



STATEMENT OF NEED AND REASONABLENESS

**In the Matter of
Proposed Amendment to and Repeal of Rules Governing
Minnesota's List of Endangered, Threatened, and Special Concern Species
in
Minnesota Rules, Chapter 6134:
*Endangered and Threatened Species***

**STATE OF MINNESOTA
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ECOLOGICAL AND WATER RESOURCES**

August 10, 2012

Conclusion

Based upon the following, the proposed amendments to and repeal of rules are both needed and reasonable.

Dated: August 15, 2012

/S/

Tom Landwehr, Commissioner
Department of Natural Resources

STATE OF MINNESOTA

**DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ECOLOGICAL AND WATER RESOURCES**

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General Statement

Introduction

Minnesota's List of Endangered, Threatened, and Special Concern Species (List) was created in 1984, amended in 1996, and has remained unchanged since. The List, established under the authority of Minnesota's Endangered and Threatened Species Statute, draws attention to species that are at greatest risk of extinction within the state; special regulations are applied to those listed as endangered or threatened. By alerting resource managers and the public to species in jeopardy, activities can be reviewed and prioritized to help preserve the diversity and abundance of Minnesota's flora and fauna. Because of the importance of this List in influencing resource use and management activities in Minnesota, it is critical that it reflect the most current information regarding the distribution, abundance, and security of species within the state. In this document, the Department of Natural Resources (DNR) describes and explains the changes it proposes to make to the status of 302 species of mammals, birds, reptiles and amphibians, fish, mollusks, jumping spiders, butterflies and moths, caddisflies, tiger beetles, leafhoppers, dragonflies, vascular plants, lichens, mosses and liverworts, and fungi.

History of Minnesota's Endangered and Threatened Species Statute

Minnesota law pertaining to endangered species dates to Laws of Minnesota 1971, Ch. 825, which listed several animal species as endangered, and granted authority to the DNR's commissioner to add or delete animals by rule. Laws of Minnesota 1974, Ch. 465 added a threatened category to the statute and dropped the listing of specific species in statute. Laws of Minnesota 1981, Ch. 285 added a special concern category to the statute, and added plants to the statute's protection. The statute, entitled *Protection of Threatened and Endangered Species* was codified into its current form (Minn. Stat., sec. 84.0895) in 1986 (Laws of Minnesota 1986, Ch. 386, art. 4, s. 9).

Content of Minnesota's Endangered and Threatened Species Statute and Associated Rule

Minnesota's Endangered and Threatened Species Statute provides protection to species at risk of extinction within Minnesota, and reflects the Legislature's intent that the DNR manage these species in such a way as to prevent their extinction and restore their viability within the bounds of the state, and thus maintain all elements of the state's native flora and fauna. The statute identifies those activities from which an endangered species is protected (Minn. Stat., sec. 84.0895, subd. 1), specifies that violation of this prohibition is a misdemeanor (Minn. Stat., sec. 84.0895, subd. 9), and authorizes peace officers or conservation officers to enforce the statute (Minn. Stat., secs. 84.0894 and 84.0895, subd. 6). It authorizes the DNR commissioner to conduct studies to support species conservation (Minn. Stat., sec. 84.0895, subd. 4), to develop programs, orders, and rules to recover species from threatened or endangered status (Minn. Stat., sec. 84.0895, subd. 5), and to designate species as endangered, threatened, or of special concern (Minn. Stat., sec. 84.0895, subd. 3, see below). While the statute and associated rule provide protection from prohibited acts to all endangered or threatened species, species of special concern receive no such protection.

The statute also provides exemptions from its stated prohibitions for: 1) plants on land classified for property tax purposes as class 2a or 2b agricultural land, or on ditches and roadways; 2) noxious weeds designated as such under statute or weeds otherwise designated as troublesome by the Department of Agriculture; 3) noxious weed control; 4) the application of pesticides or other agricultural chemicals on land adjacent to class 3 or 3b agricultural land; and 5) the accidental taking of endangered and threatened plants where the existence of the plant is not known at the time of the taking (Minn. Stat., sec. 84.0895, subd. 2). It also provides for the capture or destruction of a protected species, without permit, to avoid an immediate and demonstrable threat to human life or

property (Minn. Stat., sec. 84.0895, subd. 7(c)).

Further, the statute authorizes the DNR commissioner to issue permits, including general permits, that allow the prohibited acts if: 1) the act is for purposes of zoological, educational, or scientific study; 2) the act enhances the propagation or survival of the affected species; 3) the act prevents injury to persons or property (provided that all alternatives, including live trapping and transplantation, have been evaluated and rejected); or 4) the social and economic benefits of the act outweigh the harm caused by it (Minn. Stat., sec. 84.0895, subd. 7). The statute also authorizes the DNR commissioner to prescribe conditions to propagate a species or subspecies (Minn. Stat., sec. 84.0895, subd. 7(b)), and allows the commissioner to issue permits for forest management (Minn. Stat., sec. 84.0895, subd. 7(d)). Finally, the statute specifies that it does not apply retroactively to, or prohibit importation into the state of species (or their parts) that are legally acquired from elsewhere (Minn. Stat., sec. 84.0895, subd. 8).

Rules governing permits for the taking, possession, and disposition of endangered species were first promulgated in 1974 (Commissioners Order No. 1901; July 31, 1974). These were substantially expanded in 1985, and extended protection and permit requirements to threatened species as well (Commissioners Order No. 2204; May 30, 1985). The provisions of Commissioners Order No. 2204 were codified into rule in 1993 (18 S.R. 83; July 12, 1993), and are found at Minn. Rules, parts 6212.1800 to 6212.2300. The permit scheme, including the application process, limits on possession of specimens or their offspring, reporting, and expiration or cancellation of permits is detailed in Minn. Rules, part 6212.1800. Permitting for the rehabilitation of living specimens, possession of previously acquired specimens or specimens acquired as a result of emergency taking, and other activities otherwise prohibited is detailed in Minn. Rules, parts 6212.1900 to 6212.2300. Note that Minn. Rules, parts 6212.1800 to 6212.2300 are not the subject of this rulemaking.

History of Minnesota's List of Endangered, Threatened, and Special Concern Species

The authority to designate state endangered animals by rulemaking was first given to the DNR commissioner in Laws of Minnesota 1971, Ch. 825, although this authority was not exercised until 1984. However, the 1971 law listed several species as endangered, and provided that an "endangered" designation by the Secretary of the Interior (pursuant to federal endangered species law) would be prima facie evidence for a state designation by the commissioner. The category of threatened animals was added to the authority to designate species in Laws of Minnesota 1974, Ch. 465. The 1974 amendment reaffirmed the DNR commissioner's authority to designate state endangered and threatened animals, and dropped the statutory list of species created in 1971, but provided that "...until the commissioner adopts such a regulation, those species designated as endangered by Section 4(c)(3) of the Endangered Species Act of 1973 (Public Law 93-205) at the time of enactment thereof shall be considered endangered within the meaning of this section."

The special concern category was added to the statute in 1981, as was the application of all three categories to plants (Laws of Minnesota 1981, Ch. 285). The 1981 amendment once again directed the DNR commissioner to promulgate by rule a state List, required the convening of a voluntary Technical Advisory Committee to assist in developing the List, and specified that the List be promulgated by January 1, 1984. The 1981 amendment also provided that this committee would terminate upon adoption of the resulting rule, but in no event later than January 1, 1984. As a result, the advisory committee provision is not a part of the current statute. Minnesota's List of Endangered, Threatened, and Special Concern Species was adopted on March 5, 1984. Promulgation of this List resulted in the legislature deleting the language incorporating the federal list into Minnesota law (Laws of Minnesota 1986, Ch. 386).

The 1981 amendment also added the requirement that "The commissioner shall reevaluate the designated species list every three years after it is first adopted and make appropriate changes." (Minn. Stat., sec. 84.0895, subd. 3(c)) In 1987, the DNR published a notice in the State Register stating (in part) that "the 1984 list remains an accurate statement of the status of Minnesota's native fauna and flora and therefore the current list will remain in effect through 1990." (12 S.R. 1266, December 21, 1987) Revision of the List was initiated in 1990 and the resulting revised rule became effective on July 1, 1996. This List is codified as Minn. Rules, Ch. 6134 ("Department of Natural

Resources, Endangered and Threatened Species”). The current process of revising Minnesota’s List of Endangered, Threatened, and Special Concern Species began in 1999.

Revision of Minnesota’s List of Endangered, Threatened, and Special Concern Species

The DNR began the current process of revising Minnesota’s List of Endangered, Threatened, and Special Concern Species in 1999 by reviewing available information on the distribution and abundance of the state’s fish, wildlife, and plants. Considerable progress had been made by the DNR in completing surveys of rare species in large portions of the state since the List was amended in 1996, and a preliminary request for suggested changes to the List was emailed to DNR staff in December 1999. Also in December 1999, the DNR Commissioner requested permission from the Governor’s Office to publish a Request for Comments in the State Register. Permission was received, and a Request for Comments was published in the State Register on January 18, 2000. This Notice was also mailed to all persons and organizations that are registered with the DNR for the purpose of receiving notices of rulemaking proceedings. Subsequent staffing and workload changes within the DNR diverted staff attention from this effort, and little additional progress was made until 2004.

Between July 2004 and December 2006, DNR staff developed draft amendments to the List. For species groups about which DNR staff expertise existed (mammals, birds, reptiles and amphibians, fish, mollusks, butterflies and moths, and vascular plants), staff were relied upon to identify those species for which new information warranted a change in listed status. For those species groups for which new information was available but DNR expertise was insufficient (jumping spiders, caddisflies, tiger beetles, leafhoppers, dragonflies, lichens, mosses and liverworts, and fungi), external experts were identified and consulted. A list of all internal and external experts who participated in developing the draft amendments is included in Appendix A.

Because of the hiatus following the 2000 Request for Comments, on December 1, 2006 the DNR Commissioner informed the Governor’s Office that the rule making initiated in 2000 was being renewed, and requested permission to republish a Request for Comments in the State Register. Permission was received, and a new Request for Comments was published in the State Register on January 2, 2007. On that same date, the DNR published Draft Amendments to Minnesota’s List of Endangered, Threatened, and Special Concern Species (Draft) by posting the Draft on the DNR website at <http://www.dnr.state.mn.us/ets/rulesrevision.html>. The availability of the draft was simultaneously publicized through press releases, emails, and notices sent through the U.S. mail to a list of stakeholders compiled from various in-house mailing lists, persons and organizations who had previously expressed interest in this rulemaking, and all persons and organizations that are registered with the DNR for the purpose of receiving notices of rulemaking proceedings. The Draft included recommended changes to the status of 273 species of plants and animals, and provided brief explanations for each recommended change. The DNR website also provided an online comment form for submitting comments to the DNR. Between January 2007 and November 2009, the DNR has received 423 comments on the status of 199 species from 151 commenters. DNR staff have carefully evaluated each comment received by the DNR and have made many adjustments to the 2007 draft amendments in response to new information received through this process.

Development of the Proposed Amendments presented in this Statement of Need and Reasonableness relied upon the DNR staff’s professional judgment to evaluate whether or not a species meets the statutory definitions of “endangered,” “threatened,” or “of special concern” as provided by Minn. Stat., sec. 84.0895, subds. 3(a) and 3(b):

“Subd. 3. Designation. (a) The commissioner shall adopt rules under chapter 14, to designate species of wild animal or plant as:

(1) endangered, if the species is threatened with extinction throughout all or a significant portion of its range;

(2) threatened, if the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range; or

(3) species of special concern, if although the species is not endangered or threatened, it is extremely uncommon in this state, or has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are

not listed as threatened may be included in this category along with those species that were once threatened or endangered but now have increasing or protected, stable populations.

(b) The range of the species in this state is a factor in determining its status as endangered, threatened, or of special concern. A designation by the secretary of the interior that a species is threatened or endangered is a prima facie showing under this section.”

In applying this statutory standard, two assumptions were made to reinforce the Legislature’s intent that the DNR prevent the extinction and restore the viability of species within the bounds of the state, and thus maintain all elements of the state’s native flora and fauna:

- 1) The phrase “species of wild animal or plant” refers only to species that are believed to reproduce within the state at present, and thus only these species are considered to be eligible for designation as endangered, threatened, or of special concern. Given the limited financial resources of the DNR for use in funding research and management of listed species, this assumption allows the DNR to focus on those species for which there is some evidence of the potential for population viability and species recovery. Without this assumption, the species evaluation process would have had to consider any accidental or vagrant species that has been observed, however infrequently, in the state.
- 2) The use of the word “range” within the phrase “all or a significant portion of its range” refers to a species’ geographic distribution within this state, given that the state’s jurisdiction is limited to the territory within the state’s boundaries. This interpretation is supported by the sentence “The range of the species in this state is a factor in determining its status as endangered, threatened or of special concern.” (Minn. Stat., sec. 84.0895, subd. 3(b)). In keeping with this statutory language, whether a species is more or less common outside the state than it is within the state was considered to be of only minor significance in the species evaluation process. Thus, whether Minnesota’s population of a species was peripheral, central, or otherwise related to the species’ continental range was also considered to be of only minor significance in the species evaluation process. In fact, due to Minnesota’s location at the intersection of three major continental biomes (prairie, boreal forest, deciduous forest), the vast majority of the state’s species are at the periphery of their range, but this may or may not affect whether a species is at risk of extinction in the state.

Staff deliberation has produced the set of proposed revisions to the List that constitute the proposed amendments to Minn. Rules, Ch. 6134 presented in this Statement of Need and Reasonableness.

Statutory Authority

The Department’s statutory authority to adopt the rules is set forth in Minnesota Statutes, section 84.0895, subd. 3(a), which authorizes and mandates the Commissioner of Natural Resources to adopt rules under Minn. Stat., Ch. 14 to designate species of wild animals or plants as endangered, threatened, or of special concern.

Regulatory Analysis

Description of the Classes of Persons Affected by the Proposed Rules

The proposed rules will affect persons whose activities may result in the prohibited acts of taking, possessing, importing, transporting, or selling any portion of a species that is proposed to be added to or removed from endangered or threatened status. The proposed rules may also affect persons whose activities have a potential to affect a species that is proposed to be added to special concern status.

The activities referenced above could include forest management, mining, infrastructure (e.g., road, bridge, railroad, pipeline, power generation, landfill, airport, wastewater treatment) construction and maintenance, residential or commercial land development, environmental consulting, propagation and sale of horticultural species, aquatic plant management, falconry, minnow harvest, education, and research.

Probable Costs to the Agency or Other Agencies from the Proposed Rule

The proposed rule will result in a net 49% increase (from 197 to 293) in the number of endangered or threatened species receiving regulatory protection. This increase may result in an increase in the amount of DNR effort invested in endangered species environmental review and in takings permit

issuance. However, most species proposed for listing as endangered or threatened exist in the same locations as do other already listed endangered or threatened species, so the increase in staff effort will be much less than proportionate to the increase in number of protected species.

The proposed rules will result in a net 15% increase (from 20 to 23) in the number of mussel species receiving regulatory protection as endangered or threatened. The DNR and the Minnesota Department of Transportation (MDOT) have a history of close coordination when proposed bridge construction projects may result in the taking of protected mussels. The goal of this coordination is to avoid, minimize, and/or mitigate impacts to mussels, and can result in additional project expense for MDOT. However, the mussel species proposed for endangered or threatened status generally exist in the same locations as do other already listed endangered or threatened species, so the DNR anticipates that the effect of these additional species on MDOT project costs will be minimal.

Determination of Less Costly or Less Intrusive Methods for Achieving the Purpose of the Proposed Rules

The proposed rules will identify species at the greatest risk of extinction within the state, and which meet the statutory definitions of endangered, threatened, and special concern as provided by Minn. Stat., sec. 84.0895. The purpose of these designations is to address the mandate of Minnesota's Endangered and Threatened Species Statute by alerting resource managers, landowners, and the public to species in jeopardy so that activities can be reviewed and prioritized to help preserve the diversity and abundance of Minnesota's flora and fauna. There are no less costly or less intrusive methods available for achieving this outcome, since any method that fails to identify species at the greatest risk of extinction will also fail to affect the recovery and conservation of those species.

Description of Alternate Methods for Achieving the Purpose of the Proposed Rules

The designation of species as endangered, threatened, and of special concern provides the DNR, other resource management agencies, landowners, and the public with a list of priority species (comprising a very small percentage of all species occurring within the state) that warrant additional attention in order to avoid their extinction from the state. General improvement in the use and management of land and water within the state can certainly impart some limited benefits to species at risk of extinction, but without the focus provided by this designation, there is no assurance that these species will receive the protection they need. Similarly, public education regarding the broader use and management of land and water within the state may benefit some at risk species, but without the designation provided by the proposed rule, there is no guarantee that the mandate of the Endangered and Threatened Species Statute will be addressed. No alternative to the designation of species as endangered, threatened, or of special concern will achieve the mandated outcomes.

Probable Costs of Complying with the Proposed Rules

The proposed rule will increase the number of endangered or threatened species receiving regulatory protection from 197 to 293. By definition, most of these species are very rare and are known to exist at very few locations within the state. Also, most endangered or threatened species occur in undisturbed habitats that also support other species previously designated as endangered or threatened. In such cases, the proposed rule will have no additional regulatory impact. However, there will be cases in which a species proposed as endangered or threatened in this rulemaking occurs in a location where no previously designated endangered or threatened species exists.

When a proposed activity has the potential to take an endangered or threatened species, the activity may need to be modified in order to avoid the taking. This avoidance of taking may result in additional costs to the proposed activity. The DNR does not have data to quantify the additional cost of avoidance of taking, since this type of modification is made during the design phase of a proposed activity, and cannot be separated from other costs.

When the taking of an endangered or threatened species by a proposed activity cannot be avoided, consultation between the DNR and the proposer of the activity may result in the issuance of a takings permit in conjunction with some form of mitigation. Analysis of the cost of mitigation can be separated into two general categories, as follows.

Twenty takings permits have been issued in the past decade for proposed bridge or pipeline projects in

which the take of endangered or threatened freshwater mussels could not be avoided. In all cases, the proposer of the activity was a utility company, a large city, a county, or the Minnesota Department of Transportation. In most cases, the project proposer was required to remove and transplant the mussels to a nearby location, an expense borne by the proposer of the activity. The DNR does not know the actual cost of these mitigation actions, but a typical mussel relocation project costs \$5,000 - \$60,000. In four recent cases, the DNR chose to apply the cost of mussel relocation to other mussel conservation activities. These mitigation payments ranged from \$43,993 to \$90,000.

An additional 20 takings permits have been issued in the past decade for proposed projects in which the take of endangered or threatened plants could not be avoided. In all cases, the proposer of the activity was a land development, utility, mining, or waste management company, a county, an airport authority, or the Minnesota Department of Transportation. In several of these cases, experimental relocation of the plants was accepted as mitigation, but in most cases, compensatory mitigation was accepted by the DNR in the form of funds necessary to acquire and protect land supporting a plant population equivalent to the population to be taken by the project. Depending upon land values and the size of the plant population to be taken, the cost of compensatory mitigation in these cases has ranged from \$12,000 to \$500,000.

The proposed rules will also have an impact on a limited number of small businesses engaging in the prohibited acts of taking, importing, transporting, selling, purchasing, disposing, or possessing any portion of a species proposed as endangered or threatened in this rulemaking. These businesses may include taxidermists, pet dealers, craftspersons, tree nurseries, landscapers, and loggers. Such businesses may be asked to consult with the DNR to modify their activity to avoid or minimize the taking of an endangered or threatened species, may be required to apply for a permit to continue the activity, or may be prohibited from conducting the activity. While a permit is currently provided at no cost to the recipient, modification or prohibition of the activity may result in a cost to these businesses. The DNR has no effective way in which to estimate this cost.

Probable Cost or Consequences of Not Adopting the Proposed Rules

The consequence of not adopting the proposed rules would be that the species that are the subject of the proposed rule would not receive the protection and attention they warrant, and the DNR would default on its responsibility to designate species as endangered, threatened, or of special concern as mandated in Minn. Stat., sec. 84.0895.

Assessment of Differences between the Proposed Rules and Existing Federal Regulations

The federal Endangered Species Act (16 USC 1531-1544) requires the U.S. Department of Interior to designate species as endangered or threatened according to a set of definitions and criteria that are distinct from those in state law. Federal designation reflects a species' at-risk status at the regional, national, or global scale, while designation in the proposed rule considers a species' status at only the state scale, regardless of the species' status outside of Minnesota. This difference in scale of analysis is needed and reasonable, since the intent of state law is to prevent extinction of a species within Minnesota, while the intent of federal designation is to prevent extinction at the regional, national, or global scale.

Assessment of the Cumulative Effect of the Proposed Rules with Other Federal and State Regulations

For this assessment, "cumulative effect" means the incremental impact of the proposed rule in addition to other rules, regardless of what state or federal agency has adopted the other rules. Cumulative effects can result from individually minor but collectively significant rules adopted over a period of time.

The proposed rule has no cumulative effect with any other state or federal regulation. No other state regulation specifically designates species as endangered, threatened, or of special concern, but designation of a species as endangered or threatened (E/T) grants the species regulatory protection, and other state laws also afford regulatory protection to certain species. Most prominently, Minn. Stat. sec. 97A.015, subd. 39 designates most vertebrates as "protected wild animal(s)," and Minn. Stat. sec. 97A.405 provides some regulatory protection to those species. However, the protection given an E/T species is not cumulative with the protection given a protected wild animal, but rather is

more restrictive than the protection given a protected wild animal and is therefore a substitute for the lower level of protection. Similarly, Minn. Stat. sec. 18H.18 restricts collecting of certain wildflower species. Again, however, protection given an E/T species is not cumulative with the protection given certain wildflowers, but rather is far more restrictive than the protection given those wildflowers, and again is a substitute for the lower level of protection. Further, most species (including all small mammals, snakes, bats, and salamanders, all invertebrates except for mussels, and almost all vascular plants) are not protected under any other state law. No cumulative effect with any other state regulation exists for any of Minnesota's animal and plant species affected by the proposed rule.

The federal Endangered Species Act (16 USC 1531-1544; "federal ESA") requires the U.S. Department of Interior to designate species as endangered or threatened according to a set of definitions and criteria that are distinct from those in state law. Only 13 of Minnesota's thousands of animal and plant species are currently designated as endangered or threatened under the federal ESA, and the proposed rule contains no change in state regulatory protection for any of these species. Under the federal ESA, federally designated animals receive regulatory protection that is far more restrictive than that afforded by state designation as E/T, and so is a substitute for state protection rather than having a cumulative effect. In contrast, federally designated plants receive regulatory protection only if the plant is growing on federal land or if an action is federally funded or permitted, in which case the federal regulatory protection is far more restrictive than that afforded by state designation as E/T, and so is a substitute for state protection rather than having a cumulative effect. Otherwise, federally designated plants receive no federal regulatory protection, and there is no cumulative effect resulting from the species' E/T designation under state law. No cumulative effect with any federal regulation exists for any of Minnesota's animal and plant species affected by the proposed rule.

Performance-Based Rules

The regulatory objective of the proposed rules is to identify as accurately as possible those species that meet the statutory definition of endangered, threatened, and of special concern. A species is assigned to one of these designations only if information is available to support the conclusion that the species' status meets the designation's statutory definition. DNR staff and external advisors whose deliberations have produced the proposed rule are all highly trained experts who make an on-going effort to remain well-informed regarding the biology and taxonomy of the species upon which they focus, as well as the science of assessing the vulnerability of species to extinction. All available information is carefully considered in making these determinations.

The intent of Minnesota's Endangered and Threatened Species Statute is to preserve the diversity and abundance of Minnesota's flora and fauna by protecting and managing species included in the List. By designating endangered, threatened, and special concern species as is proposed in these rules, the DNR ensures that only those species most urgently in need of recovery will be the focus of the DNR's rare species conservation efforts.

The DNR accepts recommendations from the public and other regulated parties regarding a change in the designated status of a species at any time, and the DNR will continue to revise the List as new information becomes available.

Consultation with MMB on Local Government Impact

As required by Minnesota Statutes, section 14.131, the DNR will consult with the Minnesota Management and Budget (MMB). The DNR will do this by sending the MMB copies of the documents that are sent to the Governor's Office for review and approval on the same day they are sent to the Governor's office. The DNR will do this before publication of the Notice of Intent to Adopt Rules. The documents will include: the Governor's Office Proposed Rule and SONAR Form; the proposed rules; and the SONAR. The DNR will submit a copy of the cover correspondence and any response received from Minnesota Management and Budget to the Office of Administrative Hearing at the hearing or with the documents it submits for Administrative Law Judge review.

Determination about Rules Requiring Local Implementation

As required by Minnesota Statutes, sec. 14.128, sub. 1, the DNR has considered whether these proposed rules will require a local government to adopt or amend any ordinance or other regulation in order to comply with these rules. The agency has determined that they require no local government implementation because implementation of these rules and the List they modify is accomplished exclusively through their application under Minnesota's Endangered and Threatened Species Statute, which is the responsibility of the DNR and not of local governments.

Cost of Complying for Small Business or Small City

As required by Minnesota Statutes, sec. 14.127, the Department has considered whether the cost of complying with the proposed rules in the first year after the rules take effect will exceed \$25,000 for any small business or small city. The Department conducted the following analysis and has determined that the cost of complying with the proposed rules in the first year after the rules take effect is unlikely to exceed \$25,000 for any small business or small city.

The proposed amendments to Minn. Rules, Ch. 6134 may have an impact on small businesses engaging in the prohibited acts of taking, import, transport, sale, purchase, disposal, or possession of any portion of a species proposed as endangered or threatened in this rulemaking. These businesses may include taxidermists, pet dealers, craftspersons, tree nurseries, landscapers, loggers, and others who may use or take protected species or their parts in their activities. Such businesses may be asked to consult with the DNR to modify the activity to avoid the taking or may be required to apply for a permit to continue these activities. A permit is currently provided at no cost to the recipient. Modification of activities may result in a small cost to these businesses, but will not exceed \$25,000 in the first year after the rules take effect. In some cases, as discussed in the Regulatory Analysis section of this SONAR, mitigation for a permitted take may be required. However, in the past decade there are no cases in which such mitigation was required of a small business or small city.

Alternative Format

Upon request, this Statement of Need and Reasonableness can be made available in an alternative format, such as large print, Braille, or cassette tape. To make a request, contact Richard Baker at Department of Natural Resources, 500 Lafayette Road, St. Paul, MN, 55155-4025, phone 651-259-5073, fax 651-296-1811, and richard.baker@state.mn.us. TTY users may call the Department of Natural Resources at 1-800-657-3929 or 651-296-5484.

Additional Notice

The Notice Plan for these rules includes giving notice as required by statute. The DNR will:

- mail the Notice of Intent to Adopt Rules to everyone who has registered to be on the Department's rulemaking mailing list under Minnesota Statutes, section 14.14, subdivision 1a;
- give notice to the Legislature per Minnesota Statutes, section 14.116;
- mail the Notice of Intent to Adopt Rules to all persons and organizations who were notified of the availability of the Proposed Amendments in January, 2007;
- mail the Notice of Intent to Adopt Rules to all persons and organizations who submitted comments to the DNR on the Proposed Amendments between January 2007 and the present;
- mail the Notice of Intent to Adopt Rules to environmental and social organizations, businesses, individuals, state legislators who have an interest in these areas, and staff from bordering states that are responsible for rule making;
- distribute news releases to the media that detail the major parts of the rule; and
- use the DNR web site to inform the public of our intent to adopt rules and take requests for hearings

Witnesses

If these rules go to public hearing, the witnesses listed below may testify on behalf of the DNR, as necessary, in support of the need for and reasonableness of the rules. If these witnesses are needed to testify, they will be available to answer questions about the development and the content of the rules. The witnesses for the DNR who are employees of the DNR include:

Richard Baker, Zoologist, Endangered Species Coordinator, and Coordinator of this rulemaking
Robert Dana, Entomologist
Michael Davis, Malacologist
Carol Hall, Herpetologist
Krista Larson, Zoologist
Gerda Nordquist, Mammologist
Welby Smith, Botanist
Steven Stucker, Ornithologist
Nick Proulx, Ichthyologist

Minnesota Department of Natural Resources, 500 Lafayette Rd., St. Paul, MN 55155-4025
612-259-5100

Any other employee of the Minnesota Department of Natural Resources.

The witnesses for the DNR who are not employees of the DNR include:

Jay Hatch, Ichthyologist, University of Minnesota
Ralph Holzenthal, Entomologist, University of Minnesota
Ron Huber, Entomologist, Burnsville, MN
Jan Janssens, Bryologist, University of Minnesota
David McLaughlin, Mycologist, University of Minnesota
Kurt Mead, Entomologist, Finland, MN
Konrad Schmidt, Ichthyologist, St. Paul, MN
Clifford Wetmore, Lichenologist, University of Minnesota

Rule-By-Rule Analysis

The amendment of Minn. Rules, Ch. 6134 is necessary because the DNR is required by law to periodically assess the status of all species of wild animals and plants in the state, and to adjust that status to insure the continued presence of those species within the state. The need and reasonableness of each proposed change in status of a species is set forth in the Species Status Sheets that follow. Each Species Status Sheet identifies the species the status of which is proposed to change, the current and proposed status, and the basis for the proposed change in status. Selected references are also provided. The Species Status Sheets are organized by taxonomic group in the order they occur within the parts and subparts of Minn. Rules, Ch. 6134 (i.e., mammals, birds, reptiles and amphibians, fish, mollusks, jumping spiders, butterflies and moths, caddisflies, tiger beetles, leafhoppers, dragonflies, vascular plants, lichens, mosses and liverworts, and fungi). Within each taxonomic group, however, the Species Status Sheets are organized alphabetically by scientific name (rather than by proposed status) to facilitate the location of the status sheet for a particular species. A summary list of these species, and the page on which each taxonomic group begins, precedes the Species Status Sheets.

Because species taxonomy is a dynamic science that regularly applies new insights to the relationships among species, the proposed rules update the scientific names of 64 species for which there is no proposed change in status. A change in the scientific name of a taxon may reflect either a combining of two previously-recognized taxonomic entities into one taxon, the splitting of a single previously-recognized taxonomic entity into two or more taxa, or the reorganization of the relationships among taxa with no combining or splitting involved. In each case included in this amendment, the DNR has sought to reflect the most recent and accurate science regarding these relationships in the scientific names used. However, in the proposed rule, all common names, taxonomic authors, and taxonomic references have been removed from Minn. Rules, Ch. 6134. These common names, authors, and references are less relevant, less reliable, and subject to more rapid change than was the case when Minn. Rules, Ch. 6134 was originally created.

In the 26 cases where both a change in status and a change in scientific name is applied to one species, both the old name (as currently included in Minn. Rules, Ch. 6134) and the new name are provided on the Species Status Sheet. In these cases, the Species Status Sheet can be found alphabetically by the “old” scientific name (that which is currently in Minn. Rules, Ch. 6134).

CHANGES IN SCIENTIFIC NAMES
NOT ACCOMPANIED BY A PROPOSED CHANGE IN STATUS

<u>Old Scientific Name</u>	<u>New Scientific Name</u>	<u>Status</u>
<u>Mammals</u>		
<i>Cervus elaphus</i>	<i>Cervus canadensis</i>	SC
<i>Felis concolor</i>	<i>Puma concolor</i>	SC
<i>Phenacomys intermedius</i>	<i>Phenacomys ungava</i>	SC
<i>Pipistrellus subflavus</i>	<i>Perimyotis subflavus</i>	SC
<u>Birds</u>		
<i>Dendroica cerulea</i>	<i>Setophaga cerulea</i>	SC
<i>Gallinula chloropus</i>	<i>Gallinula galeata</i>	SC
<i>Larus pipixcan</i>	<i>Leucophaeus pipixcan</i>	SC
<i>Seiurus motacilla</i>	<i>Parkesia motacilla</i>	SC
<i>Speotyto cunicularia</i>	<i>Athene cunicularia</i>	E
<i>Wilsonia citrina</i>	<i>Setophaga citrina</i>	SC
<u>Reptiles and Amphibians</u>		
<i>Clemmys insculpta</i>	<i>Glyptemys insculpta</i>	T
<i>Eumeces fasciatus</i>	<i>Plestiodon fasciatus</i>	SC
<u>Mollusks</u>		
<i>Lampsilis higginsii</i>	<i>Lampsilis higginsii</i>	E
<u>Jumping Spiders</u>		
<i>Metaphidippus arizonensis</i>	<i>Pelegrina arizonensis</i>	SC
<u>Butterflies and Moths</u>		
<i>Atrytone arogos</i>	<i>Atrytone arogos iowa</i>	SC
<i>Erebia disa mancinus</i>	<i>Erebia mancinus</i>	SC
<i>Erynnis persius</i>	<i>Erynnis persius persius</i>	E
<i>Hesperia comma assiniboia</i>	<i>Hesperia assiniboia</i>	E
<u>Dragonflies</u>		
<i>Ophiogomphus anomalis</i>	<i>Ophiogomphus anomalus</i>	SC
<u>Vascular Plants</u>		
<i>Achillea sibirica</i>	<i>Achillea alpina</i>	T
<i>Ammophila breviligulata</i>	<i>Ammophila breviligulata</i> ssp. <i>breviligulata</i>	T
<i>Androsace septentrionalis</i> ssp. <i>puberulenta</i>	<i>Androsace septentrionalis</i>	SC
<i>Arabis holboellii</i> var. <i>retrofracta</i>	<i>Boechera retrofracta</i>	T
<i>Asplenium trichomanes</i>	<i>Asplenium trichomanes</i> ssp. <i>trichomanes</i>	T
<i>Astragalus alpinus</i>	<i>Astragalus alpinus</i> var. <i>alpinus</i>	E
<i>Astragalus flexuosus</i>	<i>Astragalus flexuosus</i> var. <i>flexuosus</i>	SC
<i>Astragalus missouriensis</i>	<i>Astragalus missouriensis</i> var. <i>missouriensis</i>	SC
<i>Baptisia alba</i>	<i>Baptisia lactea</i> var. <i>lactea</i>	SC
<i>Baptisia bracteata</i> var. <i>leucophaea</i>	<i>Baptisia bracteata</i> var. <i>glabrescens</i>	SC
<i>Botrychium lanceolatum</i>	<i>Botrychium lanceolatum</i> ssp. <i>angustisegmentum</i>	T
<i>Cacalia suaveolens</i>	<i>Hasteola suaveolens</i>	E

<u>Old Scientific Name</u>	<u>New Scientific Name</u>	<u>Status</u>
<u>Vascular Plants (cont.)</u>		
<i>Cirsium hillii</i>	<i>Cirsium pumilum</i> var. <i>hillii</i>	SC
<i>Cristatella jamesii</i>	<i>Polanisia jamesii</i>	E
<i>Cymopterus acaulis</i>	<i>Cymopterus glomeratus</i>	SC
<i>Eleocharis olivacea</i>	<i>Eleocharis flavescens</i> var. <i>olivacea</i>	T
<i>Eleocharis parvula</i>	<i>Eleocharis coloradoensis</i>	SC
<i>Empetrum eamesii</i>	<i>Empetrum atropurpureum</i>	E
<i>Euphrasia hudsoniana</i>	<i>Euphrasia hudsoniana</i> var. <i>ramosior</i>	SC
<i>Gentianella amarella</i> ssp. <i>acuta</i>	<i>Gentianella amarella</i>	SC
<i>Glaux maritima</i>	<i>Lysimachia maritima</i>	E
<i>Helictotrichon hookeri</i>	<i>Avenula hookeri</i>	SC
<i>Lechea tenuifolia</i>	<i>Lechea tenuifolia</i> var. <i>tenuifolia</i>	E
<i>Lesquerella ludoviciana</i>	<i>Physaria ludoviciana</i>	E
<i>Littorella uniflora</i>	<i>Littorella americana</i>	SC
<i>Machaeranthera pinnatifida</i>	<i>Xanthisma spinulosum</i> var. <i>spinulosum</i>	SC
<i>Oryzopsis hymenoides</i>	<i>Achnatherum hymenoides</i>	E
<i>Paronychia fastigiata</i>	<i>Paronychia fastigiata</i> var. <i>fastigiata</i>	E
<i>Polygonum careyi</i>	<i>Persicaria careyi</i>	SC
<i>Psoralidium tenuiflora</i>	<i>Psoralidium tenuiflorum</i>	E
<i>Ruppia maritima</i>	<i>Ruppia cirrhosa</i>	SC
<i>Scutellaria ovata</i>	<i>Scutellaria ovata</i> var. <i>versicolor</i>	T
<i>Sedum integrifolium</i> ssp. <i>leedyi</i>	<i>Rhodiola integrifolia</i> ssp. <i>leedyi</i>	E
<i>Senecio canus</i>	<i>Packera cana</i>	E
<i>Silene drummondii</i>	<i>Silene drummondii</i> ssp. <i>drummondii</i>	SC
<i>Stellaria longipes</i>	<i>Stellaria longipes</i> ssp. <i>longipes</i>	SC
<i>Subularia aquatica</i>	<i>Subularia aquatica</i> ssp. <i>americana</i>	T
<i>Triplasis purpurea</i>	<i>Triplasis purpurea</i> var. <i>purpurea</i>	SC
<i>Viola lanceolata</i>	<i>Viola lanceolata</i> var. <i>lanceolata</i>	T
<i>Waldsteinia fragarioides</i>	<i>Waldsteinia fragarioides</i> var. <i>fragarioides</i>	SC
<i>Woodsia scopulina</i>	<i>Woodsia scopulina</i> ssp. <i>laurentiana</i>	T

Lichens

<i>Anaptychia setifera</i>	<i>Anaptychia crinalis</i>	SC
<i>Cetraria aurescens</i>	<i>Ahtiana aurescens</i>	SC
<i>Cetraria oakesiana</i>	<i>Allocetraria oakesiana</i>	T

Mosses and Liverworts

<i>Schistostegia pennata</i>	<i>Schistostegia pennata</i>	E
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Fungi

<i>Fuscoboletinus weaverae</i>	<i>Suillus weaverae</i>	E
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**SUMMARY OF SPECIES FOR WHICH
A CHANGE IN STATUS IS PROPOSED AND A STATUS SHEET IS PROVIDED**

Notations Used

E	Endangered
T	Threatened
SC	Special Concern
N	None (location records maintained by DNR, in most cases)
N (X)	None, and probably extirpated from Minnesota (location records maintained by DNR, in most cases)
--	None (location records <i>not</i> yet maintained by DNR)
*	Change in scientific name accompanies change in status

<u>Common Name</u>	<u>Scientific Name</u>	<u>Current Status</u>	<u>Proposed Status</u>
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MAMMALS - PAGE 20

Moose	<i>Alces americanus</i>	--	SC
Gray Wolf	<i>Canis lupus</i>	SC	N
Big Brown Bat	<i>Eptesicus fuscus</i>	--	SC
Canada Lynx	<i>Lynx canadensis</i>	--	SC
Little Brown Myotis	<i>Myotis lucifugus</i>	--	SC
Northern Grasshopper Mouse	<i>Onychomys leucogaster</i>	N	SC
Western Harvest Mouse	<i>Reithrodontomys megalotis</i>	N	SC
Richardson's Ground Squirrel	<i>Spermophilus richardsonii</i>	N	SC
Northern Pocket Gopher	<i>Thomomys talpoides</i>	SC	T

BIRDS - PAGE 30

Northern Goshawk	<i>Accipiter gentilis</i>	N	SC
Boreal Owl	<i>Aegolius funereus</i>	N	SC
Henslow's Sparrow	<i>Ammodramus henslowii</i>	E	T
Lark Sparrow	<i>Chondestes grammacus</i>	--	SC
Trumpeter Swan	<i>Cygnus buccinator</i>	T	SC
Peregrine Falcon	<i>Falco peregrinus</i>	T	SC
Bald Eagle	<i>Haliaeetus leucocephalus</i>	SC	N
Loggerhead Shrike	<i>Lanius ludovicianus</i>	T	E
Horned Grebe	<i>Podiceps auritus</i>	T	E
Purple Martin	<i>Progne subis</i>	--	SC
Bell's Vireo	<i>Vireo bellii</i>	N	SC

REPTILES AND AMPHIBIANS - PAGE 42

Spotted Salamander	<i>Ambystoma maculatum</i>	N	SC
Great Plains Toad	<i>Anaxyrus cognatus</i>	--	SC
Snapping Turtle	<i>Chelydra serpentina</i>	SC	N
* Ratsnake	<i>Elaphe obsoleta</i>	SC	T
Mudpuppy	<i>Necturus maculosus</i>	--	SC

FISH - PAGE 49

Skipjack Herring	<i>Alosa chrysochloris</i>	SC	E
* Crystal Darter	<i>Ammocrypta asprella</i>	SC	E
American Eel	<i>Anguilla rostrata</i>	--	SC

<u>Common Name</u>	<u>Scientific Name</u>	<u>Current Status</u>	<u>Proposed Status</u>
<u>FISH (cont.)</u>			
Redside Dace	<i>Clinostomus elongatus</i>	N	SC
Nipigon Cisco	<i>Coregonus nipigon</i>	--	SC
Lake Chub	<i>Couesius plumbeus</i>	--	SC
* Gravel Chub	<i>Erimystax x-punctata</i>	SC	T
Bluntnose Darter	<i>Etheostoma chlorosoma</i>	N	SC
Plains Topminnow	<i>Fundulus sciadicus</i>	SC	T
Mississippi Silvery Minnow	<i>Hybognathus nuchalis</i>	--	SC
Black Buffalo	<i>Ictiobus niger</i>	SC	T
Warmouth	<i>Lepomis gulosus</i>	--	SC
Longear Sunfish	<i>Lepomis peltastes</i>	--	SC
Redfin Shiner	<i>Lythrurus umbratilis</i>	--	SC
Black Redhorse	<i>Moxostoma duquesnei</i>	N	SC
* Pallid Shiner	<i>Notropis amnis</i>	SC	E
Pugnose Shiner	<i>Notropis anogenus</i>	SC	T
Slender Madtom	<i>Noturus exilis</i>	SC	E
Suckermouth Minnow	<i>Phenacobius mirabilis</i>	--	SC
Flathead Chub	<i>Platygobio gracilis</i>	--	SC
Pygmy Whitefish	<i>Prosopium coulterii</i>	--	SC

MOLLUSKS - PAGE 70

Flat Floater	<i>Anodonta suborbiculata</i>	--	SC
Spectaclecase	<i>Cumberlandia monodonta</i>	T	E
Purple Wartyback	<i>Cyclonaias tuberculata</i>	T	E
Eastern Elliptio	<i>Elliptio complanata</i>	--	SC
Spike	<i>Elliptio dilatata</i>	SC	T
Snuffbox	<i>Epioblasma triquetra</i>	T	E
Rogers' Snaggletooth Snail	<i>Gastrocopta rogersensis</i>	--	SC
Fluted-shell	<i>Lasmigona costata</i>	SC	T
Pondmussel	<i>Ligumia subrostrata</i>	--	T
Washboard	<i>Megalanaia nervosa</i>	T	E
Minnesota Pleistocene Ambersnail	<i>Novisuccinea</i> n. sp. Minnesota A	T	N
Iowa Pleistocene Ambersnail	<i>Novisuccinea</i> n. sp. Minnesota B	E	N
Hickorynut	<i>Obovaria olivaria</i>	SC	N
Eastern Flat-whorl Snail	<i>Planogyra asteriscus</i>	--	SC
*Round Pigtoe	<i>Pleurobema coccineum</i>	T	SC
Wartyback	<i>Quadrula nodulata</i>	E	T
Salamander Mussel	<i>Simpsonaia ambigua</i>	T	E
Black Striate Snail	<i>Striatula ferrea</i>	--	SC
Pistolgrip	<i>Tritogonia verrucosa</i>	T	E
Fawnsfoot	<i>Truncilla donaciformis</i>	--	T
Midwest Pleistocene Vertigo	<i>Vertigo hubrichti hubrichti</i>	E	N
Variable Pleistocene Vertigo	<i>Vertigo hubrichti variabilis</i> n. subsp.	T	N
Dull Gloss	<i>Zonitoides limatulus</i>	--	SC

JUMPING SPIDERS - PAGE 94

A Species of Jumping Spider	<i>Habronattus calcaratus maddisoni</i>	--	SC
A Species of Jumping Spider	<i>Habronattus viridipes</i>	--	SC
A Species of Jumping Spider	<i>Marpissa formosa</i>	--	SC
A Species of Jumping Spider	<i>Marpissa grata</i>	SC	N
A Species of Jumping Spider	<i>Tutelina formicaria</i>	SC	T

<u>Common Name</u>	<u>Scientific Name</u>	<u>Current Status</u>	<u>Proposed Status</u>
<u>BUTTERFLIES AND MOTHS - PAGE 100</u>			
Abbreviated Underwing	<i>Catocala abbreviatella</i>	--	SC
Whitney's Underwing	<i>Catocala whitneyi</i>	--	SC
Dakota Skipper	<i>Hesperia dacotae</i>	T	E
Ottoe Skipper	<i>Hesperia ottoe</i>	T	E
* Poweshiek Skipperling	<i>Oarisma powesheik</i>	SC	E
Leadplant Flower Moth	<i>Schinia lucens</i>	--	SC

CADDISFLIES - PAGE 107

A Species of Northern Caddisfly	<i>Anabolia ozburni</i>	--	SC
* A Species of Northern Caddisfly	<i>Asynarchus rossi</i>	SC	T
A Species of Long Horned Caddisfly	<i>Ceraclea brevis</i>	SC	N
Vertrees's Ceraclea Caddisfly	<i>Ceraclea vertreesi</i>	SC	N
Headwaters Chilostigman Caddisfly	<i>Chilostigma itasca</i>	E	T
A Species of Caddisfly	<i>Goera stylata</i>	--	T
A Species of Purse Casemaker Caddisfly	<i>Hydroptila novicola</i>	SC	N
A Species of Purse Casemaker Caddisfly	<i>Hydroptila quinola</i>	--	SC
A Species of Purse Casemaker Caddisfly	<i>Hydroptila rono</i>	--	T
A Species of Purse Casemaker Caddisfly	<i>Hydroptila waskesia</i>	--	E
A Species of Northern Caddisfly	<i>Ironoquia punctatissima</i>	--	T
A Species of Caddisfly	<i>Lepidostoma libum</i>	--	T
A Species of Northern Caddisfly	<i>Limnephilus janus</i>	--	E
A Species of Northern Caddisfly	<i>Limnephilus secludens</i>	--	E
A Species of Purse Casemaker Caddisfly	<i>Ochrotrichia spinosa</i>	--	E
A Species of Long Horned Caddisfly	<i>Oecetis ditissa</i>	--	T
A Species of Purse Casemaker Caddisfly	<i>Oxyethira ecornuta</i>	SC	T
A Species of Net-spinning Caddisfly	<i>Parapsyche apicalis</i>	--	T
A Species of Tube Casemaker Caddisfly	<i>Polycentropus glacialis</i>	--	T
A Species of Tube Casemaker Caddisfly	<i>Polycentropus milaca</i>	SC	E
A Species of Saddle Casemaker Caddisfly	<i>Protophila erotica</i>	--	SC
A Species of Saddle Casemaker Caddisfly	<i>Protophila talola</i>	SC	N
A Species of Caddisfly	<i>Setodes guttatus</i>	SC	N
A Species of Long Horned Caddisfly	<i>Triaenodes flavescens</i>	--	SC
A Species of Long Horned Caddisfly	<i>Ylodes frontalis</i>	--	T

TIGER BEETLES - PAGE 133

Laurentian Tiger Beetle	<i>Cicindela denikei</i>	T	SC
Hairy-necked Tiger Beetle	<i>Cicindela hirticollis rhodensis</i>	SC	E

LEAFHOPPERS - PAGE 136

Hill Prairie Shovelhead Leafhopper	<i>Attenuipyga vanduzeei</i>	--	SC
Caped Leafhopper	<i>Macrosteles clavatus</i>	--	SC

<u>Common Name</u>	<u>Scientific Name</u>	<u>Current Status</u>	<u>Proposed Status</u>
<u>DRAGONFLIES - PAGE 139</u>			
Zigzag Darner	<i>Aeshna sitchensis</i>	--	SC
Subarctic Darner	<i>Aeshna subarctica</i>	--	SC
Ocellated Darner	<i>Boyeria grafiana</i>	--	SC
Pygmy Snaketail	<i>Ophiogomphus howei</i>	--	SC
St. Croix Snaketail	<i>Ophiogomphus susbehcha</i>	SC	T
Quebec Emerald	<i>Somatochlora brevicincta</i>	--	SC
Plains Emerald	<i>Somatochlora ensigera</i>	--	SC
Forcipate Emerald	<i>Somatochlora forcipata</i>	--	SC

VASCULAR PLANTS - PAGE 148

Allegheny Vine	<i>Adlumia fungosa</i>	N	SC
Moschatel	<i>Adoxa moschatellina</i>	SC	N
* Rough Bentgrass	<i>Agrostis geminata</i>	SC	N
Winter Bentgrass	<i>Agrostis hyemalis</i>	N	E
Narrow-leaved Water Plantain	<i>Alisma gramineum</i>	N	SC
Nodding Wild Onion	<i>Allium cernuum</i>	T	SC
* Wild Chives	<i>Allium schoenoprasum</i> var. <i>sibiricum</i>	T	E
Smooth Rock Cress	<i>Arabis laevigata</i> var. <i>laevigata</i>	N	SC
Green Dragon	<i>Arisaema dracontium</i>	N	SC
Slimspike Three-awn	<i>Aristida longespica</i> var. <i>geniculata</i>	N	E
Seaside Three-awn	<i>Aristida tuberculosa</i>	SC	T
Great Indian Plantain	<i>Arnoglossum reniforme</i>	N	T
Clasping Milkweed	<i>Asclepias amplexicaulis</i>	SC	T
* Short's Aster	<i>Aster shortii</i>	T	SC
Water-hyssop	<i>Bacopa rotundifolia</i>	SC	T
Stream Parsnip	<i>Berula erecta</i>	--	T
Discoïd Beggarticks	<i>Bidens discoidea</i>	N	SC
Tailed Grapefern	<i>Botrychium acuminatum</i>	N	SC
Upswept Moonwort	<i>Botrychium ascendens</i>	N	E
Slender Moonwort	<i>Botrychium lineare</i>	N	E
Goblin Fern	<i>Botrychium mormo</i>	SC	T
Blunt-lobed Grapefern	<i>Botrychium oneidense</i>	E	T
Pale Moonwort	<i>Botrychium pallidum</i>	E	SC
St. Lawrence Grapefern	<i>Botrychium rugulosum</i>	T	SC
Spatulate Moonwort	<i>Botrychium spathulatum</i>	N	E
Purple Reedgrass	<i>Calamagrostis purpurascens</i>	SC	E
Larger Water Starwort	<i>Callitriche heterophylla</i>	SC	T
Cuckoo Flower	<i>Cardamine pratensis</i> var. <i>palustris</i>	N	T
Carey's Sedge	<i>Carex careyana</i>	T	E
Raven's Foot Sedge	<i>Carex crus-corvi</i>	SC	N (X)
Gray's Sedge	<i>Carex grayi</i>	N	SC
Hooker's Sedge	<i>Carex hookerana</i>	--	SC
* Field Sedge	<i>Carex katahdinensis</i>	T	N
Intermediate Sedge	<i>Carex media</i>	N	SC
Muskingum Sedge	<i>Carex muskingumensis</i>	N	SC
New England Sedge	<i>Carex novae-angliae</i>	N	T
Necklace Sedge	<i>Carex ormostachya</i>	N	SC
Ross' Sedge	<i>Carex rossii</i>	N	T
* Weak Arctic Sedge	<i>Carex supina</i> var. <i>spaniocarpa</i>	SC	E
Wood's Sedge	<i>Carex woodii</i>	SC	N

<u>Common Name</u>	<u>Scientific Name</u>	<u>Current Status</u>	<u>Proposed Status</u>
<u>VASCULAR PLANTS (cont.)</u>			
Hairy Lip-fern	<i>Cheilanthes lanosa</i>	E	N
Carolina Spring Beauty	<i>Claytonia caroliniana</i>	SC	N
Slender Dayflower	<i>Commelina erecta</i>	--	E
Late Hawthorn	<i>Crataegus calpodendron</i>	--	SC
Black Hawthorn	<i>Crataegus douglasii</i>	T	SC
Rattlebox	<i>Crotalaria sagittalis</i>	--	SC
Silvery Spleenwort	<i>Deparia acrostichoides</i>	N	SC
Slender Hair Grass	<i>Deschampsia flexuosa</i>	SC	T
Big Tick Trefoil	<i>Desmodium cuspidatum</i> var. <i>longifolium</i>	SC	T
Stemless Tick Trefoil	<i>Desmodium nudiflorum</i>	SC	T
Obovate Beakgrain	<i>Diarrhena obovata</i>	SC	E
Hoary Whitlow Grass	<i>Draba cana</i>	N	E
Marginal Shield Fern	<i>Dryopteris marginalis</i>	T	E
Three-stamened Waterwort	<i>Elatine triandra</i>	N	SC
Neat Spikerush	<i>Eleocharis nitida</i>	T	SC
Robbins' Spikerush	<i>Eleocharis robbinsii</i>	N	T
Two Leaf Waterweed	<i>Elodea bifoliata</i>	--	E
Black Huckleberry	<i>Gaylussacia baccata</i>	--	T
Northern Oak Fern	<i>Gymnocarpium robertianum</i>	N	SC
Kentucky Coffee Tree	<i>Gymnocladus dioica</i>	N	SC
Witch-hazel	<i>Hamamelis virginiana</i>	SC	T
Canada Frostweed	<i>Helianthemum canadense</i>	N	SC
Beach Heather	<i>Hudsonia tomentosa</i>	SC	T
Appalachian Fir Moss	<i>Huperzia appalachiana</i>	N	SC
Eastern Green-violet	<i>Hybanthus concolor</i>	N	E
* Butternut	<i>Juglans cinerea</i>	SC	E
Jointed Rush	<i>Juncus articulatus</i>	N	E
Marginated Rush	<i>Juncus marginatus</i>	SC	E
Slender Rush	<i>Juncus subtilis</i>	N	E
Catchfly Grass	<i>Leersia lenticularis</i>	SC	T
* Small-flowered Woodrush	<i>Luzula parviflora</i> ssp. <i>melanocarpa</i>	SC	T
Rock Sandwort	<i>Minuartia dawsonensis</i>	SC	T
Broadleaf Water Milfoil	<i>Myriophyllum heterophyllum</i>	N	SC
Southern Naiad	<i>Najas guadalupensis</i> ssp. <i>olivacea</i>	--	SC
Old Field Toadflax	<i>Nuttallanthus canadensis</i>	N	SC
Clustered Broomrape	<i>Orobanche fasciculata</i>	SC	T
* Louisiana Broomrape	<i>Orobanche ludoviciana</i>	SC	T
One-flowered Broomrape	<i>Orobanche uniflora</i>	SC	T
Canada Forked Chickweed	<i>Paronychia canadensis</i>	T	E
Franklin's Phacelia	<i>Phacelia franklinii</i>	SC	T
Broad Beech Fern	<i>Phegopteris hexagonoptera</i>	T	E
Wild Sweet William	<i>Phlox maculata</i>	--	SC
Canadian Ricegrass	<i>Piptatherum canadense</i>	N	T
Scouler's Popcornflower	<i>Plagiobothrys scouleri</i> var. <i>paniculatus</i>	N	SC
Slender Plantain	<i>Plantago elongata</i>	T	SC
Tuberclad Rein Orchid	<i>Platanthera flava</i> var. <i>herbiola</i>	E	T
* Alpine Bistort	<i>Polygonum viviparum</i>	SC	T
Christmas Fern	<i>Polystichum acrostichoides</i>	T	E
Braun's Holly Fern	<i>Polystichum braunii</i>	E	T
Algae-like Pondweed	<i>Potamogeton confervoides</i>	N	E
Oakes' Pondweed	<i>Potamogeton oakesianus</i>	N	E
Spotted Pondweed	<i>Potamogeton pulcher</i>	N	E

<u>Common Name</u>	<u>Scientific Name</u>	<u>Current Status</u>	<u>Proposed Status</u>
<u>VASCULAR PLANTS (cont.)</u>			
* Sheathed Pondweed	<i>Potamogeton vaginatus</i>	SC	E
Vasey's Pondweed	<i>Potamogeton vaseyi</i>	SC	N
Nodding Rattlesnakeroot	<i>Prenanthes crepidinea</i>	SC	N (X)
Rough-fruited Fairybells	<i>Prosartes trachycarpa</i>	N	E
Swamp White Oak	<i>Quercus bicolor</i>	N	SC
Sooty-colored Beak Rush	<i>Rhynchospora fusca</i>	SC	N
Bristle-berry	<i>Rubus fulleri</i>	--	T
Missouri Dewberry	<i>Rubus missouricus</i>	--	E
Kinnickinnick Dewberry	<i>Rubus multiflorus</i>	--	SC
Prince Edward Island Blackberry	<i>Rubus quiescens</i>	--	SC
Swamp Blackberry	<i>Rubus semisetosus</i>	N	T
Bristle-berry	<i>Rubus stipulatus</i>	N	E
Vermont Blackberry	<i>Rubus vermontanus</i>	--	SC
* Three-leaved Coneflower	<i>Rudbeckia triloba</i>	SC	T
Wild Petunia	<i>Ruellia humilis</i>	N (X)	SC
Short-beaked Arrowhead	<i>Sagittaria brevirostra</i>	N	E
Hooded Arrowhead	<i>Sagittaria calycina</i> var. <i>calycina</i>	N	T
Satiny Willow	<i>Salix pellita</i>	SC	T
False Mountain Willow	<i>Salix pseudomonticola</i>	--	SC
Encrusted Saxifrage	<i>Saxifraga paniculata</i>	T	SC
* Clinton's Bulrush	<i>Scirpus clintonii</i>	SC	T
* Elegant Groundsel	<i>Senecio indecorus</i>	SC	E
Soapberry	<i>Shepherdia canadensis</i>	--	SC
Cliff Goldenrod	<i>Solidago sciaphila</i>	SC	N
Clustered Bur Reed	<i>Sparganium glomeratum</i>	SC	N
Case's Ladies' Tresses	<i>Spiranthes casei</i> var. <i>casei</i>	N	T
Coralberry	<i>Symphoricarpos orbiculatus</i>	SC	N
Yellow Pimpernel	<i>Taenidia integerrima</i>	N	SC
* Rough-seeded Fumeflower	<i>Talinum rugospermum</i>	E	T
Hairy-jointed Meadow-parsnip	<i>Thaspium barbinode</i>	--	SC
* Bitter Fleabane	<i>Trimorpha acris</i> var. <i>asteroides</i>	SC	E
* Short Ray Fleabane	<i>Trimorpha lonchophylla</i>	SC	T
Spike Trisetum	<i>Trisetum spicatum</i>	--	SC
* Eastern Hemlock	<i>Tsuga canadensis</i>	SC	E
Hidden-fruit Bladderwort	<i>Utricularia geminiscapa</i>	N	T
Purple-flowered Bladderwort	<i>Utricularia purpurea</i>	SC	E
Lavender Bladderwort	<i>Utricularia resupinata</i>	SC	T
Alpine Bilberry	<i>Vaccinium uliginosum</i>	T	E
* Silverleaf Grape	<i>Vitis aestivalis</i>	SC	T
Alpine Woodsia	<i>Woodsia alpina</i>	SC	T
Oregon Woodsia	<i>Woodsia oregana</i> ssp. <i>cathcartiana</i>	N	SC

LICHENS - PAGE 282

Powdery Almond Lichen	<i>Amygdalaria panaeola</i>	--	SC
Concentric Ring Lichen	<i>Arctoparmelia centrifuga</i>	--	SC
A Species of Ring Lichen	<i>Arctoparmelia subcentrifuga</i>	--	SC
Golden-dot Lichen	<i>Arthrurhaphis citrinella</i>	--	T
Pale-footed Horsehair Lichen	<i>Bryoria fuscescens</i>	--	SC
Black Disc Lichen	<i>Buellia nigra</i>	E	SC
A Species of Firedot Lichen	<i>Caloplaca stellata</i>	--	SC

<u>Common Name</u>	<u>Scientific Name</u>	<u>Current Status</u>	<u>Proposed Status</u>
<u>LICHENS (cont.)</u>			
Orange-tinted Fringe Lichen	<i>Heterodermia obscurata</i>	--	SC
A Species of Rim-lichen	<i>Lecanora epanora</i>	--	T
Smooth Lungwort	<i>Lobaria quercizans</i>	SC	N
Brown-eyed Camouflage Lichen	<i>Melanelia subolivacea</i>	--	SC
Port-hole Lichen	<i>Menegazzia terebrata</i>	--	SC
Powdery Saucer Lichen	<i>Ochrolechia androgyna</i>	--	SC
Bolander's Peltula Lichen	<i>Peltula bolanderi</i>	--	T
Ragbag Lichen	<i>Platismatia glauca</i>	--	SC
Brown-gray Moss-shingle Lichen	<i>Protopannaria pezizoides</i>	--	T
Frayed Ramalina Lichen	<i>Ramalina roesleri</i>	--	T
Angel's Hair Lichen	<i>Ramalina thrausta</i>	--	SC
Pixie Foam Lichen	<i>Stereocaulon pileatum</i>	--	SC
A Species of Thelocarpon Lichen	<i>Thelocarpon epibolum</i>	--	SC
Methuselah's Beard Lichen	<i>Usnea longissima</i>	--	SC
Bloody Beard Lichen	<i>Usnea mutabilis</i>	--	T
Red Beard Lichen	<i>Usnea rubicunda</i>	--	SC

MOSSES AND LIVERWORTS - PAGE 306

Lidded Earth Moss	<i>Aphanorrhegma serratum</i>	--	SC
Wave-leaved Crane's-bill Moss	<i>Atrichum crispum</i>	--	SC
Little Saw Moss	<i>Atrichum tenellum</i>	--	SC
Bud-headed Thread Moss	<i>Aulacomnium androgynum</i>	--	SC
Differential Branched Crease Capsule Moss	<i>Aulacomnium heterostichum</i>	--	SC
Sword Moss	<i>Bryoxiphium norvegicum</i>	SC	E
Egg-leaf True Moss	<i>Bryum cyclophyllum</i>	--	SC
Bug-on-a-stick Moss	<i>Buxbaumia aphylla</i>	--	SC
Hair-pointed Feather Moss	<i>Cirriphyllum piliferum</i>	--	T
Hidden-perianth Liverwort	<i>Cryptocolea imbricata</i>	--	T
Mowed Mosquito Moss	<i>Cynodontium schisti</i>	--	T
Pygmy Plume Moss	<i>Cyrto-hypnum pygmaeum</i>	--	SC
Tall Extinguisher Moss	<i>Encalypta procera</i>	--	SC
Selwyn's Ear-leaf Liverwort	<i>Frullania selwyniana</i>	--	SC
Spaced-out Tangle Moss	<i>Heterocladium dimorphum</i>	--	SC
Rolled-leaf Wet-ground Moss	<i>Hyophila involuta</i>	--	SC
Wright's Blunt Leaved True Moss	<i>Jaffueliobryum wrightii</i>	--	SC
Lustrous Bow Moss	<i>Lescuraea saxicola</i>	--	T
Swan Moss	<i>Meesia uliginosa</i>	--	SC
Urn-bearing Hair Moss	<i>Pogonatum urnigerum</i>	--	SC
Cushion Peat Moss	<i>Sphagnum compactum</i>	--	T
Red Twisted Peat Moss	<i>Sphagnum lescurii</i>	--	T
Red Parasol Moss	<i>Splachnum rubrum</i>	--	E
Nipple Moss	<i>Thelia hirtella</i>	--	SC
* Curved-leaved Golden Moss	<i>Tomenthypnum falcifolium</i>	SC	N
Shortleaf Chalk Moss	<i>Tortella inclinata</i>	--	SC
Down Liverwort	<i>Trichocolea tomentella</i>	--	T

FUNGI - PAGE 334

A Species of Porcini Mushroom	<i>Boletus subcaerulescens</i>	--	SC
A Species of Cup Fungus	<i>Sarcosoma globosum</i>	--	SC

MAMMALS

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Alces americanus*

COMMON NAME: Moose

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Moose is the largest member of the deer family, and inhabits lowland boreal forests and brushlands in northern parts of North America, where it feeds on a wide variety of aquatic and terrestrial vegetation. Although Moose were distributed throughout northern Minnesota prior to European settlement, hunting, habitat changes, and other factors reduced the species' range within the state so that by the early 1970s, Moose were restricted to two disjunct populations in the northwestern and northeastern portions of the state, each of which numbered into the thousands into the mid 1980s.

Between 1990 and 2000, the northwestern Minnesota Moose population underwent a substantial decline, and a 2007 Minnesota DNR aerial survey determined that as of that date, fewer than 100 Moose comprised the northwestern population. Aerial surveys currently estimate the northeastern Minnesota population at roughly 4,230 individuals. The northwestern Minnesota Moose population decline occurred in less than a decade. Recent surveys document a slow decline in the northeastern Minnesota Moose population.

Moose are known to be well adapted to cold temperatures, but intolerant of heat. Summer temperatures are believed to limit the species' southern distribution. Warming temperatures have been correlated with the decline of the northwestern Minnesota Moose population, and high temperatures have been correlated with higher mortality observed in the northeastern Minnesota population. For these reasons, climate change is believed to present a significant potential threat to Minnesota's Moose populations within the foreseeable future. Current predictions anticipate a significant increase in temperatures within Minnesota's Moose range. Increased temperatures are likely to increase heat stress and lead to increased mortality within the state's remaining Moose populations. Changes in land ownership and changes in forest management practices within the state's Moose range may be having a significant adverse effect on the quantity and quality of the species' habitat within the state, and particularly on thermal refuges in warmer weather.

Minnesota's northwestern Moose population represents a significant portion of its range in the state and has experienced a dramatic decline in the past decade. The state's northeastern Moose population has not shown as rapid a decline, but is very likely to be dramatically impacted by rising temperatures resulting from climate change. This will likely lead to a marked decline in this population within the foreseeable future. Given these observations and concerns about the future of the state's Moose population, it is needed and reasonable to designate Moose as a species of Special Concern in Minnesota.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Canis lupus*

COMMON NAME: Gray Wolf

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: Prior to European settlement, the Gray Wolf inhabited most of North America south to at least 20° Latitude. Human persecution, habitat deterioration, and the reduction of prey populations led to the near elimination of wolves from the western U.S. by the 1930s. By the 1960s, only a small number of wolves survived in northeastern Minnesota, although large populations remained in Canada and Alaska. The Gray Wolf was placed on the federal list of endangered and threatened species in 1967, and became fully protected under the federal Endangered Species Act in 1974. Since then, wolves in Minnesota have increased and expanded their range to the point that they were federally delisted in 2012.

In the early 1950s, Minnesota's primary Gray Wolf range encompassed a 12,000 square mi. area in northern Minnesota and contained only 450-700 individuals. As of 2012, the wolf range in Minnesota has expanded to an estimated area of over 27,000 square mi., and the population has grown to an estimated 3,000 wolves. This expansion has increased the number of wolves in agricultural lands and in areas where road and human densities were formerly believed to be too high to sustain wolf populations without considerable conflict with humans. Thus, wolves have demonstrated an ability to adapt to human presence. Livestock depredations in Minnesota increased as wolves expanded their range; however, over the last 10 years as the population and distribution of wolves has stabilized, so have the number of depredations. In anticipation of the federal delisting of gray wolves, the Minnesota legislature passed a wolf management bill in 2000, and the DNR completed a comprehensive wolf management plan in 2001. The plan is designed to protect wolves and monitor their population while giving owners of livestock and domestic pets more protection from wolf depredation. It established a minimum population of 1,600 wolves to ensure long-term survival. The DNR will implement a wolf hunting and trapping season in the fall of 2012.

In much of northern Minnesota, Gray Wolf density is now approximately one per 10 square miles, which is at or near carrying capacity for the species. While prey species before European settlement (e.g., moose, bison, caribou, elk) supported lower wolf densities across more of the state, its principal modern prey (deer) is so abundant that the number of wolves in northern Minnesota is now likely above the pre-settlement population level. Minnesota's population of gray wolves is second only to Alaska among U.S. states and exceeds the federal delisting goal of 1,251-1,400. Population estimates indicate that there has been no significant change in the number or distribution of wolves in Minnesota over the last 10 years, and few suitable areas in the state remain unoccupied. These data indicate that Minnesota's Gray Wolf population has fully recovered, and special concern status is no longer warranted.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Eptesicus fuscus*

COMMON NAME: Big Brown Bat

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Big Brown Bat is one of Minnesota's four species of cave-hibernating bats and is distributed widely across North and Central America. It is found throughout Minnesota during summer and winter. Warm season roosts can consist of tree hollows, undersides of bridges, and buildings, including attics, barns, and behind shutters. Winter roosts are mostly located in caves and mines, although the species also regularly hibernates in buildings, cellars, and tunnels. The Big Brown Bat is the second most common bat species found in Minnesota. Based on extensive surveys for bats conducted in the early 1980s and additional information collected by the Minnesota County Biological Survey, over 2,000 individuals are estimated to hibernate in the state's caves and mines. An additional unknown number hibernate in buildings. Secure winter roost sites, where the Big Brown Bat spends nearly half of each year, are critical to the survival of the species.

In February 2006, cave-hibernating bats in New York were found to have an unusual white substance on their muzzles and had lost much of their body fat. In subsequent winters, bats with this "white-nose syndrome" have died in large numbers. In the four years since it was first discovered, white-nose syndrome has spread to caves and mines in 14 eastern and central states and two Canadian provinces. An estimated one million bats have died; mortality in some northeastern bat hibernacula has neared 100%. Despite an intensive research effort, the cause of these deaths remains unknown and a cure remains undiscovered. White-nose syndrome continues to spread west at a rapid rate, and its arrival in Minnesota's bat hibernacula is likely in the very near future. While federal and state agencies are taking steps to slow the spread of white-nose syndrome, its anticipated profound impact on Minnesota's cave-hibernating bats indicates that Special Concern status for the Big Brown Bat is reasonable and needed at this time.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Lynx canadensis*

COMMON NAME: Canada Lynx

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Canada Lynx was designated as a threatened species, including within Minnesota, under the federal Endangered Species Act in April 2000. The species occurs across Canada and Alaska, with the southern range margin extending into the northeast, western Great Lakes, and northern Rockies regions of the United States. It is usually found in association with its primary prey, Snowshoe Hare, which occur in highest densities within younger, regenerating boreal forest patches with a coniferous component. Historically, the number of lynx within Minnesota fluctuated with the well-documented decadal lynx-hare cycle in Canada. Minnesota's lynx population has also been influenced by immigration from the Canadian population.

In Minnesota, the majority of reports of lynx sightings are from the northeastern portion of the state, with occasional reports from the forests of north-central Minnesota. During 2000-2006, 426 reports of lynx observations were received by the DNR; of these, 63 were considered verified. All but seven of the verified reports came from the Arrowhead region of the state. Genetic analyses identified 110 individual lynx in the state during 2002-2008. Ten den sites of radio-collared lynx were found during 2004-2007, confirming reproduction within the state. However, of 33 kittens handled at den sites, only two were documented to survive to reproductive age.

Human-caused mortality of Minnesota's small lynx population is the primary threat to the species. While there is no accurate population estimate for the species within the state, existing models suggest that the population size is at or below 200 animals. In a 2003-2008 radiotelemetry study, over 50% of the cases in which the cause of mortality could be established were attributable to anthropogenic causes. Documented causes include trapping, road-kill, shooting, and train-kill. In addition, all known mortalities of radio-collared kittens are thought to be caused by humans.

Low Snowshoe Hare densities at the landscape scale are also a potential threat to lynx. High hare populations tend to develop where there is adequate understory cover in the form of regenerating conifers, downed trees, and thick brush, which is usually the product of forest management or natural disturbance. However, post-harvest regeneration practices may reduce dense cover required by hare for shelter from predation. The current interest in biofuels harvest may also exacerbate this threat.

Climate change also presents a significant potential threat to Canada Lynx in Minnesota. Current predictions anticipate a significant increase in winter temperatures in the foreseeable future, which are likely to lead to a reduction in snow depths. Bobcats (*Lynx rufus*) tend to displace lynx in areas of lesser snow depth, and this displacement is expected to occur throughout the range of lynx in Minnesota as winter temperatures rise. In light of these existing and anticipated threats, it is needed and reasonable to designate Canada Lynx as a species of Special Concern in Minnesota.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Myotis lucifugus*

COMMON NAME: Little Brown Myotis

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Little Brown Myotis is one of Minnesota's four species of cave-hibernating bats, and the most common of the state's seven bat species. Distributed widely across North and Central America, this bat is also found throughout Minnesota during summer and winter, and comprises the majority of bats found at most roost sites in the state. Warm season roosts can consist of tree hollows, undersides of bridges, and buildings, including attics, barns, and behind shutters. Winter roosts are mostly located in caves, mines, cellars, and tunnels. Due to the limited number of suitable winter roost sites, the Little Brown Myotis congregates in very large numbers during hibernation. Based on extensive surveys for bats conducted in the early 1980s and additional information collected by the Minnesota County Biological Survey, over 15,000 individuals are estimated to hibernate in the state. A more recent study found that the state's largest bat hibernaculum, Soudan Underground Mine, alone supports an estimated wintering population of over 5,000 individuals. Secure winter roost sites, where the Little Brown Myotis spends nearly half of each year, are critical to the survival of the species.

In February 2006, cave-hibernating bats in New York were found to have an unusual white substance on their muzzles and had lost much of their body fat. In subsequent winters, bats with this "white-nose syndrome" have died in large numbers. In the four years since it was first discovered, white-nose syndrome has spread to caves and mines in 14 eastern and central states and two Canadian provinces. An estimated one million bats have died; mortality in some northeastern bat hibernacula has neared 100%. Despite an intensive research effort, the cause of these deaths remains unknown and a cure remains undiscovered. White-nose syndrome continues to spread west at a rapid rate, and its arrival in Minnesota's bat hibernacula is likely in the very near future. While federal and state agencies are taking steps to slow the spread of white-nose syndrome, its anticipated profound impact on Minnesota's cave-hibernating bats indicates that Special Concern status for the Little Brown Myotis is reasonable and needed at this time.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Onychomys leucogaster*

COMMON NAME: Northern Grasshopper Mouse

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Northern Grasshopper Mouse is found in south-central Canada and the western and Great Plains regions of the United States. In Minnesota, this species occurs in the western part of the state where it can be locally common, but is never abundant. Unlike other rodents, Northern Grasshopper mice are predators, and therefore have large home ranges. These mice are strongly associated with dry, sparsely-vegetated grasslands that grow on gravelly to sandy soils, and they have been found in the sandy spoil and topsoil piles from sand and gravel quarry excavations.

Destruction of prairie habitat, especially through sand and gravel mining activities, poses the largest threat to the survival of Northern Grasshopper mice in Minnesota. Despite considerable survey effort in recent years, very few new locations of Northern Grasshopper mice have been documented. Due to its limited distribution and abundance in the state, specific habitat requirements, and susceptibility to habitat destruction, it is needed and reasonable to designate the Northern Grasshopper Mouse as a species of Special Concern at this time.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Reithrodontomys megalotis*

COMMON NAME: Western Harvest Mouse

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Western Harvest Mouse is distributed throughout much of the central and western United States and is a relatively uncommon inhabitant in southwestern and southeastern Minnesota. This mouse is found in dry prairie and old field habitats such as grasslands, overgrown pastures, fencerows, and unmowed roadsides. Its distribution in the state has been greatly affected by the destruction of grassland habitats through cultivation, and residential and commercial development. Deterioration of habitat quality resulting from encroachment of invasive plant species and subsequent control practices is likely the reason that the Western Harvest Mouse is now absent from areas where it was once abundant. This species now has become increasingly restricted to small, fragmented habitats. For these reasons, it is needed and reasonable to designate the Western Harvest Mouse as a species of Special Concern at this time.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Spermophilus richardsonii*

COMMON NAME: Richardson's Ground Squirrel

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Richardson's Ground Squirrel occurs in south-central Canada and the northern Great Plains of the United States, including the western edge of Minnesota. This species prefers dry, well-drained soils for burrowing, and open areas with short vegetation and high visibility for detecting predators. It avoids cultivated fields or grasslands with tall vegetation. Richardson's Ground Squirrels form cohesive social groups of related individuals that cooperate in rearing young and alerting others to approaching threats. As with other social ground squirrels, there may be a minimum population size necessary for a self-sustaining colony. Reduction of suitable habitat due to changes in land practices has resulted in the disappearance of known Richardson's Ground Squirrel colonies in western Minnesota. Small, isolated colonies can also be focal points for local predators, increasing their vulnerability to local extirpation. Despite evidence to the contrary, many consider ground squirrels as serious agricultural pests, and human extermination efforts have had significant negative impacts on this species throughout its range. Due to this species' isolated distribution in Minnesota and its vulnerability to local extirpation, it is needed and reasonable to designate the Richardson's Ground Squirrel as a species of Special Concern at this time. This status will highlight the need to gather more field data on the current distribution and abundance of this species in the state.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Thomomys talpoides*

COMMON NAME: Northern Pocket Gopher

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Northern Pocket Gopher is found in North America from southern British Columbia south through the Sierra Nevada range and east through the plains of Canada, Colorado, eastern Nebraska, South Dakota, North Dakota, and the extreme northwestern corner of Minnesota. In Minnesota, at the eastern edge of its range, the Northern Pocket Gopher has been documented primarily in Kittson County, with one additional occurrence in Marshall County. Because of its restricted distribution in northwest Minnesota and the scarcity of records within this area of the state, the Northern Pocket Gopher was listed as a species of Special Concern in 1984.

Based on trapping records, Northern Pocket Gophers appear to have declined in the state. The major causes of the decline are thought to include habitat loss, persecution by humans, and competition with the more common Plains Pocket Gopher (*Geomys bursarius*). Northern Pocket Gophers occur in a wide range of soil conditions; however, in Minnesota, they are restricted to the heavy soils of the Red River valley. Flooding events in the past decade have submerged known locations of this species. Cultivation destroys underground burrows, so most occurrences are restricted to ditch banks and elevated flood control berms, making them vulnerable to trapping. Compounding this problem is the view of pocket gophers as unwanted pests in agricultural areas because of the mounds of soil they create in fields and pastures. Mounds and runways cause potential damage to livestock and machinery and may lead to reduction of crop yields. Because of this, pocket gophers are controlled by poisoning and trapping, and some counties still carry a bounty of \$0.70 to \$2.00 per pocket gopher. Unfortunately, no distinction is made between the more common Plains Pocket Gopher and the rare Northern Pocket Gopher. In 1993, over 33,000 pocket gophers were turned in for bounties in counties where Northern Pocket Gophers are known to live. There is no record of which species was collected.

Recent survey efforts by the Minnesota DNR County Biological Survey have confirmed the loss of Northern Pocket Gophers from known locations in Minnesota since 1991. Reclassification from Special Concern to Threatened status is needed and reasonable for this species because of its limited distribution in the state, the continuing threat of habitat loss, and the potential for persecution due to its similarity to the Plains Pocket Gopher, which is viewed as a pest species in agricultural areas.

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BIRDS

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Accipiter gentilis*

COMMON NAME: Northern Goshawk

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Northern Goshawk is a large, forest-dwelling raptor that occurs throughout the boreal and montane forests of North America. Within Minnesota, it is found nesting and wintering widely dispersed across the state's northern forests. Recent research within Minnesota has documented the Northern Goshawk's preference for mature and old upland forest for nesting and foraging, with a minimum of 4,000 acres of this age class found in active territories. Nests tend to be built in the primary crotch of mature aspen trees. Telemetry studies have determined that the average home range of a pair of breeding goshawks within Minnesota is 25 square miles.

Increased survey effort for Northern Goshawk nests during the past decade has found an average of 29 territories with nest attempts per year in the state. A system for reporting and investigating stick nests has been in place for several years, and new nests are reported as they are discovered. Since 1991, 130 active territories have been identified in Minnesota. Interagency Northern Goshawk nest monitoring efforts typically monitor nest territories until they have been inactive for five years, and have determined that an average of 79% of active nest territories have been occupied in the previous year, emphasizing the ongoing importance of existing nest territories to this species. Nest success and productivity rates in Minnesota appear to be lower than other areas of the country, with nest success averaging 1.5-1.8 young per successful nest.

In 2005, the Northern Goshawk was designated a 'Species of Greatest Conservation Need' in Minnesota's Comprehensive Wildlife Conservation Strategy. The availability of large patches of mature forest preferred by the species is in decline regionally due to fragmented land ownership as well as fragmentation of historically large contiguous stands resulting from past and current forest management practices. Harvest plans for public lands in Minnesota project a decrease in the old aspen utilized by Northern Goshawks. While harvest plans will eventually produce an increase in mature upland conifers, a gap in the availability of these conifer forests will exist during the coming decades as these forests mature and become goshawk habitat. As an example, a recent study found an average net loss of 26% of upland mature/old forest habitat within eight Northern Goshawk territories between 1996 and 2006. Given these trends and their likely effect on the species' habitat availability and nest success, it is reasonable and needed to designate the Northern Goshawk as a Species of Special Concern.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Aegolius funereus*

COMMON NAME: Boreal Owl

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Boreal Owl is a small forest-dwelling owl that reaches the southeastern edge of its breeding range in northeastern Minnesota. Although never common within the state, Boreal Owl nests have been occasionally documented in Lake, Cook, St. Louis, and Roseau counties since the first discovery of a nest in the state in 1978. Auditory survey efforts have regularly detected singing males during the breeding season in these counties, as well as in Itasca and Lake of the Woods counties. However, reports of Boreal Owl nests and singing males have declined dramatically in Minnesota during the past decade. While the species exhibits a somewhat cyclic population fluctuation that may reflect changes in prey populations and snow depth, the degree to which this dynamic may influence the observed trend in the state's Boreal Owl population is unknown.

Boreal Owls establish their nests in abandoned cavities originally excavated by woodpeckers. Prior to nesting, males attract females by singing from nearby song perches that are usually located in conifer trees. Nest cavities are usually in old aspen or birch trees located within older coniferous forest stands. A 1995 study of Boreal Owl nests or potential nests (cavities near song perches) in Minnesota found 36 (92%) of 39 cavities were in old trembling aspen trees. The average age of 17 of these cavity trees was 86 years. In a separate study conducted during 1987-2009, trees supporting 50 active Boreal Owl cavities averaged 42.6 cm dbh, with 52% in trembling aspen, 26% in paper birch, and 22% in pine and other species. The Boreal Owl is a nocturnal species that roosts during the day and forages at night. Telemetry studies have found that roosting and foraging sites tend to be located within older stands of lowland conifers, primarily black spruce.

Cavity nesting birds like the Boreal Owl require trees old enough to support the development of heart rot and the subsequent creation of a suitably sized cavity. However, trembling aspen on most forest lands in Minnesota are currently being managed at a rotation age of less than 60 years. The continued demand for aspen fiber indicates that a gap in the availability of trees sufficiently large to support cavity development will occur in the coming decades and will limit the availability of nest sites for the Boreal Owl. Lowland conifer stands that are used by this species for roosting and foraging are also being reduced in size and are increasingly isolated from each other.

In 2005, the Boreal Owl was designated a 'Species of Greatest Conservation Need' under Minnesota's Comprehensive Wildlife Conservation Strategy. In light of the steady loss of nesting and foraging habitat, and the continued decline in observations of this species, it is needed and reasonable to designate the Boreal Owl as a Species of Special Concern at this time.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Ammodramus henslowii*

COMMON NAME: Henslow's Sparrow

CURRENT MINNESOTA STATUS: Endangered

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Henslow's Sparrow was once broadly distributed across the northcentral and northeastern United States, from southern Minnesota east to New York and south to Missouri and Virginia. Across the country, the number of Henslow's Sparrows declined by over 68% between 1966 and 1991. In Minnesota, the Henslow's Sparrow has been a widespread but relatively uncommon summer resident throughout the southern half of the state. This species requires uncultivated grasslands and old fields with standing, dead vegetation and a substantial litter layer. Areas used one year may be abandoned the next year if the grass has become too long or too short. Therefore, the Henslow's Sparrow's distribution in the state is sporadic and the extent of its former range is difficult to delineate. The major cause of the species' decline is habitat loss and degradation resulting from urban sprawl, intensive agriculture, increased frequency of mowing hayfields, and conversion of pastures, hay fields, and old fields to row crops. There is evidence that other factors are also involved in this species decline, as it is not utilizing seemingly suitable habitat in some places. The Henslow's Sparrow was classified as a Special Concern species in Minnesota in 1984, but its continued decline in the state led to its reclassification as Endangered in 1996. Since that time there has been an increase in records, particularly from several native prairie areas in western Minnesota.

A 1988-1989 habitat evaluation of 23 sites where Henslow's Sparrows had been sighted in previous years revealed that one-third of the sampled sites were no longer suitable because of urban development and agricultural use. For a number of years, Great River Bluffs State Park (formerly O.L. Kipp State Park) supported a stable population of Henslow's Sparrows. This population was intensively studied between 1987 and 1989 and was found to consist of 19-23 adults; however, from 1996 to 2006 the number of singing males fluctuated between 1 and 28 singing males. A management plan for Henslow's Sparrows was drafted in 1996. Some of the habitat maintenance activities recommended in this plan have been implemented, including prescribed burns, removal of woody vegetation, and fertilizing brome grass to increase vigor. Since 1996, observations of Henslow's Sparrows have increased, with breeding season records coming from counties scattered throughout western, central, and southern Minnesota. From 2006 to 2009, the Minnesota DNR's County Biological Survey documented singing males at 25 sites in 10 different counties. Also, Henslow's Sparrows have become established at Afton State Park in east-central Minnesota. Of particular interest is the consistent presence of this species in several large tracts of native prairie in western Minnesota.

Recent studies in several other states have shown a positive correlation between Conservation Reserve Program (CRP) land enrollments and an increasing Henslow's Sparrow population trend. However, many of these CRP acres are scheduled to expire by 2012, and therefore large areas of grassland habitat may be converted back to rowcrops if contracts are not extended, as currently appears likely. In addition, grassland habitat is under increasing pressure for use in biofuel production. Because several new colonies of Henslow's Sparrows have been discovered in recent years and some historic populations appear to be recovering, Endangered status is no longer necessary. However, Threatened status remains reasonable and needed because of its sporadic distribution in the state and the continued threats to grassland habitat.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Chondestes grammacus*

COMMON NAME: Lark Sparrow

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Lark Sparrow is a distinctive bird that breeds throughout much of western and central United States into southern British Columbia. Near the northeastern edge of its continental range, this species occurs in low densities along the prairie-forest border from southeastern Minnesota, through the Minnesota River valley, and at scattered sites in both the northwestern part of the state and the Anoka Sand Plain. In Minnesota, Lark Sparrows specialize in relatively open oak savanna or in dry prairie with scattered small trees, primarily bur oak or red cedar. They are typically closely associated with native plant communities, but can sometimes be sparsely-distributed in brushy pastures. This species appears to tolerate some disturbance (e.g., grazing) as long as dry grassland habitat with sparse tree cover and sandy soil are present.

The population estimate of Lark Sparrows based on the Breeding Bird Survey is the fourth lowest of any sparrow, with an estimated 4,169 individuals breeding in Minnesota. The Minnesota DNR County Biological Survey has documented Lark Sparrows in approximately 57 known nesting locations in the state. However, recent surveys have found few new records despite significant effort. The vast majority of oak savanna and dry prairie habitat for Lark Sparrows has already been lost. The few remaining areas of suitable habitat in Minnesota are susceptible to increases in woody vegetation, primarily due to lack of fire. These remaining sites are also at significant risk of development for housing and sand and gravel mining. Invasive species such as spotted knapweed are also a potential threat. Due to its rarity, patchy distribution, restrictive habitat requirements, and limited habitat availability, Special Concern status for the Lark Sparrow in Minnesota is reasonable and needed at this time.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Cygnus buccinator*

COMMON NAME: Trumpeter Swan

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Trumpeter Swan was a widespread but uncommon breeder throughout the prairies and parkland regions of Minnesota until the early 1800s. As central and western Minnesota was settled, this large, conspicuous bird quickly became over-hunted. When the first official species status review by the state was conducted in 1984, the last record of a wild breeding population in Minnesota was found to be from about 1885. As a result, the trumpeter swan was considered extirpated in the state.

Captive breeding of Trumpeter Swans was initiated by Hennepin Parks (now Three Rivers Park District) in 1969. Implementation of a restoration plan for the species in Minnesota was initiated in 1982 through a collaborative effort by partners from state and federal agencies, Canadian provinces, universities, tribes, and the Trumpeter Swan Society. The initial objective of the plan was to establish a breeding population of 15 pairs of swans in Minnesota. By 1996 when the Trumpeter Swan was listed as a state-threatened species, there were approximately 17 nesting pairs in east-central Minnesota and 13 nesting pairs in the northwest. To date, more than 350 swans have been released in the state, and Minnesota's trumpeter swan population now exceeds 5,000 birds. The species' breeding range is now expanding to the north and east, with Trumpeter Swans released in Minnesota documented in southwestern Ontario, and Trumpeter Swans released in Iowa nesting in Minnesota. Minnesota DNR biologists continue to conduct management and education efforts to ensure that a healthy population of this species remains in Minnesota.

Once hunted to near extinction, the recovery of Minnesota's population continues, far exceeding the state's initial reintroduction goal of 15 breeding pairs and the revised goal of 500 individuals. However, due to continued threats and the lack of secure wintering locations, long-term viability of the population is still unknown. Threats to the Trumpeter Swan population in Minnesota include illegal shooting, collisions with power lines, loss or degradation of wetland habitat, and human disturbance. In addition, it is estimated that lead poisoning from ingestion of lead shot and fish sinkers in bottom sediments of wetlands is responsible for more than half of the mortality of midwestern Trumpeter Swans. The Minnesota Trumpeter Swan population has reached the point where Threatened status is no longer necessary. However, with long-term viability still a concern, Special Concern status is needed and reasonable to ensure the continued recovery of the species in Minnesota.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Falco peregrinus*

COMMON NAME: Peregrine Falcon

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Peregrine Falcon formerly nested on bluffs along the Mississippi River and its tributaries south of Red Wing and into Iowa, along the St. Croix River, on cliffs along the North Shore, and in the Boundary Waters Canoe Area Wilderness. Extirpated by pesticide poisoning, the falcon last nested along the Mississippi River in 1962. A substantial reintroduction effort began in 1982, after several earlier attempts had failed. The success of this effort was highly uncertain in 1984 when the species was designated as Endangered. In 1993, the reintroduction goal of 40 territorial pairs in the Midwest was surpassed, and the rearing and releasing of Peregrine Falcons produced in captivity had essentially been completed. In 1994, there were 17 territorial pairs in Minnesota, of which 13 pairs successfully fledged 36-37 young. As a result of these successful reintroduction efforts, the status of this species in Minnesota was downgraded to Threatened in 1996, and they were removed from the federal endangered species list in 1999.

Historically never having supported more than 40 nesting pairs, Minnesota is now home to a Peregrine Falcon population that has adapted to artificial eyries and urban habitats, recolonized several historical eyries along the North Shore, and increased its nesting range in the state. In 2007, 52 nesting pairs successfully fledged 94 young in Minnesota, a figure which is nearly double the number of nesting pairs and fledged young in 1998 (24 & 52, respectively). However, the majority of breeding Peregrine Falcons in the Midwest now inhabit urban or semi-urban areas, with approximately 84% nesting on tall buildings, bridges, and smokestacks, a marked change from the original cliff-nesting population. Peregrine Falcons have been slow to recolonize their original cliff habitat along the Mississippi River, in part due to heavy predation by Great Horned Owls. Falcons continue to nest on cliffs along the North Shore of Lake Superior, and two cliff-nesting pairs are also known from Houston and Winona counties in southeastern Minnesota. Continued threats to Peregrine Falcon populations include collisions with buildings, disease, environmental pollutants, predation, particularly by Great Horned Owls (*Bubo virginianus*) and Raccoons (*Procyon lotor*), and potential loss or disturbance of natural cliff nesting sites. The Minnesota Peregrine Falcon population has reached the point where Threatened status is no longer needed. However, with long-term viability still a concern, reclassification of the Peregrine Falcon to Special Concern status in Minnesota is reasonable at this time.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Haliaeetus leucocephalus*

COMMON NAME: Bald Eagle

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: The designation of the Bald Eagle as Threatened in Minnesota in 1984 recognized the perilous decline in its abundance due to organochlorine-based pesticide poisoning that occurred in the first half of the 20th century. When DDT was banned in 1972, the Minnesota population had declined, but not to the point of being endangered. In 1983, the Northern States Bald Eagle Recovery Plan set a goal of 300 occupied breeding areas in Minnesota by the year 2000. This goal was surpassed in 1987 when 350 occupied breeding areas were documented through aerial surveys. Due to continued range expansion and increases in the numbers of occupied breeding areas, Bald Eagles were downgraded to Special Concern status in 1996. Bald Eagles are now occupying parts of their historical range along rivers and lakes in southern and western Minnesota that had been vacant for decades, including along the Mississippi River in the Twin Cities metropolitan area.

The number of known active Bald Eagle nests has been steadily increasing statewide since 1973. In the spring of 2005, the Minnesota DNR, U.S. Fish and Wildlife Service, and U.S. Geological Survey conducted a statewide Bald Eagle survey of known nest sites and identified 872 nests with adult eagles present. This translates to a 28% increase in the number of nesting Bald Eagles across Minnesota over the 681 active nests found in the 2000 survey, and greater than 100% increases in southwestern Minnesota, the Twin Cities metropolitan area, and along the lower Mississippi River. The range of Bald Eagles also continues to expand. The 2005 survey documented an increase in known active nests within 52 (60%) of Minnesota's 87 counties over the five-year period, including the location of nests in 10 counties for which they had not been found in 2000. As in the 2000 survey, the greatest increases in numbers of known nests were observed at the edge of the Bald Eagle's range in the state, indicating that the species is continuing to expand into southern and western Minnesota, regions from which it disappeared over 100 years ago. Moreover, there is increasing evidence that some Bald Eagles are relatively tolerant of human disturbance, allowing them to nest successfully in areas with higher levels of human activity.

Due to continued population increases, range expansions, and evidence of adaptation to human disturbance, it is reasonable to remove this species from Special Concern status. With an estimated 1,312 active nests in the state, the Minnesota Bald Eagle population far exceeds the original 300 pair recovery goal set forth for the year 2000, and eagles are successfully nesting in proximity to humans, even in the Twin Cities metropolitan area. With the support of the results of these and similar surveys in Maine, Florida, and Washington, the U.S. Fish and Wildlife Service removed Bald Eagles from its federal list of threatened species on August 9, 2007. Bald Eagles and active nests still receive federal protection under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Lanius ludovicianus*

COMMON NAME: Loggerhead Shrike

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Loggerhead Shrikes are widely distributed throughout most of the continental United States and the southern part of the Prairie Provinces of Canada. They live in upland grassland habitat and sometimes in agricultural areas, where short grass vegetation and perching sites such as hedgerows, shrubs, and small trees are found. In Minnesota, the Loggerhead Shrike population has fallen sharply, and the species is currently very rare or absent throughout much of its former range. There are now only a few localities, primarily in western and east-central Minnesota, where the species is consistently reported each year. The Loggerhead Shrike was placed on the National Audubon Society's Blue List in 1972 and was designated a threatened species in Minnesota in 1984.

Since the 1940s, some areas have experienced population declines, partly as a result of tree encroachment on grasslands and increasingly intensive row-cropping practices. Federal breeding bird survey routes, which are run throughout the country, indicate a population decline of 3% each year between 1966 and 2000 and a 53% decline rangewide over a 20-year period from 1980-2000. Additionally, demographic data from the upper Midwest show that annual survival rates of adult and juvenile Loggerhead Shrikes are too low to maintain population stability. As of the 1990s, the densest population of shrikes in Minnesota occurred in Dakota County where territories were annually monitored and reports during the nesting season were investigated. This Dakota County population as well as all known historical shrike locations in northwestern Goodhue County, eastern Rice County, and the Anoka Sand Plain were surveyed in 2008, but shrikes were only confirmed at a total of 7 locations. Targeted surveys were also conducted at non-historical locations in Sherburne, Anoka, Isanti, and Chisago counties in 2008; however, no shrikes were observed.

Habitat destruction is partly responsible for this species' decline, as Loggerhead Shrikes require relatively large areas of grassland with scattered shrubs or small trees for nesting. Many sites currently used by this species in Minnesota are threatened by rural residential construction. Intensive farming practices often preclude shelterbelts and hedgerows, making the habitat unsuitable for Loggerhead Shrikes. Some areas have become overgrown with trees, particularly red cedar. While often an important nest tree, dry grassland slopes can get so covered by the dense growth of red cedar that they become unsuitable shrike habitat. Habitat losses on overwintering grounds are likely a big factor in the species decline as well, especially as migrating shrikes from northern breeding areas increasingly encounter sites already saturated by resident, non-migratory shrikes. Additionally, as predators, shrikes are vulnerable to environmental contamination via reduced food supply and ingestion of contaminated prey. In one study, the decrease in Loggerhead Shrike numbers corresponded to the treatment of grasshoppers with an insecticide.

While Loggerhead Shrikes continue to be observed at widely scattered locations in Minnesota, few persistent populations are known. Shrikes are likely extirpated from central Minnesota, are rare and declining from grassland habitat in southern Minnesota, and appear to be declining from the last known stronghold in Dakota County. Due to the current population status and increasing threats from habitat loss and fragmentation, reclassification of the Loggerhead Shrike to Endangered status is needed and reasonable at this time.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Podiceps auritus*

COMMON NAME: Horned Grebe

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: The horned grebe nests across the northwestern tier of the United States, from Minnesota to Oregon, and northward through most of western Canada to central Alaska. Formerly, this species also nested south and east to the Atlantic Coast. Horned grebes nested throughout Minnesota in the early 1900s, although they were more regular and abundant in the northern counties. Small, shallow marshes with emergent vegetation interspersed with areas of open water are the preferred habitat of the horned grebe. On larger water bodies (over 10 ha (24.7 ac.)) they prefer to use bays and inlets, which provide protection from wind and wave action. By 1984, breeding records were restricted to the Roseau River Wildlife Management Area and Agassiz National Wildlife Refuge in northwestern Minnesota. This range contraction, coupled with declining numbers, led to the horned grebe's designation as a state special concern species in 1984. A 1991 survey of 76 wetlands deemed to provide suitable horned grebe habitat in 6 northwestern counties (Kittson, Marshall, Pennington, Polk, Red Lake, and Roseau) located only 1 grebe, and there was no evidence of breeding. As a result, the horned grebe was reclassified as a threatened species in 1996.

Both the federal breeding bird survey routes (BBS) and Christmas bird counts indicate slow, long-term population declines and range contraction for horned grebes continent-wide. BBS data show declines of nearly 3% each year between 1966 and 2010.

Historically, habitat destruction was undoubtedly an important fact in this species' decline. Horned grebes are generally tolerant of humans, although they may abandon lakes with highly developed shorelines or too much human activity on the water. Several serious threats to horned grebe habitat in Minnesota are the direct result of agricultural activities, including eutrophication of water bodies from fertilizer run-off, pesticide build-up, and filling or draining of wetlands. Horned Grebes spend the winter primarily in coastal bays and estuaries along the Pacific, Atlantic, and Gulf Coasts. Recent oil spills in the Gulf of Mexico could negatively impact wintering Horned Grebes.

Since being reclassified as Threatened in 1996, reports of horned grebes in suitable habitat during the breeding season have continued to decline, and no persistent breeding populations are known in Minnesota. There has been no documented nesting of Horned Grebes in Minnesota in over 20 years. Interestingly, there have been two recent observations of Horned Grebes with juveniles from northeastern Minnesota during mid- to late August; one from northern Cook County in 2008, and another from northern Lake County in 2009. Both observations were outside of this species' historic breeding range in Minnesota, and August is typically the time of Horned Grebe migration. In both cases it is unknown whether or not nesting actually occurred in Minnesota, or if the birds migrated into the state from elsewhere. Due to the current population status and continuing threats from habitat loss and water quality issues, reclassification of the horned grebe to Endangered status is needed and reasonable at this time.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Progne subis*

COMMON NAME: Purple Martin

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Purple Martin is a large, neo-tropical migratory swallow with a breeding range distributed throughout much of the central and eastern United States, the west coast, and parts of Canada and Mexico. This aerial insectivore is widely distributed throughout Minnesota. While it was historically known to inhabit woodpecker holes in dead snags and other natural cavities, the decline in availability of these natural nest sites and the ease with which Purple Martins are attracted to artificial nests has resulted in their almost exclusive use of nest boxes in Minnesota today.

Although not naturally colonial, the Purple Martin's reliance on birdhouses has resulted in their aggregation in large colonies, and exposes them to several threats. They must compete with House Sparrows and European Starlings, two invasive exotic cavity-nesters that are also widely distributed in the state, which displace Purple Martins from nest boxes, and which are also known to destroy Purple Martin eggs and kill their nestlings. Predators such as Cooper's Hawks and Great Horned Owls are known to prey on Purple Martin colonies. In addition, Purple Martin colonies are vulnerable to infestation by nest parasites such as blow flies, bird fleas, and mites. In the fall, Purple Martins aggregate in the thousands at pre-migratory roost sites where they are vulnerable to any localized impact to the site.

Purple Martins are readily observed by participants in the U.S. Fish and Wildlife Service's Breeding Bird Survey, and BBS data show a population decline of 5.4% per year in Minnesota during the period 2000-2010. This is one of the largest declines of any bird for which the state's BBS data are statistically significant. Due to the documented decline in Purple Martins over the past three decades, as well as the continuing threats to the state's population, its designation as a Species of Special Concern is needed and reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Vireo bellii*

COMMON NAME: Bell's Vireo

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Bell's Vireo is a breeding resident in the central and southwestern portions of the United States and is sparsely distributed in southern Minnesota, which lies at the northern edge of its range. This small bird has very restricted habitat requirements, utilizing semi-open shrub swamps, brushy oldfield, and brushy prairie edges. Only an estimated 15 nesting locations are known for the Bell's Vireo in the state, and significant regional declines have been detected. Federal breeding bird survey routes indicate an average population decline of 2.9% per year between 1966 and 2007 in the Midwest. Surveys by the Minnesota DNR County Biological Survey have documented isolated locations of the Bell's Vireo in Dakota, Wabasha, and Winona counties, and most recently one record in Lyon County in 2006. Due to its rarity, patchy distribution, and specific habitat needs, it is reasonable and needed to designate the Bell's Vireo as a species of Special Concern in Minnesota. This status will highlight the need to monitor its occurrence at known nesting locations, and to gain a better understanding of its current distribution and abundance in the state.

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AMPHIBIANS AND REPTILES

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Ambystoma maculatum*

COMMON NAME: Spotted Salamander

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Spotted Salamander is found in the eastern half of North America from Ontario and Quebec throughout much of the eastern United States, including in the northern hardwood forests near the extreme eastern edge of Minnesota. This species was first discovered in Minnesota in 2001, and since this time the Minnesota DNR County Biological Survey has identified egg masses at several wetland locations along the Wisconsin border in a thirty-mile-diameter area of eastern Pine and southeastern Carlton counties. This species is restricted to forested habitat with suitable breeding sites such as small, seasonal ponds or shallow, emergent wetlands that do not contain fish. Potential threats to populations in Minnesota include loss of ephemeral wetland habitat, forest fragmentation, intensive timber harvest near breeding sites, and acid deposition. More information is needed on the distribution, abundance, and ecology of this species in Minnesota to assess its status. Until this is accomplished, it is needed and reasonable to classify the Spotted Salamander as a species of Special Concern due to its forest-wetland dependence and limited known distribution in the state.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Anaxyrus cognatus*

COMMON NAME: Great Plains Toad

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Great Plains Toad is widespread in the Great Plains of the United States and occurs in western Minnesota in open grasslands, cultivated fields, and tallgrass prairies. In parts of its range, populations appear more localized and isolated than historical records indicate. Reproductive activity is triggered by heavy spring rain events, at which time adults emerge from burrows to breed in temporary, shallow water such as flooded fields, ditches, ephemeral ponds, and wetlands. Because reproduction is dependent on rainfall, toads may forego breeding during years with insufficient precipitation. As a result, population densities of Great Plains Toads can undergo substantial fluctuations during periods of prolonged drought.

Surveys conducted by the Minnesota DNR's County Biological Survey for Great Plains Toads between 1988 and 2007 found mixed results for this species. Drought conditions coincided with no records of this species during surveys of counties in far western Minnesota in 1988. Records of Great Plains Toads were obtained in two of six counties in far northwestern Minnesota in the early to mid 1990s, and the species appeared to be abundant in a few isolated areas of southwestern Minnesota during surveys in the late 1980s and mid 2000s, although it was absent from several historical localities. The lack of records may be attributed, in part, to the difficulty in sampling for this species, which resides in burrows outside the breeding season. However, several potential threats related to habitat loss raise greater concerns about the future of Great Plains Toads in Minnesota. These threats include loss and degradation of suitable habitat resulting from the conversion of grasslands to row crops, tilling of wetlands, and use of herbicides and pesticides. This species relies on periodic pulses of heavy rain events for the subsequent recruitment of young into the population, and the loss of adequate breeding habitat can severely impact its future. Given its unique life history characteristics and limited habitat availability, it is needed and reasonable to designate the Great Plains Toad as a species of Special Concern in Minnesota. This status will highlight the need for additional survey effort to more accurately assess its distribution and abundance in the state.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Chelydra serpentina*

COMMON NAME: Snapping Turtle

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: The Snapping Turtle occurs throughout the eastern United States and southern Canada and is found in a wide variety of aquatic habitats throughout Minnesota. While Snapping Turtles prefer slow-moving, quiet waters with muddy bottoms and dense vegetation, they are common and often abundant in lakes, rivers and marshes. Despite their widespread occurrence, several factors prompted concern for the status of this species in Minnesota and led to its listing as a Special Concern species in 1984. The major factor driving its listing was the unknown and possibly detrimental effects of commercial harvest on local populations. Snapping Turtles are harvested for their meat, and used for human consumption.

Since the 1984 listing, additional research on the demography and life history of turtles suggested that commercial turtle harvest practices in northern latitudes were not sustainable. A study of turtles in the Weaver Bottoms area of the Upper Mississippi River found reduced numbers of Snapping Turtles and concluded that harvesting and unintended drowning by commercial fisherman might be responsible. Subsequently, updates to Minnesota's commercial turtle harvesting rules were made and implemented in 2004 to address these concerns. These changes included limiting the number of traps that could be used, restricting turtle licenses to Minnesota residents, and putting a moratorium on the sale of new licenses. Anyone who held a license prior to the rule changes was permitted to renew it, and they are allowed to pass their license down one generation to their children with approval from the DNR commissioner. In 2003, 51 Minnesotans were awarded commercial turtle harvest licenses; as of February 2009, thirty-two of these licenses remain active. Additionally, trappers must now keep a daily log of where their traps are located and how many turtles they harvest. These logs must be submitted monthly during the trapping season (March - November). Failure to submit this report to the Minnesota DNR can result in nonrenewal of a harvester's license. The DNR created a database in 2004 to maintain the trapping data, which will allow for greater monitoring of Snapping Turtle harvest and population levels in Minnesota. Because of the recent restrictions imposed on commercial turtle harvest in Minnesota, listing of the Snapping Turtle as a species of Special Concern is no longer warranted.

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SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Elaphe obsoleta*

NEW SCIENTIFIC NAME: *Pantherophis obsoletus*

COMMON NAME: Ratsnake

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Ratsnake occurs throughout the central and eastern United States and into southern Ontario. In Minnesota, Ratsnakes have only been documented in a few locations in the southeast corner of the state. In addition to a few specimens collected by Breckenridge in Houston County in 1942, there have only been a handful of verified sightings and live captures of this species. Due to the scarcity of records and limited information on its distribution, abundance, and habitat requirements, the Ratsnake was listed as a special concern species in 1984. Since that time, extensive surveys have been conducted by the Minnesota DNR County Biological Survey and by biologists funded through the Minnesota DNR Nongame Wildlife Program to study historic locations of Ratsnakes and document new den sites; however, only two additional records have been obtained as a result of these survey efforts.

Ratsnakes are woodland snakes that frequent moist forests and forest edges in the summer months and move to rocky outcrops or bluffs where they are found in the fall and spring. Because they are arboreal, Ratsnakes are often found high up in trees where they retreat to tree cavities. In Minnesota, the few records and sightings have occurred on the tops and backsides of wooded bluffs. Old decayed trees are utilized as denning sites and provide an important component in their home range, along with deep rock crevices that are used as hibernacula.

The limited distribution of the Ratsnake in Minnesota makes it highly susceptible to habitat destruction and alteration, and the loss of bluff prairie and woodland habitat to agricultural, commercial, and industrial development has been a major factor in the species' decline. The development of forested bluffs for homesites causes fragmentation of habitat and increases the potential for snakes to be killed on roads. While rock crevices may not be a limiting factor in southeast Minnesota, denning trees can be lost during large scale logging activities or by removal of dead trees for firewood. The time needed to reestablish a suitable denning tree after such a loss could result in the dispersal of the local population. The Ratsnake is also vulnerable to collection for the pet trade and indiscriminate killing. This snake is often misidentified as a rattlesnake, since it will vibrate its tail when threatened. Because of this, people who encounter them feel threatened and often kill them. Ratsnakes are susceptible to local extirpation by overcollecting or destruction at den sites where large numbers of snakes aggregate for overwintering.

It is needed and reasonable to upgrade the Ratsnake from Special Concern to Threatened status at this time. Despite significant search efforts in Minnesota since its listing in 1984, available records of this forest species are lacking; moreover, the discovery of a few dens in southeastern Minnesota could stimulate collection for the pet trade, and the impact of road mortality is putting increasing pressure on remaining populations. Protection of large forested tracts near active dens is needed to help ensure the survival of this species in Minnesota.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Necturus maculosus*

COMMON NAME: Mudpuppy

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Mudpuppy is a fully-aquatic species of salamander that is found in medium to large rivers and some larger lakes within the Mississippi, Minnesota, Red, and St. Croix river basins in Minnesota. Anecdotal evidence suggests that this species is relatively common in the Minnesota, Red, and St. Croix river basins. However, its status within its historic range in the Mississippi River (below St. Anthony Falls) is questionable, and it may be extirpated from its historic range in the Lake Superior watershed despite an abundance of suitable habitat. Its distribution and abundance elsewhere in the state is poorly known.

Threats to Mudpuppy populations in Minnesota include habitat loss, siltation and pollution, persecution by humans, and the use of the lampricides. While Mudpuppies are apparently tolerant of some siltation, habitat modification activities such as shoreline development, dams, channelization, and dredging can bury exposed rocks, logs, or other types of cover that they depend upon for refuge and nesting. These salamanders are sometimes killed by anglers who erroneously believe they are harmful, and they are also commercially harvested for bait, the pet trade, and by biological supply companies that are difficult to monitor. In addition, Mudpuppies are vulnerable to the lampricide TFM, which is used to control sea lamprey in Lake Superior. A 1990 study conducted in the Grand River, Ohio found that the size of Mudpuppy populations decreased by 29% the year following TFM application. Mudpuppies serve as the obligate larval host species for the imperiled Salamander Mussel, and therefore local extirpation of Mudpuppies would prevent reproduction and ultimately result in the loss of this mussel.

Because of its inferred population decline, loss and degradation of its habitat, vulnerability to lampricide, and threats of overexploitation from commercial harvest, it is needed and reasonable to designate the Mudpuppy as a species of Special Concern at this time. This status will highlight the need to gather more field data on the distribution and abundance of this species in Minnesota.

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FISH

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Alosa chrysochloris*

COMMON NAME: Skipjack Herring

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Skipjack Herring inhabit large rivers in deep, clear, fast-flowing areas over sand or gravel substrate. Skipjack Herring were abundant in the early part of the twentieth century in the Mississippi River as far north as Minneapolis, and both adults and juveniles were once common in Lake Pepin, indicating successful reproduction in Minnesota waters. They reached Big Stone Lake in the Minnesota River and Taylors Falls in the St. Croix River. However, dam construction along the Mississippi River, beginning with the Keokuk dam in southeastern Iowa completed in 1913, blocked the Skipjack Herring's pre-spawning migration route to the upper sectors of the river. Consequently, populations declined dramatically, and this species was not reported in Minnesota for decades and was considered extirpated. However, during prolonged high water years in 1986 and 1993, Skipjack Herring were collected in Lake Pepin for the first time since 1928. Because of its rediscovery in the state and the documented evidence of successful spawning both years, the Skipjack Herring was listed as a Special Concern species in Minnesota in 1996.

Since this time, Skipjack Herring rarely have been documented in the state. The Minnesota DNR's County Biological Survey conducted extensive surveys for rare fish species on the Mississippi River from 2006-2008, and while the Skipjack Herring was a targeted species, none were found. Single specimens were incidentally sampled by commercial seines in 2001 and 2008 on Lake Pepin and during netting surveys on the Mississippi River north of Winona in 2002 and 2011. High water levels in two of those years may have contributed to the ability of the species to negotiate the dams on the Mississippi River and reach Lake Pepin. However, young-of-the-year have not been collected during any of these subsequent years, suggesting that reproduction is not occurring. The main threats to Skipjack Herring populations in Minnesota are physical barriers that impede upstream migration on the Upper Mississippi River. It is known that lock and dam structures hinder migration of Skipjack Herring during the early spring. Therefore, management actions such as the construction of fish passage facilities will be necessary on Mississippi River dams between Minneapolis and Keokuk, Iowa, and on dams on the Minnesota River to its source at Big Stone Lake in order for the recovery of this species in Minnesota waters. While further research into the species' life history and ecological requirements is needed, it is needed and reasonable to reclassify the Skipjack Herring as Endangered in Minnesota.

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SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Ammocrypta asprella*

NEW SCIENTIFIC NAME: *Crystallaria asprella*

COMMON NAME: Crystal Darter

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: The Crystal Darter is a rare, slender fish that occurs in large clear-water streams with clean sand and gravel bottoms, and moderate to swift currents. This species reaches the northern limit of its range in the Mississippi River drainage in southeastern Minnesota and has become extirpated in numerous states within its formerly large historic range. The Crystal Darter was listed as a Special Concern species in 1984 because it was considered the rarest and least known of Minnesota's darters, and more information on its distribution and abundance in the state was needed to better assess its status.

A number of targeted collection efforts have been conducted since its listing in 1984 that confirm this species as rare in Minnesota. Today, Crystal Darters are only known to occur in small numbers at six sites in the Zumbro River, one site in the Root River, three sites in the lower St. Croix River, and 18 sites in the Mississippi River from just north of Redwing to the state's southern border. Stream surveys in the 1990s and early 2000s occasionally sampled one or two specimens per site, but few new location records were obtained as a result of these efforts. Between 2006 and 2008, the Minnesota DNR extensively surveyed 192 river miles of the Mississippi River from the tailwaters of the Coon Rapids Dam (Pool A) to the Minnesota-Iowa border (Pool 9) and only documented two individuals in the navigation channel at Pool 5. Minnesota DNR biologists have observed and photographed Crystal Darters a number of times at night using scuba gear in the St. Croix River downstream of Taylors Falls, which appears to be the last stronghold for this species in the state.

The Crystal Darter is particularly sensitive to siltation, requiring clear, fast-flowing rivers. Population declines have occurred across much of the species range from activities such as channelization, dredging, and impoundments that have altered stream velocities and resulted in sediment loading. Dams have also impacted the species by reducing the amount of suitable habitat and isolating populations, thereby making them vulnerable to extirpation from single destructive events. Crystal Darters can be difficult to detect using conventional fish survey methods because they are often found in deep water during the day (2-5 meters) and will burrow into the substrate to await passing prey. Therefore, while targeted surveys using a bottom trawl have been employed in sampling Crystal Darters, techniques that allow for effective surveying of deep, fast flowing stream segments need to be developed. In addition, long-term population monitoring and identification of habitat guilds is needed to assess trends and guide management decisions for this rare species. Given its limited abundance, fragmented distribution, habitat sensitivity, and vulnerability to extirpation, Endangered status is needed and reasonable at this time.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Anguilla rostrata*

COMMON NAME: American Eel

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: American Eels are a catadromous species of fish, where females spend most of their life cycle in freshwater, but migrate to the mid-Atlantic Ocean to spawn. They are typically found in large rivers and lower reaches of large tributaries in muddy or rocky bottoms, though young adults called elvers must migrate through a variety of stream sizes, substrates, and current flows to reach upstream freshwater habitats. Male eels typically remain in coastal waters near the mouth of the Mississippi. In Minnesota, American Eels are mainly found in three river systems: the Mississippi River upstream to St. Cloud, the Minnesota River to Granite Falls, and the St. Croix River to Taylors Falls. They are generally sampled in large boulders or log jams that provide crevice habitats, and are often found in tailwater reaches of dams.

American Eels have never been abundant in the state and are difficult to sample using standardized sampling gear. However, anecdotal reports suggest this species has become far less common over the past several decades. Despite extensive survey efforts by the Minnesota DNR County Biological Survey, very few individuals have been sampled in recent years, and they are not caught as frequently as they once were. The main threats to American Eel populations in Minnesota are physical barriers that impede upstream migration, which result in fragmentation and loss of available habitat. Individuals must traverse a distance of 2,900 miles after hatching and navigate upstream through a series of 18 locks and dams on the Upper Mississippi River to reach Minnesota waters. In other parts of their range, American Eels may also be impacted by commercial harvest, parasites, pollution, and changes in oceanic conditions. Because of habitat modification, unique life history characteristics, and apparent population declines, it is needed and reasonable to designate the American Eel as a species of Special Concern in Minnesota.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Clinostomus elongatus*

COMMON NAME: Redside Dace

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Redside Dace have a widespread, but disjunct distribution in Ontario, Canada, eastern United States, and parts of the Midwest including the Southeast Driftless Area of Minnesota. These fish are most abundant in clear, spring-fed, coldwater streams that are characterized by limestone slabs or gravel substrate. They typically are found in pools with slow-to-moderate current and overhanging vegetation, and they spawn in riffles or shallow, flowing pools. In Minnesota, Redside Dace are restricted to the lower Mississippi drainage in perennial headwater reaches of the Cannon, Zumbro, and Root rivers, where they are found consistently during surveys but in low numbers. These fish are also found in the Cedar River, where they are considered extremely rare.

Redside Dace are reportedly decreasing across much of their range, and the unique life history and habitat requirements of Redside Dace make them inherently sensitive to habitat modification and degradation. While they can tolerate some turbidity, their preferred stream habitat is under increasing pressure from human activities such as farming and residential development. Redside Dace are aerial insect feeders, and they rely on overhanging riparian vegetation as a main source of their food. Riparian buffer zones are needed to protect bank vegetation, and to reduce siltation from stream bank erosion and runoff. In addition, non-native brown trout may potentially threaten the persistence of Redside Dace in some headwater reaches of streams by preying upon and competing with these minnows for food. Further research is needed on the life history, habitat preferences, and abundance of this species in Minnesota. Until this is accomplished, Special Concern status is needed and reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Coregonus nipigon*

COMMON NAME: Nipigon Cisco

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: In 2003, the taxonomy within the genus *Coregonus* was revised to recognize *Coregonus nipigon* as a distinct species. The Nipigon Cisco is a coldwater fish that is apparently restricted worldwide to large, deep oligotrophic lakes in far northeastern Minnesota, southern Ontario, and southern Manitoba. In Minnesota, this species is only known from 3 lakes in Cook County and 4 lakes in St. Louis County. The Nipigon Cisco can be distinguished morphologically from other *Coregonus* species such as the Shortjaw Cisco by the presence of black pigmented fins and a high gill raker count. The amount of suitable habitat is limited in the state, as surveys have reported Nipigon Cisco at water depths as shallow as 40 feet with most records from 60-90ft depths. Currently, very little is known about the life history or status of this deep lake species. Potential threats to the Nipigon Cisco include competition with smelt and the recent introduction of non-native plankton. Given the globally-restricted range of this species and its specialized habitat needs, further research into its ecology, distribution, and abundance in Minnesota is warranted. Therefore, Special Concern status for the Nipigon Cisco is needed and reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Couesius plumbeus*

COMMON NAME: Lake Chub

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Lake Chub is a glacial relict that has the northern-most distribution of any North American minnow. In Minnesota, this species occurred historically in Lake Superior and the Lake Superior watershed as far south as Duluth. Although the Lake Superior population is secure, inland populations have drastically declined and are now restricted to Cook County within the Brule and Pigeon River systems. Lake Chubs are typically found in the shallow water of lakes in the south and rivers in the northern part of their range that have gravel or rocky bottoms. However, while targeted surveys for this species have not been completed, the known extant inland populations of Lake Chubs in Minnesota occur in stream rather than in lake habitat. These inland populations are morphologically distinct and physically isolated from the Lake Superior populations, and therefore research is needed to assess whether inland forms are in fact genetically different. Given the range reduction of inland populations in Minnesota and their vulnerability to local extirpation, it is needed and reasonable to designate the Lake Chub as a species of Special Concern. This status will highlight the need for targeted survey work to determine the current distribution and abundance of this species in the state.

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SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Erimystax x-punctata*

NEW SCIENTIFIC NAME: *Erimystax x-punctatus*

COMMON NAME: Gravel Chub

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Gravel Chub is a slender minnow that is sporadically distributed in the central and eastern United States. It inhabits riffle and run areas of large creeks and small rivers in clear to slightly turbid waters characterized by fine or pea-sized limestone gravel substrate. The Gravel Chub is declining rangewide and has been extirpated from some portions of the northern part of its range. It is presumed to reach its current northern range limit in Minnesota, where it is restricted to two rivers in the Mississippi River drainage in the southeastern part of the state: the Upper Iowa River and the Root River. Because of its limited distribution and the fragile nature of its preferred habitat, the Gravel Chub was listed as a Special Concern species in Minnesota in 1984.

Despite improved sampling techniques and increased effort since listing in 1984, the Gravel Chub remains a rare species in the state. Targeted surveys by the Minnesota DNR between 1992-2000 and by the Minnesota Pollution Control Agency in 2004 recorded spotty occurrences of this species in the Root River in Fillmore and Olmsted counties, and in a few mile reach in the Upper Iowa River in Fillmore County downstream of the Lidtke Mill Dam. Gravel Chubs are absent upstream of this dam in Mower County, although apparently suitable habitat exists on this stretch of the Upper Iowa River.

In addition to its highly restricted distribution and low abundance, this species is threatened by the degradation of its specialized stream habitat. Because Gravel Chubs require permanent flow and silt-free riffles, sediment loading in streams of the lower Mississippi River drainage in Minnesota and the continued interference with flow regimes puts this species at great risk. Dams, channelization, and dredging increase siltation, physically alter habitat conditions, and isolate populations by blocking the movement of fish. These fragmented populations are susceptible to the loss of genetic diversity and to local extirpation from natural or catastrophic events such as a toxic chemical spill. Given its limited range, specific habitat requirements, and sensitivity to habitat modification, it is needed and reasonable to list the Gravel Chub as a Threatened species in Minnesota.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Etheostoma chlorosoma*

COMMON NAME: Bluntnose Darter

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Bluntnose Darter is a small, slender darter that is found in the Mississippi River and its larger tributaries, and reaches its northern distribution in southeastern Minnesota. This species occurs in quiet waters, sluggish streams where the bottom is sand and organic debris, and in the sloughs and backwaters of larger rivers. Prior to 1984, the only validated specimens of Bluntnose Darter from Minnesota were two collected in 1944 from isolated ponds of the Mississippi River at the Iowa border. Additional specimens were reported to be taken in 1945 from Pine Creek and the Root River in Houston County, but they could not be verified. When the Bluntnose Darter was designated as a species of Special Concern in 1984, it was hoped that further investigations would identify extant populations of the species in Minnesota. Over the next ten years, several extensive surveys failed to find this species in Minnesota waters. Subsequently, this species was removed from Special Concern status in 1996 and considered extirpated from the state.

Since delisting in 1996, the Bluntnose Darter has been rediscovered in Minnesota at two new locations. In 1997, a single specimen was caught in Pine Creek near La Crescent in Houston County. In 2001, another specimen was collected from the Mississippi River near the city of Winona. More information is needed on the distribution and abundance of this species in Minnesota to assess its current status. Until this is accomplished, Special Concern status is needed and reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Fundulus sciadicus*

COMMON NAME: Plains Topminnow

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Plains Topminnow has both declined and been extirpated from portions of its North American range. In Minnesota, it is restricted to the Rock River system in Pipestone, Nobles, and Rock counties in small prairie streams that are tributary to the Missouri River. The Plains Topminnow is found in spring-fed pools and backwaters of clear to moderately turbid creeks and rivers that have sandy or rocky bottoms and a heavy growth of aquatic plants. As of the mid-1980s, this minnow was not well surveyed in Minnesota and had only been reported from Kanaranzi Creek and the Rock River proper. Given its limited distribution and abundance in the state, the Plains Topminnow was listed as a Special Concern species in 1984.

Since this time, extensive survey efforts have confirmed that the Plains Topminnow is one of the rarest inhabitants of Minnesota's southwestern prairie streams. Fish surveys conducted and supported by the Minnesota DNR in the 1990s and 2000s increased the known number of locations of this species in the state to approximately 25 and the known number of rivers and tributaries to eight, all of which are within the Rock River system. While it is associated with similar habitat as the Topeka Shiner, it is far less common within Minnesota, and is rarely sampled in abundant numbers where it occurs. Water quality throughout the Plains Topminnow's range in southwestern Minnesota has been degraded by nutrient and pesticide runoff, heavy sediment loading, highway construction, urban development, and dewatering and construction of impoundments. In addition, the potential stocking of non-native Mosquitofish could jeopardize the viability of remaining populations. These cold-water fish have been introduced into stream habitat in other parts of the Plains Topminnow's range to serve as mosquito larvae control agents, and these cold-tolerant fish compete with and appear to be displacing Plains Topminnows. Given its specialized habitat requirements, sensitivity to stream degradation, limited distribution, and rarity despite extensive survey effort, it is needed and reasonable to reclassify the Plains Topminnow to Threatened status in Minnesota.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Hybognathus nuchalis*

COMMON NAME: Mississippi Silvery Minnow

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Mississippi Silvery Minnow is distributed along the Mississippi River basin and Gulf Coast drainages of the United States, and is found at the northern extent of its continental range in Minnesota. It is often found in schools along side channel borders (and sometimes main channel borders) of medium to large rivers where it feeds on algae and other organic matter. Most known records of this minnow in the state occur in the Mississippi River.

Populations of Mississippi Silvery Minnows are in decline and have suffered a substantial range reduction since the establishment of Mississippi River dams. In the 1940s, surveys by the Upper Mississippi River Conservation Commission documented the distribution of the Mississippi Silvery Minnow between Pools 3 and 9, including samples from Pool 4 where it was very abundant. Since then, this species has not been reported between Pools 3-5A of the Mississippi River, and it has rarely been sampled in Pools 6, 7, and 9. Between 2006 and 2008, the Minnesota DNR extensively surveyed 192 river miles of the Mississippi River from the tailwaters of the Coon Rapids Dam (Pool A) to the Minnesota-Iowa border (Pool 9) and only caught a total of three individuals: two in Pool 6 and one in Pool 9. Due to the range contraction of this species in Minnesota, its occurrence in a highly impacted ecosystem (the Mississippi River), and the lack of recent observations despite intensive search efforts, Special Concern status for the Mississippi Silvery Minnow is needed and reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Ictiobus niger*

COMMON NAME: Black Buffalo

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Black Buffalo is a rare fish that is found in sloughs, impoundments, and both fast- and slow-flowing portions of large rivers. Although the Black Buffalo was known historically in Minnesota from the Mississippi River as far north as Lake Pepin, there were no verified records in the state before 1983. However, this species has since been verified as a part of Minnesota's fish fauna. In the 1990s, specimens were collected from Pools 4, 7, and 8 of the Mississippi River and from the lower portions of the Cottonwood River, a tributary of the Minnesota River. Because of its rarity in the state and the vulnerability of its habitat to degradation, the Black Buffalo was listed as a Special Concern species in Minnesota in 1996.

Since 1996, the Black Buffalo has been identified from approximately fifteen locations on the Minnesota and Mississippi rivers; however, a majority of these records consist of only one or two individuals per site, and only adults have been observed. Minnesota DNR biologists conducted extensive, targeted surveys for Black Buffalo in the Mississippi River from 2006-2008, and small numbers of adults were sampled in Pools A, 1, 2, 4, 5, 6, and 9. Therefore, while the Black Buffalo appears to be relatively widespread in the Mississippi River, it occurs in low abundance, and surveys have not consistently documented its presence at a number of previously-known locations.

The Black Buffalo is sensitive to habitat degradation and sediment load, and therefore alteration of river habitat throughout its known range is a continuing threat. Activities impacting habitat of this large river species include the hydrologic alteration of streams and their watersheds, the continuing decline in habitat conditions on the Mississippi River associated with its management as a navigation channel, non-point and point source water pollution, and sedimentation. Dams, channelization, and dredging increase siltation, physically alter habitat conditions, and hamper the movement of fish. In addition, biologists in Minnesota and Wisconsin are seeing evidence of hybridization of Black Buffalo with Smallmouth and Bigmouth Buffalo, which can threaten the species' genetic integrity and potentially lead to extinction of natural populations. For these reasons, it is needed and reasonable to designate the Black Buffalo as a Threatened species in Minnesota.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Lepomis gulosus*

COMMON NAME: Warmouth

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Warmouth is a species of sunfish that occurs near the northern periphery of its range in Minnesota in lakes and backwater areas of rivers with dense vegetation. Historically, it was found in the Mississippi River drainage in southeastern Minnesota including the Mississippi River mainstem from Wabasha downstream to the Iowa border. Currently, known populations of Warmouth are restricted to the Mississippi River and several lakes within the floodplain downstream of Winona (Pools 5A-9), the mouth of the Root River, and an introduced population in Big Ole and East lakes in Itasca County. While the introduced population appears secure, Warmouth in the Mississippi River are sporadically distributed and not abundant. From 2006-2008, Minnesota DNR biologists conducted extensive rare fish surveys in the Mississippi River between the Coon Rapids dam and the Iowa border, and only a total of eight Warmouth were collected: five individuals in Pools 5A and three individuals in Pool 9. However, because these sunfish are difficult to detect using standardized sampling techniques and preferred habitats are difficult to access, additional targeted sampling efforts using trapnets is needed to adequately survey for this species. The amount of suitable habitat is limited due to issues with sediment load filling in backwater areas on the Mississippi River, and remaining populations are vulnerable to further deterioration in quality and quantity of these vegetated backwater habitats. Given that this species is uncommon in Minnesota and occurs in a highly impacted ecosystem (the Mississippi River) where its distribution and abundance has contracted, Special Concern status is needed and reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Lepomis peltastes*

COMMON NAME: Northern Longear Sunfish

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Northern Longear Sunfish is a small, colorful fish that occurs in parts of central and eastern North America, and has an extremely spotty distribution mostly in the northern third of the state. Unlike its southern counterpart (the Central Longear Sunfish) that lives in streams of varying degrees of water quality, the Northern Longear Sunfish is typically associated in Minnesota with lakes that have high water quality, substrates that are a firm mixture of sand, marl, and silt, and stretches of relatively undisturbed shoreline with emergent vegetation that also contain extensive shallows of submerged vegetation; males set up their nests in these vegetated in-shore shallows. Lakes with good water quality and undisturbed shoreline but that contain essentially only clean sand bottoms (i.e., are lacking the carpets of submerged vegetation) generally do not appear to support this species.

In 2006 and 2007, extensive, targeted surveys were conducted for Northern Longear Sunfish in one river and 119 lakes in the Red River, Mississippi River, and Lake of the Woods drainages, and specimens were found in 22 lakes as well as the one river sampled. Of these, 11 serve as confirmation of previously known locations and 12 are new state distributional records. The Northern Longear Sunfish is vulnerable to habitat modification and deterioration in water quality, which may occur as a result of shoreline development, sedimentation, turbidity, removal of riparian vegetation, and installation of sand blankets to create swimming beaches. In fact, population declines and extirpations have been detected in lakes where shoreline habitat has been significantly modified. More surveys are needed to establish the geographic range and abundance of this species in Minnesota. However, given its specialized habitat requirements, sensitivity to water quality, and scattered distribution in the state, it is needed and reasonable to classify the Northern Longear Sunfish as a special of Special Concern at this time.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Lythrurus umbratilis*

COMMON NAME: Redfin Shiner

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Redfin Shiner is a fairly widespread North American minnow that inhabits headwater to mid-headwater reaches of perennial streams with rubble substrate. Near the northern edge of its continental range, it occurs in the Zumbro, Root, and Cedar River systems in southeastern Minnesota. Past records indicate that the Redfin Shiner was once quite common in tributaries of the Zumbro and Cedar rivers and also historically occurred in the Upper Iowa River; however, no specimens have been documented from this stream in Minnesota since 1966. Survey data suggest a definite decline in both distribution and abundance of Redfin Shiners, with recent collections of only one or two individuals per site except when sampling during spawning. In 1991, 1998 and 1999, the Minnesota DNR conducted extensive surveys of southeastern streams and only collected two individuals at one location in the Cedar River and a single individual on the North Branch of the Root River. While they can tolerate some turbidity, their preferred stream habitat is under increasing pressure from human activities such as farming and residential development. Because of their reduced distribution and abundance in the state as well as the potential for further negative impacts to their stream habitat, it is needed and reasonable to designate the Redfin Shiner as a species of Special Concern in Minnesota.

SELECTED REFERENCES:

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Moxostoma duquesnei*

COMMON NAME: Black Redhorse

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Black Redhorse is an inhabitant of small to medium-sized perennial streams with clear water and gravel substrate. This species occurs on the periphery of its continental range in southeastern Minnesota where it is restricted to the Zumbro, Root, and Upper Iowa River drainages. It was designated as a species of Special Concern in 1984 to reflect concern about its limited distribution within the state. At that time, it was known to occur at only six sites in the Zumbro and Root River drainages. However, due to its discovery at 18 additional sites over the next decade, the Black Redhorse was removed from Special Concern status in 1996.

Since delisting in 1996, extensive, targeted collection efforts confirm the Black Redhorse as a rare species in Minnesota. Stream surveys conducted by the Minnesota DNR and Minnesota Pollution Control Agency between 1998-2004 recorded sporadic occurrences of this species at several new and previously known locations on the Zumbro, Root, and Upper Iowa River systems; however, a majority of these records consist of only a few adults per site, and individuals were absent at many sampling locations. The Black Redhorse is a sensitive species that requires clear riffles with uninterrupted flow for spawning, and therefore it is vulnerable to impacts from agricultural runoff and other activities that result in the deterioration of water or habitat quality. Based on its restricted range, low abundance, and the small number of site occurrences despite significant survey effort, it is needed and reasonable to classify the Black Redhorse as a species of Special Concern in Minnesota.

SELECTED REFERENCES:

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- Coffin, B. and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. Univ. of Minnesota Press. Minneapolis. 473 pp.
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SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Notropis amnis*

NEW SCIENTIFIC NAME: *Hybopsis amnis*

COMMON NAME: Pallid Shiner

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: The Pallid Shiner is a rare species that reaches its northern distribution limit in the Mississippi River drainage of Minnesota and Wisconsin. This species inhabits large- and medium-sized rivers, and occasionally streams, often at the downstream ends of sand and gravel bars, and rarely enters the mouths of smaller tributary streams. It appears to avoid heavily silted habitats, but has been collected over substrates ranging from mud to sand, gravel, and rocks. It seems to prefer slow-moving waters, but has also been found in habitats with moderate to swift currents. The range of the Pallid Shiner in Minnesota appears to have shrunk since 1930. Two specimens were collected from the St. Croix River north of Taylors Falls in the early 1900s, but subsequent intensive collecting failed to reveal additional specimens in this drainage. While historical records documented this species in the Mississippi River as far north as Pool 2, as of the 1980s, recent records indicated that this species had become restricted to the Mississippi River channel south of Lake Pepin. Given its rarity in the state, the Pallid Shiner was listed as a Special Concern species in Minnesota in 1984.

Today, the Pallid Shiner is barely hanging on in Minnesota and is considered one of the rarest fish in the state. This large river minnow was sporadically caught in Pool 8 on the Mississippi River in the 1990s, but since this time has only been reported from the area once in 2005. In 2002, it was reported from Pool 3 of the Mississippi River, marking the first time it had been recorded that far north since the late 1940s. However, these two records are the last reports of the Pallid Shiner in Minnesota. Despite extensive, targeted surveys by the Minnesota DNR from 2006-2008, no individuals were sampled at any of 403 sites on the Mississippi River from the Coon Rapids dam (Pool A) to the Iowa border (Pool 9). In addition to the high level of decline in both distribution and abundance, the known range of the Pallid Shiner is limited to a heavily used portion of the Mississippi River, making remaining populations extremely vulnerable to impacts from human activities. For these reasons, reclassification from Special Concern to Endangered status is needed and reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Notropis anogenus*

COMMON NAME: Pugnose Shiner

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Pugnose Shiner is a small minnow that is rare throughout its range in the Upper Mississippi River, Red River, and Great Lakes basins. Minnesota serves as the center of abundance for this species, but extirpations have occurred at many of its historical locations in the state. Records are known from across the central portion of Minnesota, but collections of more than 10 individuals are rare. Becker (1983) believed this species to be in serious trouble throughout its range, as it is extremely intolerant to turbidity and siltation. The loss of shoreline vegetation and an increase in turbidity in lakes and streams are linked to its demise in other states, and both of these phenomena have occurred at many of the historic Minnesota sites. For these reasons, the Pugnose Shiner was listed as a Special Concern species in Minnesota in 1996.

The Minnesota DNR's County Biological Survey recorded Pugnose Shiners in numerous locations across the central portions of the state in surveys from 1997-2008. However, these minnows are sampled in low abundance (<10 individuals) in most locations where they occur, and are often absent in apparently suitable habitat. Pugnose Shiners prefer clear, glacial lakes and streams with an abundance of submerged vegetation. They live in low velocity habitats over sand, mud, or gravel substrates, and are commonly found in pondweed (*Potamogeton* spp.), water milfoil (*Myriophyllum* spp.), elodea (*Elodea* spp.), eelgrass (*Verbasicum blattaria*), coontail (*Ceratophyllum* spp.), bulrush (*Scirpus* spp.), muskgrass (*Chara* spp.), and filamentous algae. The presence of rooted aquatic plants seems more important to this species than substrate type.

The Pugnose Shiner is vulnerable to the removal of shoreline and littoral vegetation from lakes, increases in eutrophication from nutrient enrichment, increases in water turbidity, and possibly the invasion of Eurasian water milfoil (*Myriophyllum spicatum*). The destruction of habitat may have isolated populations of this species and caused its entire range to be discontinuous. Additional losses of Minnesota's populations would significantly impact the global security of this species. While targeted survey efforts for Pugnose Shiners have been completed and this species is confirmed rare in Minnesota, research on the life history, genetics, and the determination of specific habitat impacts and stressors is also needed. Due to concerns about habitat loss, low abundance, and history of extirpations, reclassification from Special Concern to Threatened status is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Noturus exilis*

COMMON NAME: Slender Madtom

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: The Slender Madtom is a small catfish that reaches its known northern range limit in Minnesota, where it is restricted to a seven-mile reach of Otter Creek in extreme southwestern Mower County. It is found in riffles of small- to medium-sized permanent, spring-fed creeks with moderate to swift currents, and its preferred bottom substrates include limestone slabs, rubble, or gravel interspersed with sand. The Slender Madtom usually stays near or under sheltering rocks in riffles at depths of less than 12 inches, or sometimes under the cover of leaf litter in pools. The first verifiable record of this species in the state was based on three specimens collected from Otter Creek in Mower County in 1954, and attempts to collect additional specimens over the next several decades were unsuccessful. Consequently, the Slender Madtom was listed as a Special Concern species in Minnesota in 1984.

Since this time, the Slender Madtom has only been documented at a total of four locations on Otter Creek and has not been found anywhere else in the Cedar Creek watershed. Stream surveys in 1985 and 1990 failed to discover additional Slender Madtom records in Minnesota, although the species was documented two miles south of the Minnesota-Iowa border. A 1991 survey collected two additional specimens from Otter Creek approximately 5 miles upstream from the original 1954 site location. Then, in 2008, the Minnesota DNR's County Biological Survey collected a single individual at the original site location and a total of seven individuals at two new sites nearby. Despite additional surveys, no other records exist for the Slender Madtom in Minnesota.

Populations across the Slender Madtom's range have declined since the late 1970s. Causes for decline may include siltation and turbidity in farming areas, and the dewatering of habitats by hydropower operations. Predation and intraspecific and interspecific competition may also affect the survivorship of Slender Madtoms. Moreover, because this species is only known from a few locations within a highly localized area of Minnesota, a single catastrophic event such as a toxic chemical spill could result in the extirpation of remaining populations of Slender Madtoms in the state. Due to similarity in appearance, the waters of Dodge, Freeborn, and Mower counties were closed to the commercial harvest of tadpole madtoms and stonecats in 2007, except by special permit, to protect the Slender Madtom. Given its rarity, specialized habitat requirements, and restriction to one minor watershed in the southeastern part of the state, it is needed and reasonable to list the Slender Madtom as Endangered at this time. Additional research needs for this species in Minnesota include life history studies, genetic analysis, identification of habitat guilds, and the determination of specific habitat impacts and stressors.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Phenacobius mirabilis*

COMMON NAME: Suckermouth Minnow

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Suckermouth Minnow is slender fish that inhabits riffle areas of sandy streams with little vegetation and feeds on aquatic insects and other bottom-dwelling invertebrates. In Minnesota, its range is limited to the lower Mississippi River drainage in the southeastern part of the state where its overall distribution and abundance in the state has declined from historical records. The Suckermouth Minnow once occurred in the Cannon, Zumbro, Root, and Upper Iowa river systems as well as in the Mississippi River proper. However, extensive surveys conducted in the 1990s and 2000s indicate that this species is likely extirpated from the Mississippi River (last reported in 1955) and is now absent from a number of previously-known locations in the Cannon, Zumbro, and Root River systems. Single specimens were collected from the Little Cedar River in 1998 and 2004, marking the first reports of Suckermouth Minnows from this stream in Minnesota. The Suckermouth Minnow is often found in turbid water and is considered a pioneer species that can readily colonize recently disturbed habitat, yet it is apparently disappearing from a number of historical locations in river systems that have been highly impacted by human activity. Further research into the causes for this species' apparent decline and determination of specific habitat impacts is needed. However, given its reduced range and low abundance, Special Concern status is needed and reasonable at this time.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Platygobio gracilis*

COMMON NAME: Flathead Chub

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Flathead Chub is a large, silvery minnow that inhabits turbid, flowing waters of large rivers in the Northwest Territories and Great Plains of the United States. Minnesota lies near the northeastern periphery of its range, and its occurrence in the state is documented from only a single specimen collected from the Red River of the North near Climax in Polk County in 1984. While it is uncertain whether the Flathead Chub is a native species to the state or was introduced into the Red River, populations are known from Lake Winnipeg and the lower Red River in southern Manitoba just across the Minnesota-Canada border. Because frequent, wide lateral flooding of the Red River could connect southern Manitoba populations with Minnesota, it is highly plausible that this minnow has extended its range southward into Minnesota waters. Further survey work is needed to attempt to relocate this species in Minnesota and clarify its distribution. Until more field data are available, a status of Special Concern is needed and reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Prosopium coulterii*

COMMON NAME: Pygmy Whitefish

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Pygmy Whitefish is a tiny coldwater fish that inhabits deepwater areas of deep lakes. This species is only known from Lake Superior in Minnesota and has a highly disjunct North American distribution, with the closest population to Lake Superior located 1,000 miles to the west in western Montana and southwestern Alberta. The Pygmy Whitefish was first discovered in Lake Superior in the 1950s using a small mesh bottom trawl, and subsequent sampling found it to be widely distributed from the Apostle Islands to Whitefish Bay and Isle Royale. It has occasionally been collected in Minnesota, but it is difficult to sample because individuals typically occur in water depths of 60-220 feet. Currently, very little is known about the life history or status of this deep lake species in Minnesota. Given its specialized habitat needs and restricted range in the state, it is reasonable that the Pygmy Whitefish be designated as a species of Special Concern. This status will highlight the need for further research into its ecology, distribution, and abundance in Minnesota.

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MOLLUSKS

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Anodonta suborbiculata*

COMMON NAME: Flat Floater

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Flat Floater is large, thin-shelled mussel that is distributed across parts of the central and eastern United States, and is found at the northern extent of its continental range in Minnesota where it inhabits sloughs and backwater areas of large rivers in soft substrate. This species was not historically known from Minnesota; however, documentation of this species in the 1980s in Pools 6 and 8 on the Mississippi River as well as a single collection of fresh-dead shells from Pool 7 in 2001 provide evidence of a recent expansion into the state. Surveys conducted since this time have identified Flat Floaters in small numbers at a few locations in the Mississippi River between Pool 5A and Pool 9 in Reno Bottoms near the Minnesota-Iowa border. These mussels are absent from main channel habitat and are typically not found in soft areas of channel borders. In addition, the amount of suitable backwater and slough habitat is limited due to issues with sediment load filling in these areas on the Mississippi River. More surveys are needed to establish the distribution, abundance, and ecology of Flat Floaters as well as to identify the primary larval fish host in Minnesota, which will aid in its conservation. Until this is accomplished, it is needed and reasonable to classify the Flat Floater as a species of Special Concern.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Cumberlandia monodonta*

COMMON NAME: Spectaclecase

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: The Spectaclecase mussel inhabits large rivers with moderate to swift currents, and appears to often colonize microhabitats that are sheltered from the main force of the current. Within these microhabitats, the Spectaclecase occurs in colonies among patches of boulders and under large rocks that are intermixed with mud, sand, and gravel substrates. This species historically inhabited the Mississippi River in Minnesota, yet recent collections in the state have been confined to the main channel of the St. Croix River. Given its limited distribution and very specific habitat requirements, the Spectaclecase was listed as a threatened species in Minnesota in 1996 and was designated as an endangered species, including within Minnesota, under the federal Endangered Species Act in April 2012.

Currently, the Spectaclecase mussel is only known from eight sites along an 85-mile reach of the St. Croix River in Minnesota. Despite extensive, targeted mussel surveys in recent years, no new locations have been discovered since the 1996 state listing, and few large colonies remain. The viability of these remaining populations of Spectaclecase mussels is jeopardized by the introduction of non-native zebra mussels (*Dreissena polymorpha*) in the St. Croix River. Zebra mussels can attach themselves in large numbers to the shells of native mussels, eventually causing death by suffocation. While the Spectaclecase has the potential to be locally abundant, the colonial nature of this species makes it especially vulnerable to zebra mussel infestation. Other threats to Spectaclecase mussels include habitat modification, non-point and point source water pollution, and siltation. A critical research need includes the identification of the primary larval fish host for this mussel species, which will aid in its conservation. At this time, it is needed and reasonable to list the Spectaclecase mussel as Endangered in Minnesota.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Cyclonaias tuberculata*

COMMON NAME: Purple Wartyback

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: The Purple Wartyback mussel is most often found inhabiting larger rivers in areas with moderate current and gravel substrates. Past surveys and shell records indicate that the Purple Wartyback was once widely distributed in the Mississippi River below St. Anthony Falls and in the Minnesota and St. Croix rivers, although it was not found in large numbers anywhere. Today, it is apparently extirpated from the Minnesota River, extremely rare in the Mississippi River, and healthy only in portions of the St. Croix River system. Due to its limited distribution, population declines, and threats to its persistence in the state, the Purple Wartyback was listed as a threatened species in Minnesota in 1996.

A 10-year statewide mussel survey initiated by the Minnesota DNR in 1999 resulted in a better understanding of the Purple Wartyback mussel's ecology and current status in Minnesota. Despite extensive survey efforts, few new locations of live Purple Wartyback mussels have been identified since their listing in 1996, and only a single live individual has been documented on the Mississippi River. The largest remaining populations of Purple Wartyback mussels are located in the St. Croix River drainage where their viability is jeopardized by the introduction of non-native zebra mussels. Zebra mussels can attach themselves in large numbers to the shells of native mussels, eventually causing death by suffocation. Purple Wartybacks are particularly vulnerable to infestation because their sizeable shell provides a large surface area for zebra mussel attachment. In addition, their restricted range makes them highly susceptible to stochastic events. These mussels are also threatened by habitat modification, non-point and point source water pollution, and sediment pollution. Dams, channelization, and dredging increase siltation, physically alter habitat conditions, and block the movement of fish hosts. For these reasons, it is needed and reasonable to reclassify the Purple Wartyback as Endangered in Minnesota.

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- Dawley, C. 1947. Distribution of aquatic mollusks in Minnesota. *American Midland Naturalist* 38:671-697.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Elliptio complanata*

COMMON NAME: Eastern Elliptio

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Eastern Elliptio is an eastern North American species that reaches its western-most distribution in Minnesota. This species is a habitat generalist that is found in both soft and coarse substrates within Lake Superior, the lower St. Louis River, and the lower Pigeon River. Surveys have shown that these mussels are abundant in the St. Louis-Lake Superior estuary, but are uncommon and sparsely distributed in nearby river habitat. Because the Eastern Elliptio appears to have immigrated to Minnesota after the canal system was established, they likely have the capacity to expand their range within the Lake Superior drainage. However, current populations are highly susceptible to zebra mussel infestation in Lake Superior and the lower St. Louis River. Zebra mussels can attach themselves in large numbers to the shells of native mussels, eventually causing death by suffocation. Because of its restricted range and vulnerability to zebra mussels, the designation of the Eastern Elliptio as a species of Special Concern is needed and reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Elliptio dilatata*

COMMON NAME: Spike

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Spike is a large freshwater mussel that is widespread in the eastern United States and occurs in the Minnesota, St. Croix, and Mississippi River drainages in Minnesota as well as in several southern streams. Spikes are usually found in small to large rivers, but they are also known to inhabit outlets of reservoirs dominated by swift currents. They are most often found in sand and gravel substrates in depths ranging from two to 24 feet. The Spike was listed as a Special Concern Species in Minnesota in 1996 because it had only been found alive in a small number of drainages, and it was vulnerable to continuing degradation of its stream habitat.

A 10-year statewide mussel survey initiated by the Minnesota DNR in 1999 resulted in a better understanding of the Spike mussel's ecology and current status in Minnesota. Once historically widespread and locally abundant in Minnesota, the most substantial populations of Spike remaining in Minnesota occur in the St. Croix River and its tributaries, in a short reach of Rose Creek, and in lower Lake Pepin and its outlet on the Mississippi River, which is now infested with zebra mussels. Occasional specimens are collected from tributaries to the Mississippi River, but persistence of these mussel populations is very tenuous. Despite ample habitat, the Spike is apparently extirpated in the mainstem of the Minnesota River and its tributaries, with the exception of a single, small population on the Chippewa River. In 2000, a small number of Spikes were collected from zebra mussel infested habitats in the Mississippi River and translocated into areas of the Mississippi River south of the Twin Cities, an area currently devoid of zebra mussels where habitat conditions have dramatically improved over the past decade.

The Spike is very sensitive to habitat and water quality, and therefore stream degradation throughout this mussel's known range is a continuing threat. Activities impacting mussel habitat include the hydrologic alteration of streams and their watersheds, the continuing decline in habitat conditions on the Mississippi River associated with its management as a navigation canal, non-point and point source water pollution, and sedimentation. Dams, channelization, and dredging increase siltation, physically alter habitat conditions, and block the movement of fish hosts. Moreover, the small, isolated populations of Spike mussels in the southern streams are vulnerable to stochastic events such as chemical spills. The Spike mussel is also being impacted by the infestation of non-native zebra mussels in the St. Croix River and the Mississippi River drainage. Zebra mussels can attach themselves in large numbers to the shells of native mussels, eventually causing death by suffocation. A critical research need includes the identification of the primary larval fish host for this mussel species, which will aid in its conservation. For these reasons, it is needed and reasonable to reclassify the Spike as Threatened in Minnesota.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Epioblasma triquetra*

COMMON NAME: Snuffbox

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: The Snuffbox is the most widespread member of the nearly extinct genus *Epioblasma*. This increasingly rare species prefers large rivers with strong current and sand and gravel substrates. The Snuffbox historically inhabited the Upper Mississippi and Ohio River drainages of the United States, including the Mississippi River in Minnesota. As of the 1990s, this species was considered extirpated in the Mississippi River in Minnesota and known only from the St. Croix River, where it was very rare. Given its limited range and sparse distribution, the Snuffbox was listed in Minnesota as a Threatened species in 1996, and was designated as an endangered species, including within Minnesota, under the federal Endangered Species Act in March 2012.

A 10-year statewide mussel survey initiated by the Minnesota DNR in 1999 resulted in a better understanding of the Snuffbox mussel's ecology and current status in Minnesota. As part of this statewide effort, intensive mussel surveys have been conducted across this species' historical range; however, no new Snuffbox populations have been located. Today, the Snuffbox is rare throughout the Midwest and is confined in Minnesota to a small 16-mile reach of the lower St. Croix River downstream from Taylors Falls. This isolated Snuffbox population is possibly the largest population of this species remaining in the entire Upper Mississippi River drainage, and therefore is in need of protection.

The continued existence of the Snuffbox is jeopardized by non-point and point source water and sediment pollution, and the infestation of non-native zebra mussels in the St. Croix River. Zebra mussels also threaten recovery efforts in the Mississippi River and its tributaries, areas that would otherwise be targeted for reintroductions. Zebra mussels can attach themselves in large numbers to the shells of native mussels, eventually causing death by suffocation. Propagation efforts funded by the National Park Service are now underway and juveniles are being released into the gorge area of Mississippi River Pool 2 in downtown St. Paul, an area currently devoid of zebra mussels where habitat conditions have dramatically improved over the past decade. Given the diminishing size and number of remaining Snuffbox populations, the attendant probability of inbreeding that could weaken them genetically, and the vulnerability of these populations to habitat degradation and destruction, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Gastrocopta rogersensis*

COMMON NAME: A Species of Snaggletooth Snail

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: *Gastrocopta rogersensis* is a species of landsnail that has only been recently differentiated from the closely related *G. procera* based on several aspects of shell morphology. It is a strict calciphile that ranges from Oklahoma and Arkansas east to southwestern Ohio and north to southeastern Minnesota. In Minnesota, *G. rogersensis* is limited to xeric bedrock glades where it occurs on exposed soil, under stones, and in thin accumulations of leaf litter and grass thatch. Since 2001, five locations for this species have been documented in the state: three from Houston County and one each from Fillmore and Winona counties. All of these sites are within 30 miles of the Mississippi River. At this time insufficient data exists to determine the abundance of this species in Minnesota, although it seems likely that it should be of consistent occurrence in bedrock glade sites within the extreme southeastern corner of the state. However, this species has also demonstrated a highly significant, almost hundred-fold reduction in population size following the initiation of fire management on glade sites. Given the frequent use of fire as a management technique on this habitat type in southeastern Minnesota, the long-term viability of *G. rogersensis* populations is unclear. Thus, due to the limited number of documented populations in Minnesota, its restricted range in the state, and its sensitivity to fire management practices within its only utilized habitat in the state, it is reasonable and needed to list *G. rogersensis* as a species of Special Concern.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Lasmigona costata*

COMMON NAME: Fluted-shell

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Fluted-shell is a relatively widespread but uncommon species in Minnesota that is known from the Red, Rainy, Minnesota, St. Croix, and Mississippi (below St. Anthony Falls) river drainages. The Fluted-shell prefers habitats of medium to large rivers characterized by soft or gravel substrates, moderate current, and a water depth of least two feet. Historically, this species was present in the Red River drainage and reported in low numbers from the Mississippi River, where it represented less than 1% of the mussel fauna. The Fluted-shell was characterized as “sparingly established in the Minnesota River (although surveys found only dead shells at 13 sampling stations) and on the verge of extirpation from the entire drainage. In the 1990s, live specimens were reported from the Cannon, Clearwater, Ottertail, Root, Zumbro, and Mississippi rivers, but it was only considered common in the St. Croix River, where live specimens were found at many sampling points throughout the river. Given the species’ perilously low numbers everywhere but the St. Croix River, the Fluted-shell was listed as Special Concern in Minnesota in 1996.

A 10-year statewide mussel survey initiated by the Minnesota DNR in 1999 resulted in a better understanding of the Fluted-Shell's ecology and current status in Minnesota. Today, the Fluted-shell has a highly fragmented distribution in Minnesota and is not considered abundant in most locations where it does occur. It is absent by and large from the Mississippi River, likely extirpated from the entire Minnesota River drainage, and is rare in southeastern Minnesota streams. The best populations remaining in the state occur in the St. Croix and Root river drainages as well as the Otter Tail and Red Lake rivers. Threats to the Fluted-shell include the continued loss and degradation of habitat throughout its known range, non-point and point source water pollution, siltation, and the infestation of non-native zebra mussels. A critical research need includes the identification of the primary larval fish host for this mussel species, which will aid in its conservation. At this time, it is needed and reasonable to list the Fluted-shell as Threatened in Minnesota. If the observed population trends cannot be reversed, the Fluted-shell may become Endangered in the future.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Ligumia subrostrata*

COMMON NAME: Pondmussel

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Pondmussel is a small freshwater mussel that is distributed across the central and east central United States, and lies at the northern extent of its continental range in Minnesota. It inhabits ponds, creeks, and small rivers in mud or sand substrate, and is typically found in areas with little or no current such as bottom pools and edges of stream margins. The Pondmussel was first discovered in Minnesota in 1999 during a statewide mussel survey initiated by the Minnesota DNR. Based on survey findings of empty, weathered shells, the Pondmussel once occurred in both the Minnesota and Missouri River watersheds. However, results of extensive mussel surveys show that its range in the state has contracted over the last several decades, and it is now quite rare in locations where it occurs. The Pondmussel is apparently extirpated from the Minnesota River system, and a total of 25 live individuals have been collected from eight sites in the Missouri River watershed, mainly in tributaries of the Big Sioux River drainage. This remnant population in the Big Sioux River drainage is of considerable conservation importance, as it appears to serve as the stronghold for this species in the upper Midwest. A critical research need includes the identification of the primary larval fish host for this mussel species in Minnesota, which will aid in its conservation. Given its limited, diminishing geographic range in the state as well as the small number and size of documented populations, a status of Threatened for the Pondmussel is reasonable and needed.

SELECTED REFERENCES:

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Megalonaias nervosa*

COMMON NAME: Washboard

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: The Washboard is a large river species historically found in the Minnesota and St. Croix rivers and in the Mississippi River below St. Anthony Falls. This species typically inhabits the main channel areas of rivers with slow current and substrates composed of sand, gravel, or mud. It was likely always rare in the Minnesota River, where a mussel survey in 1989 found only 2 dead shells and no live individuals. Surveys conducted in the 1980s and 1990s identified the Washboard as very rare in the Mississippi and St. Croix rivers, comprising only 1% of the mussels sampled. Due to the small number of occurrences and concerns about declining habitat conditions on the Mississippi River, the Washboard was listed as a Threatened species in Minnesota in 1996.

A 10-year statewide mussel survey initiated by the Minnesota DNR in 1999 resulted in a better understanding of the Washboard's ecology and current status in Minnesota. Washboard mussels are now restricted to the lower Mississippi River and in a few isolated pockets of the lower St. Croix River, where all remaining populations are threatened by the introduction of non-native zebra mussels. Zebra mussels can attach themselves in large numbers to the shells of native mussels, eventually causing death by suffocation. Washboards are particularly vulnerable to infestation because their sizeable shell provides a large surface area for zebra mussel attachment. Biologists have verified Washboard mortality in Pool 6 of the Mississippi River due to zebra mussel suffocation. In 2000, over 600 Washboard mussels were collected from zebra mussel infested habitats in the Mississippi River and translocated into areas of the Mississippi River south of the Twin Cities, where habitats were devoid of zebra mussels.

The designation of the Washboard as Endangered is needed and reasonable because it is now found alive in only a small number of locations, making it highly susceptible to catastrophic events. All recent observations of Washboard mussels in Minnesota are of old or dead individuals, and surveys have shown little evidence of reproduction or recruitment. Population viability is also jeopardized by the continuing decline in habitat conditions on the Mississippi River associated with its management as a navigation canal, and non-point and point source water and sediment pollution. Dams, channelization, and dredging increase siltation, physically alter habitat conditions, and block the movement of fish hosts.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Novisuccinea* n. sp. Minnesota A

COMMON NAME: Minnesota Pleistocene Ambersnail

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: The Minnesota Pleistocene Ambersnail is a landsnail that is known from 13 sites within a restricted area of southeast Minnesota and northeast Iowa. It has been reported from nine sites in Minnesota in Fillmore and Olmsted counties, where it is generally confined to seeps and vent opening areas on the lower portions of certain cool, moist, north-facing, dolomite precipices, termed maderate cliffs. Based on its rarity, restricted range, and sensitivity to habitat modification, it was classified as a Threatened species in the state in 1996.

The Minnesota Pleistocene Ambersnail was first proposed as a previously undescribed new species in 1987 based on comparisons of shell morphology, genitalic anatomy, and isozymes to other *Novisuccinea* species. While it was not thought to be distinct from *Novisuccinea* n. sp. Minnesota B at that time, it was later elevated to full species status in 1991 due to putative differences in its shell characteristics. However, no anatomical or molecular data were used to verify this conclusion, designation of the taxon has never received peer review, and no name for the taxon has ever been proposed. Species identifications in this group using only characteristics such as shell morphology or genitalic morphology can be erroneous because of considerable variation in these features both within and between populations as well as between closely related species of snails and different snail genera. Moreover, shell and anatomical features are now known to possess highly plastic characteristics that can change over an individual's lifespan. As a result, the taxonomic status of the Minnesota Pleistocene Ambersnail is not sufficiently established to distinguish it as a separate taxonomic entity with a range limited to these nine documented locations in the state. Because the taxon has never been provided a Latin name, nor has its taxonomic status ever been vetted through peer review, it cannot be considered a species of conservation interest in Minnesota at this time. Therefore, it is reasonable and needed to remove the Minnesota Pleistocene Ambersnail from Threatened status.

SELECTED REFERENCES:

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- Frest, T.J., and E.J. Johannes. *In preparation*. Glacial relict *Vertigo* (Gastropoda: Pupillidae) from the Driftless Area (Paleozoic Plateau, Upper Midwest. 66 pp.
- Hoagland, K.E. & G.M. Davis. 1987. The succineid snail fauna of Chittenango Falls, New York: taxonomic status with comparisons to other relevant taxa. *Proceedings of the Academy of Natural Sciences of Philadelphia* 139:465-526.
- Nekola, J.C., T.A. Smith, and T.J. Frest. 1996. Terrestrial gastropod faunas of Door Peninsula natural areas. Report submitted to Michael Grimm, Door County coordinator, Wisconsin Chapter, The Nature Conservancy. 106 pp.
- Ostlie, W.R. 1990. Completion of the algific slope/maderate cliff landsnail survey in Minnesota. Final report submitted to the Minnesota Department of Natural Resources, Nongame Wildlife Program. Unpaged.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Novisuccinea* n. sp. Minnesota B

COMMON NAME: Iowa Pleistocene Ambersnail

CURRENT MINNESOTA STATUS: Endangered

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: The Iowa Pleistocene Ambersnail is a landsnail that is known from 17 sites in a limited range in southeast Minnesota and northeast Iowa. It has been reported from five sites in Minnesota in Fillmore and Olmsted counties, where it is generally confined to seeps and vent opening areas on the lower portions of certain cool, moist, north-facing, dolomite precipices, termed maderate cliffs. Based on its rarity, restricted range, and sensitivity to habitat modification, it was classified as an Endangered species in the state in 1996.

The Iowa Pleistocene Ambersnail was first proposed as a potentially undescribed new species in 1987 based on comparisons of shell morphology, genitalic anatomy, and isozymes to other *Novisuccinea* species. While it was not thought to be specifically distinct from *Novisuccinea* n. sp. Minnesota A at that time, it was later elevated to full species status in 1991 due to putative differences in its shell characteristics. However, no anatomical or molecular data were used to verify this conclusion, designation of the taxon has never received peer review, and no name for the taxon has ever been proposed. Species identifications in this group using only characteristics such as shell morphology or genitalic morphology can be erroneous because of considerable variation in these features both within and between populations as well as between closely related species of snails and different snail genera. Moreover, shell and anatomical features are now known to possess highly plastic characteristics that can change over an individual's lifespan. As a result, the taxonomic status of the Iowa Pleistocene Ambersnail is not sufficiently established to distinguish it as a separate taxonomic entity with a range limited to these five documented locations in the state. Because the taxon has never been provided a Latin name, nor has its taxonomic status ever been vetted through peer review, it cannot be considered a species of conservation interest in Minnesota at this time. Therefore, it is reasonable and needed to remove the Iowa Pleistocene Ambersnail from Endangered status.

SELECTED REFERENCES:

- Frest, T.J. 1991. Summary status reports on eight species of candidate land snails from the driftless area (paleozoic plateau), Upper Midwest. Unpubl. final report to the USFWS, Region 3. 54 pp.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Obovaria olivaria*

COMMON NAME: Hickorynut

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: The Hickorynut most often inhabits large rivers and is rarely found in smaller streams. It typically occurs in sand and gravel substrates in water depths that generally exceed five to six feet. The Hickorynut was historically found in the Minnesota and St. Croix rivers and the Mississippi River below St. Anthony Falls. As of the 1990s, this species was extirpated from the Minnesota River, considered rare in the St. Croix River, and uncommon and scattered in the Mississippi River. Given the reduction in range and abundance of this species as well as its larval host fish, the Shovelnose Sturgeon, the Hickorynut was listed as a Special Concern species in Minnesota in 1996.

A 10-year statewide mussel survey initiated by the Minnesota DNR in 1999 resulted in a better understanding of the Hickorynut's ecology and current status in Minnesota. While the Hickorynut is still absent from the Minnesota River, current populations of this mussel in the St. Croix River drainage are widespread and locally common. In addition, the Hickorynut has expanded its range in the Mississippi River where reproduction is occurring and it appears to be thriving. The area of the Mississippi River from St. Anthony Falls to Lake Pepin is now supporting a healthy population of this species due to improvements in water quality. In 2000, 148 Hickorynuts were collected from zebra mussel infested habitats in the Mississippi River and translocated into areas of the Mississippi River south of the Twin Cities, where habitats were devoid of zebra mussels. The Hickorynut also has the potential for successful reintroduction to the Minnesota River drainage once habitat conditions and water quality on this river improve. Based on its extended geographic distribution as well as the number, size, and distribution of current populations, it is reasonable to remove the Hickorynut from Special Concern status at this time.

SELECTED REFERENCES:

- Bright, R. C., C. Gatenby, D. Olson, and E. Plummer. 1990. A survey of the mussels of the Minnesota River, 1989. Final report submitted to the Natural Heritage and Nongame Research Program, Minnesota Department of Natural Resources. 106 pp.
- Cummings, K. S., and C. A. Mayer. 1992. Field guide to freshwater mussels of the Midwest. Illinois Natural History Survey Manual 5. 194 pp.
- Doolittle, T. C. J. 1988. Distribution and relative abundance of freshwater mussels in the Saint Croix National Scenic Riverway. Final report submitted to the Natural Heritage and Nongame Research Program, Minnesota Department of Natural Resources. Unpaged.
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- Hornbach, D. J., P. Baker, and T. Deneka. 1995. Abundance and distribution of the endangered mussel *Lampsilis higginsii* in the lower St. Croix River, Minnesota and Wisconsin. Final report submitted to the U.S. Fish and Wildlife Service, Minneapolis, Minnesota. 68 pp.
- Parmalee, P. W., and A. E. Bogan. 1998. The freshwater mussels of Tennessee. The University of Tennessee Press, Knoxville, Tennessee. 328 pp.
- Sietman, B. E. 2003. Field guide to the freshwater mussels of Minnesota. Minnesota Department of Natural Resources, St. Paul, Minnesota. 144 pp.
- van der Schalie, H., and A. van der Schalie. 1950. The mussels of the Mississippi River. American Midland Naturalist 44:448-464.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Planogyra asteriscus*

COMMON NAME: Eastern Flat-whorl Snail

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Eastern Flat-whorl Snail is limited in North America from Newfoundland and the Canadian Maritimes west through New York, Ohio, and Ontario to northeastern Minnesota. While apparently rare across much of its range, it is a consistent and common component of northern white cedar faunas in regions which support a maritime-like climate with increased humidity, lower summer temperatures, and higher winter temperatures due to proximity to large water bodies. Large populations are often found in areas with fairly acidic soil conditions. Only four localities of Eastern Flat-whorl Snail are known from Minnesota, all adjacent to the Lake Superior shore in Cook County, where they are limited to fen and mesic upland sites supporting Northern White Cedar. These Minnesota populations appear disjunct from the nearest known sites in the Keweenaw Peninsula, with no populations known from adjacent Ontario, Wisconsin, or the western Upper Peninsula. No locations of Eastern Flat-whorl Snails were found in northeastern Minnesota among approximately 60 surveyed upland cliff sites supporting Northern White Cedar inland from the Lake Superior shore in 1998. While it is unlikely that many additional populations will be located in the state, other sites may occur in coastal habitats in Cook, Lake and St. Louis counties. Further survey work is needed to document the full range and abundance of this species in the state. However, due to the limited number of known populations of the Eastern Flat-whorl Snail in Minnesota, its disjunct, isolated distribution, restrictive habitat requirements, and limited habitat availability, a status of Special Concern is reasonable and needed at this time.

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- Nekola, J.C. 2008. Land snail ecology and biogeography of eastern Maine. Final report to Maine Department of Inland Fisheries & Wildlife, Bangor, Maine. 121 pp.
- Nekola, J.C. 2009. Conservation prioritization of the Ontario and Quebec land snail faunas. Final report submitted to the Committee on the Status of Endangered Wildlife in Canada. 120 pp.
- Nekola, J.C., M. Barthel, P. Massart, and E. North. 1999. Terrestrial gastropod inventory of igneous outcrops in Northeastern Minnesota. Final report submitted to the Natural Heritage and Nongame Research Program, Minnesota Department of Natural Resources, St. Paul. 69 pp.

SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Pleurobema coccineum*

NEW SCIENTIFIC NAME: *Pleurobema sintoxia*

COMMON NAME: Round Pigtoe

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Round Pigtoe is found primarily in medium to large rivers but occasionally occurs in smaller rivers. Preferred habitats include fast current areas with coarse sand and gravel substrates. The Round Pigtoe was historically found in the Zumbro, Cannon, Minnesota, and St. Croix rivers, as well as the Mississippi River below St. Anthony Falls, though this species was not considered to be abundant anywhere in the state. In the 1990s, the Round Pigtoe was considered extirpated from the Minnesota River, extremely rare in the Cannon and Zumbro rivers, rare in the Mississippi River, and common only in the St. Croix River, where it comprised only 3% of the specimens collected during surveys. Due to its limited distribution, vulnerability to catastrophic events, and degradation of its habitat, the Round Pigtoe was listed as a threatened species in Minnesota in 1996.

A 10-year statewide mussel survey initiated by the Minnesota DNR in 1999 resulted in a better understanding of the Round Pigtoe's ecology and current status in Minnesota. While the Round Pigtoe is still absent from the Minnesota River mainstem and rare in the Cannon River, this species is now abundant and actively reproducing in parts of the Mississippi River; recent pool-wide surveys of Pool 5 and Pool 6 documented ongoing recruitment of this mussel. Large populations can also be found on the St. Croix River. In 2000, over 50 Round Pigtoes were collected from zebra mussel infested habitats in the Mississippi River and translocated into areas of the Mississippi River south of the Twin Cities, where habitats were devoid of zebra mussels. Round Pigtoes also have the potential to recolonize the Minnesota River once habitat conditions and water quality on this river improve. However, due to continuing decline of habitat conditions associated with the management of the Mississippi River as a navigational canal, water and sediment pollution, and vulnerability to zebra mussel infestation, the long-term viability of Round Pigtoes in Minnesota is still a concern. Therefore, Special Concern status is reasonable and needed in order to support the continued recovery of this mussel species.

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- Bright, R.C., E. Plummer, and D. Olson. 1988. A survey of the mussels of the Zumbro River drainage, southeastern Minnesota. Report submitted to Minnesota Department of Natural Resources. 27+ pp.
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- Dawley, C. 1947. Distribution of aquatic mollusks in Minnesota. American Midland Naturalist 38:671-697.
- Doolittle, T.C.J. 1988. Distribution and relative abundance of freshwater mussels in the Saint Croix National Scenic Riverway. Final report submitted to the Natural Heritage and Nongame Research Program, Minnesota Department of Natural Resources. Unpaged.
- Heath, D.J. 1990. Identification of distribution, abundance, and critical habitat for *Lampsilis higginsii* and Category 2 species of mussels - performance report. Wisconsin Endangered Resources Report #65. 11+ pp.
- Hornbach, D.J., P. Baker, and T. Deneka. 1995. Abundance and distribution of the endangered mussel *Lampsilis higginsii* in the lower St. Croix River, Minnesota and Wisconsin. Final report submitted to the USFWS, Minneapolis, Minnesota. 68 pp.
- Sietman, B.E. 2003. Field guide to the freshwater mussels of Minnesota. Minnesota Department of Natural Resources, St. Paul, Minnesota. 144 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Quadrula nodulata*

COMMON NAME: Wartyback

CURRENT MINNESOTA STATUS: Endangered

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Wartyback is found in large rivers in Minnesota where it occurs in areas of slow or moderate current characterized by sand or fine gravel substrates. Museum records and recent surveys show that the Wartyback historically populated the Minnesota River and the Mississippi River below St. Anthony Falls in Minnesota. By the 1990s, populations of Wartyback mussels in Minnesota had declined precipitously. In the Minnesota River, biologists found a total of 7 live individuals at 4 sites above Mankato, and dead shells at 8 other sites. No individuals were reported as a result of survey efforts in the St. Croix River, and only a few individuals had been recently reported from the Mississippi River in Pool 9. Given the Wartyback's restricted range and the small number of reported live specimens, it was listed as an Endangered species in Minnesota in 1996.

A 10-year statewide mussel survey initiated by the Minnesota DNR in 1999 resulted in a better understanding of the Wartyback's ecology and current status in Minnesota. Since 1996, the Wartyback has expanded its range and has been discovered at a number of new locations on the lower Mississippi and lower Minnesota rivers. However, only several of these locations yielded a sample of more than 10 individuals. While the Wartyback is still rare and sporadically distributed in the Mississippi River, it is now one of the most numerous mussels in Pools 2 and 3, providing evidence of some recent recovery in the Twin Cities area. The Wartyback has also been sampled in a handful of locations in the Minnesota River, including two sites where a few young individuals were observed. Because catfish appear to serve as a larval fish host, these mussels have the potential to be distributed across a wider range in the Mississippi and Minnesota river systems.

Degradation of mussel habitat in streams throughout the Wartyback's known range is a continuing threat to this species. Populations in Minnesota are vulnerable to further decline because of hydrologic alteration of streams and their watersheds, the continuing decline in habitat conditions on the Minnesota and Mississippi rivers, non-point and point source water and sediment pollution, and the infestation of non-native zebra mussels in the Mississippi River. Zebra mussels can attach themselves in large numbers to the shells of native mussels, eventually causing death by suffocation. While Wartyback mussels have been slowly increasing their distribution in the state, long-term viability of existing populations is still a concern. Therefore, the continued protection and careful monitoring associated with Threatened status is needed and reasonable to ensure the recovery of this species in Minnesota.

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- Hornbach, D.J., P. Baker, and T. Deneka. 1995. Abundance and distribution of the endangered mussel *Lampsilis higginsii* in the lower St. Croix River, Minnesota and Wisconsin. Unpubl. Report to USFWS, Minneapolis.
- Kelner, D., M. Davis. 2002. Final report: mussel (Bivalvia: Unionidae) survey of the Mississippi National River and Recreation Area Corridor, 2000-01. Final report submitted by the Minnesota DNR. 44+ pp.
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- van der Schalie, H. and A. van der Schalie. 1950. The mussels of the Mississippi River. *Amer. Midl. Nat.* 44:448-464.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Simpsonaias ambigua*

COMMON NAME: Salamander Mussel

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: The Salamander Mussel is a small, thin-shelled mussel that lives in the swift current of medium to large rivers and has very specific habitat requirements. It lives in colonies under flat rocks or under ledges of rock walls where its larval host, the Mudpuppy Salamander (*Necturus masculosus*), also resides. The Salamander Mussel is a widely-distributed species in the Mississippi and Ohio River drainages, but one that is uncommon and rarely collected anywhere in its continental range. In Minnesota, the Salamander Mussel historically occurred in the Mississippi and St. Croix rivers, and was first reported from the Minnesota River near Granite Falls in 1989 where researchers found four dead shells. However, by the 1990s, the Salamander Mussel was restricted to the lower St. Croix River, where it was considered rare. Due to its limited distribution, narrow habitat requirements, and threats of an impending zebra mussel infestation, the Salamander Mussel was listed as a Threatened species in Minnesota in 1996.

A 10-year statewide mussel survey initiated by the Minnesota DNR in 1999 resulted in a better understanding of the Salamander Mussel's ecology and current status in Minnesota. Today, the Salamander Mussel is only known from four sites in the lower St. Croix River in Minnesota: three sites along a 1.3 mile reach between Taylors Falls and Franconia, and one isolated site near Hudson. Despite extensive, targeted mussel surveys in prime Mudpuppy habitat, no new populations have been discovered since the 1996 state listing, and few large colonies remain. The viability of these remaining colonies of Salamander Mussels is jeopardized by the infestation of non-native zebra mussels in the St. Croix River. Zebra mussels can attach themselves in large numbers to the shells of native mussels, eventually causing death by suffocation. Other factors that threaten the continued existence of the Salamander Mussel include high stream-flow variations on the St. Croix River caused by a hydroelectric dam operating on a seasonal peaking regime, and the threat of non-point and point source water and sediment pollution. The Salamander Mussel's larval host is intolerant of siltation, and habitat modification activities such as dams, channelization, and dredging can bury the exposed rock layers that the Mudpuppy depends on. Moreover, because the Salamander Mussel is very rare and highly localized, remaining populations are extremely vulnerable to extirpation from stochastic events such as chemical spills. For these reasons, it is needed and reasonable to list the Salamander Mussel as Endangered in Minnesota.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Striatura ferrea*

COMMON NAME: Black Striate Snail

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Black Striate Snail is principally Appalachian in distribution, ranging from Tennessee and North Carolina north to the Canadian Maritimes and the north shore of the St. Lawrence in Quebec west through the Great Lakes into Michigan, northern Wisconsin, and Minnesota. Only a single occurrence is known in Minnesota from within the city of Duluth in St. Louis County. This population was discovered on a mesic talus slope consisting of mafic basalt boulders during a land snail inventory in 1998 and represents the known western terminus of this species' range. The Black Striate Snail favors acid, base-poor habitats, and although a number of acid upland cliff and talus slope sites were inventoried during the 1998 surveys, no additional populations were found. While this species appears quite rare in the state, a thorough field survey of pineland and other suitable acidic habitats in the region is needed to adequately document its range and abundance in the state. Given the documentation of only a single known population of the Black Striate Snail in Minnesota at the western edge of its range and its restriction to the Duluth metropolitan area, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Tritogonia verrucosa*

COMMON NAME: Pistolgrip

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: In Minnesota, the Pistolgrip mussel is most often found inhabiting large rivers in areas with moderate current and gravel substrates. This species historically occurred in the Minnesota and St. Croix rivers, and in the Mississippi River below St. Anthony Falls. Surveys conducted in the 1980s and 1990s failed to locate live Pistolgrip mussels in the Minnesota River, and found only a few live specimens across a greatly reduced distribution in the Mississippi River. Only the St. Croix River appeared to support a viable population, where live specimens were reported from more than five sites, and it represented about one percent of the mussels sampled. Due to the small number of occurrences, concerns about habitat conditions, and the impending zebra mussel infestation, the Pistolgrip was designated as a Threatened species in Minnesota in 1996.

A 10-year statewide mussel survey initiated by the Minnesota DNR in 1999 resulted in a better understanding of the Pistolgrip's ecology and current status in Minnesota. In the past decade, this mussel has only been found live in a 34-mile reach of the lower St. Croix River downstream from Taylors Falls, has become exceedingly rare on the Mississippi River, and is considered extirpated in the Minnesota River. Because the Pistolgrip is now limited to such a small number of locations in a highly localized area, remaining populations are extremely vulnerable to extirpation from stochastic events such as chemical spills. Degradation of mussel habitat in streams throughout the Pistolgrip's known range is a continuing threat to this species. Populations in Minnesota are sensitive to further decline because of hydrologic alteration of streams and their watersheds, the continuing decline in habitat conditions on the Mississippi River associated with its management as a navigation canal, non-point and point source water and sediment pollution, and the infestation of non-native zebra mussels in the Mississippi and St. Croix rivers. Zebra mussels can attach themselves in large numbers to the shells of native mussels, eventually causing death by suffocation. Given the highly restricted range of healthy, reproducing populations of Pistolgrip mussels, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Truncilla donaciformis*

COMMON NAME: Fawnsfoot

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Fawnsfoot is a small freshwater mussel that typically inhabits the main channel of large rivers in flowing water characterized by sand or gravel substrate. This species historically occurred in the Minnesota and St. Croix rivers and was common in the Mississippi River, where it was reported as one of the most abundant mussels. Today, based on results from a 10-year statewide mussel survey initiated by the Minnesota DNR in 1999, the Fawnsfoot is considered one of the least abundant species in the Mississippi River, with one population above St. Anthony Falls and diminished numbers below St. Anthony Falls to the Minnesota-Iowa border. The Fawnsfoot is nearly extirpated from the Minnesota River and is very rare in the St. Croix River, where its distribution has been shrinking since the 1970s. Threats to the Fawnsfoot include the continued loss and degradation of habitat throughout its known range, non-point and point source water pollution, siltation, and the infestation of non-native zebra mussels in the Mississippi and lower St. Croix rivers. Given the substantial reduction in range and abundance of this species in Minnesota over the last several decades, a designation of Threatened status is needed and reasonable at this time.

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- Fuller, S.L.H. 1980. Final report: Freshwater mussels (Mollusca: Bivalvia: Unionidae) of the Upper Mississippi River: observations at selected sites within the 9-foot navigation channel project for the St. Paul District, United State Army Corps of Engineers, 1977-1979. Volume 1: Text. Academy of Natural Sciences of Philadelphia, Division of Limnology and Ecology, Philadelphia, PA. 175pp.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Vertigo hubrichti hubrichti*

COMMON NAME: Midwest Pleistocene Vertigo

CURRENT MINNESOTA STATUS: Endangered

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: First described as a *Vertigo gouldii* subspecies, *Vertigo hubrichti* was eventually raised to species status in 1985. At that time, *V. h. hubrichti* was identified as a subspecies based on aspects of its shell morphology, and its range was believed to be limited to algific talus slopes in northeastern Iowa, southwestern Wisconsin, and at four small sites in Fillmore County in southeastern Minnesota. Based on its highly restricted range, rarity, and sensitivity to disturbance, *V. h. hubrichti* was designated as Endangered in Minnesota in 1996.

However, in the late 1990s, its known range was expanded to include areas from eastern Wisconsin to eastern Ontario, and individuals essentially identical to *V. h. hubrichti* have also been found in interior Alaska near Fairbanks and northern Yukon. Moreover, recent field work and surveys of museum holdings demonstrate that *V. h. hubrichti* occurs across a wider range of habitats than previously believed. Populations are now known to inhabit a number of cool, mesic, calcareous wooded locations across its range; these habitats include algific talus slopes and moderate cliff sites as well as carbonate cliffs and alvar sites supporting Northern White Cedar.

Recent taxonomic work based on both shell morphology and genetic data from across the known range of *V. hubrichti* and related *Vertigo* species (specifically *V. arthuri*, *V. brierensis*, *V. iowaensis*, and *V. paradoxa*) has demonstrated that these various taxa all represent members of the same species-level clade, and therefore *V. hubrichti* can no longer be considered a distinct species. Instead, the “*hubrichti*” name simply represents one of several different shell forms within the morphologically diverse species *V. arthuri*. As a result of the reduced taxonomic status, this landsnail does not warrant listing as a species of conservation importance in Minnesota because other shell forms of *V. arthuri* occur at numerous locations across the northern part of the state. Therefore, Endangered status is no longer reasonable or needed.

SELECTED REFERENCES:

- Frest, T.J. 1991. Summary status reports on eight species of candidate land snails from the driftless area (paleozoic plateau), Upper Midwest. Unpubl. final report to the USFWS, Region 3. 54pp.
- Hubricht, L. 1985. The distributions of the native land mollusks of the eastern United States. Fieldiana 24: 1-191.
- Nekola, J.C. 2002. Distribution and ecology of terrestrial gastropods in northwestern Minnesota. Final report submitted to the Minnesota Department of Natural Resources, St. Paul. 200 pp.
- Nekola, J.C. 2009. Conservation prioritization of the Ontario and Quebec land snail faunas. Final report submitted to the Committee on the Status of Endangered Wildlife in Canada. 120 pp.
- Nekola, J.C., and B.F. Coles. 2010. Pupillid land snails of eastern North America. American Malacological Bulletin 28:29-57.
- Nekola, J.C., B.F. Coles, and U. Bergthorsson. 2009. Evolutionary pattern and process in the *Vertigo gouldii* (Mollusca: Pulmonata, Pupillidae) group of minute North American land snails. Molecular Phylogenetics and Evolution 53:1010-1024.
- Nekola, J.C., M. Barthel, P.A. Massart, and E. North. 1999. Terrestrial gastropod inventory on igneous outcrops in northeastern Minnesota. Final report submitted to the Minnesota DNR, St. Paul. 76 pp.
- Ostlie, W.R. 1990. Completion of the algific slope/moderate cliff landsnail survey in Minnesota. Final report submitted to the Minnesota Department of Natural Resources, Nongame Wildlife Program. Unpaged.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Vertigo hubrichti variabilis* n. subsp.

COMMON NAME: Variable Pleistocene Vertigo

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: This taxon was erected by Frest in the early 1990s to represent what was believed to be a putative distinct race within *V. hubrichti* with a limited distribution in southeastern Minnesota, southwestern Wisconsin, and northeastern Iowa. In Minnesota, *V. h. variabilis* has only been reported from 12 sites in Fillmore, Olmsted, Houston, and Winona counties in small, relicit, cold-producing habitats terms algific slopes and maderate cliffs. Based on its restricted range, rarity, and sensitivity to disturbance, *V. h. variabilis* was designated as Threatened in Minnesota in 1996.

However, the status of the *V. h. variabilis* taxon has never been vetted through the standard scientific review process, and type material has never been deposited within any public museum. The shell features used by Frest to distinguish *V. h. variabilis* appear to fall well within the normal levels of variation in shell morphology observed within and between members of the *V. arthuri-hubrichti-paradoxa* species complex. Moreover, no biogeographical data has been presented to document that this taxon only occupies a limited subset of the entire *V. hubrichti* range; rather, both appear to have identical geographic distributions. Therefore, the subspecies *V. h. variabilis* appears to be synonymous with *V. hubrichti*.

Recent taxonomic work based on both shell morphology and genetic data from across the known range of *V. hubrichti* and related *Vertigo* species (specificially *V. arthuri*, *V. brierensis*, *V. 'iowaensis'*, and *V. paradoxa*) has demonstrated that these various taxa all represent members of the same species-level clade, and therefore *V. hubrichti* can no longer be considered a distinct species. Instead, the “*hubrichti*” name simply represents one of several different shell forms within the morphologically diverse species *V. arthuri*. As a result of the reduced taxonomic status, this landsnail does not warrant listing as a species of conservation importance in Minnesota because other shell forms of *V. arthuri* occur at numerous locations across the northern part of the state. Therefore, Threatened status is no longer reasonable or needed.

SELECTED REFERENCES:

- Frest, T.J. 1991. Summary status reports on eight species of candidate land snails from the driftless area (paleozoic plateau), Upper Midwest. Unpubl. Final Report to the USFWS, Region 3. 54pp.
- Hubricht, L. 1985. The distributions of the native land mollusks of the eastern United States. Fieldiana 24: 1-191.
- Nekola, J.C. 2002. Distribution and ecology of terrestrial gastropods in northwestern Minnesota. Final report submitted to the Minnesota Department of Natural Resources, St. Paul. 200 pp.
- Nekola, J.C. 2009. Conservation prioritization of the Ontario and Quebec land snail faunas. Final report submitted to the Committee on the Status of Endangered Wildlife in Canada. 120 pp.
- Nekola, J.C., and B.F. Coles. 2010. Pupillid land snails of eastern North America. American Malacological Bulletin. 28:29-57.
- Nekola, J.C., B.F. Coles, and U. Bergthorsson. 2009. Evolutionary pattern and process in the *Vertigo gouldii* (Mollusca: Pulmonata, Pupillidae) group of minute North American land snails. Molecular Phylogenetics and Evolution 53:1010-1024.
- Nekola, J.C., M. Barthel, P.A. Massart, and E. North. 1999. Terrestrial gastropod inventory on igneous outcrops in northeastern Minnesota. Final report submitted to the Minnesota DNR, St. Paul. 76 pp.
- Ostlie, W.R. 1990. Completion of the algific slope/maderate cliff landsnail survey in Minnesota. Final report submitted to the Minnesota Department of Natural Resources, Nongame Wildlife Program. Unpaged.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Zonitoides limatulus*

COMMON NAME: Dull Gloss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This snail has a wide but sporadic occurrence ranging from eastern New York state and southeastern Minnesota south to central Missouri and Kentucky. It apparently occurs at fewer than two dozen extant sites across this region and represents one of the most restricted land snail species within its geographic range. In Minnesota, it is only known from three sites in Houston and Olmsted counties where it is limited to humid, forested rock carbonate and sandstone outcrops, including non-chilled borders to algific slopes. Although such habitats are frequent throughout the Paleozoic Plateau region of the state, it appears that this species is absent from most potential sites; for instance, only two populations are known from similar sites in adjacent Iowa. Therefore, while it is unlikely that many additional populations will be located in Minnesota, additional survey work is needed to document the full range and abundance of this species in the state. Populations may be negatively impacted not only from timber cutting and rock removal, but also highway construction, and grazing. Given the documentation of only three known population of this species in Minnesota at the extreme northwestern edge of its range and its restriction to a limited number of easily disturbed habitats, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

- Frest, T.J. 1983. Northern driftless area survey. Final report submitted to the Minnesota Department of Natural Resources. 17 pp.
- Hubricht, L. 1985. The distributions of the native land molluscs of the eastern United States. Fieldiana 24: 1-191.
- Ostlie, W.R. 1990. Completion of the algific slope/moderate cliff landsnail survey in Minnesota. Final report submitted to the Minnesota Department of Natural Resources, Nongame Wildlife Program. Unpaged.

JUMPING SPIDERS

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Habronattus calcaratus maddisoni*

COMMON NAME: A Species of Jumping Spider

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Jumping spiders are a relatively easily surveyed and identified group of spiders, but studies of their distribution have been limited. *Habronattus calcaratus maddisoni* is a distinctive jumping spider with a central white abdominal band, a hook-like structure on the male's third leg, and characteristic genetics and courtship behavior. Its recorded range extends from the Cumberland Plateau north to Maine and west to the Great Lakes. Not previously known from Minnesota, *H. c. maddisoni* was discovered in St. Louis County in August 2010 under pin oak at the site of a proposed state park on the shore of Lake Vermillion; a second specimen was collected the same week in cattails at a nearby quarry. These discoveries extended the range of the species by 125 miles from the previous western-most record at Isle Royale, Michigan. Until further surveys are conducted more widely in the state, Special Concern designation for *Habronattus calcaratus maddisoni* is needed and reasonable.

SELECTED REFERENCES:

- Ehmann, W. J. 2011. Reconnaissance for State-Listed Jumping Spiders (Araneae: Salticidae) in St. Louis and Lake Counties, Minnesota. Final Report submitted to the Minnesota County Biological Survey, Minnesota Department of Natural Resources. 11 pp.
- Griswold, C.F. 1987. A revision of the jumping spider genus *Habronattus* F.O.P.—Cambridge (Araneae: Salticidae), with phenetic and cladistic analyses. University of California Publications in Entomology 107. University of California, Berkeley. 344pp.
- Richman, D.B., and Cutler, B. 1977. A list of jumping spiders (Araneae: Salticidae) of the United States and Canada. Peckhamia 1:82-109.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Habronattus viridipes*

COMMON NAME: A Species of Jumping Spider

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Jumping spiders are a relatively easily surveyed and identified group of spiders, but studies of their distribution have been limited. *Habronattus viridipes* is a dark-colored, medium-sized jumping spider with a spotty eastern North American distribution and a western range limit in Minnesota. Several jumping spider surveys have been conducted in Minnesota over the past decade. While many species have been collected repeatedly at a wide variety of sites during these surveys, *Habronattus viridipes* has been found at only three locations: in 1996 at Kellogg-Weaver Dunes SNA, Winona County; in 2001 at Glacial Lakes State Park, Pope County, and in 2004 from Seven Sisters Preserve, Otter Tail County. Each of these sites are dominated by dry prairie habitat, which is itself a rare plant community within the state. Until further surveys are conducted more widely in the state, this limited distribution indicates that Special Concern designation for *Habronattus viridipes* is needed and reasonable at this time.

SELECTED REFERENCES:

- Ehmann, W. J. 2002. Conservation biology of special concern jumping spiders (Araneae: Salticidae) of Minnesota. Final Report submitted to the Natural Heritage and Nongame Research Program, Minnesota Department of Natural Resources. 11 pp.
- Ehmann, W. J., and B. E. Boyd. 1997. Surveys for proposed special concern jumping spiders of Minnesota. Final report submitted to the Minnesota Department of Natural Resources. Unpaged.
- Griswold, C.F. 1987. A revision of the jumping spider genus *Habronattus* F.O.P.—Cambridge (Araneal: Salticidae), with phenetic and cladistic analyses. University of California Publications in Entomology 107. University of California, Berkeley. 344pp.
- Richman, D.B., and Cutler, B. 1977. A list of jumping spiders (Araneae: Salticidae) of the United States and Canada. Peckhamia 1:82-109.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Marpissa formosa*

COMMON NAME: A Species of Jumping Spider

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Jumping spiders are a relatively easily surveyed and identified group of spiders, but studies of their distribution have been limited. *Marpissa formosa* is a small, dark-colored jumping spider with a spotty eastern North American distribution and a northwestern range limit in Minnesota. Several jumping spider surveys have been conducted in Minnesota over the past decade. While many species have been collected repeatedly at a wide variety of sites during these surveys, *Marpissa formosa* has been found at only four locations: in 2001 at Uncas Dunes SNA, Sherburne County, in 2004 from Lake Carlos State Park, Douglas County, and in 2009 from the Cobb River WPA, Blue Earth County and at Woman Lake, Cass County. Until further surveys are conducted more widely in the state, this limited distribution indicates that Special Concern designation for *Marpissa formosa* is needed and reasonable at this time.

SELECTED REFERENCES:

- Barnes, R. D. 1958. North American jumping spiders of the subfamily Marpissinae (Araneae, Salticidae). American Museum Novitates 1867: 1-50.
- Ehmann, W. J. 2002. Conservation biology of special concern jumping spiders (Araneae: Salticidae) of Minnesota. Final Report submitted to the Natural Heritage and Nongame Research Program, Minnesota Department of Natural Resources. 11 pp.
- Ehmann, W. J., and B. E. Boyd. 1997. Surveys for proposed special concern jumping spiders of Minnesota. Final report submitted to the Minnesota Department of Natural Resources. Unpaged.
- Richman, D.B., and Cutler, B. 1977. A list of jumping spiders (Araneae: Salticidae) of the United States and Canada. Peckhamia 1:82-109.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Marpissa grata*

COMMON NAME: A Species of Jumping Spider

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: *Marpissa grata* is a Great Lakes endemic species, known only from Michigan and Minnesota. The species is associated with fresh water habitats, either wetlands, ponds or rivers. It is taken most frequently by sweeping sedges or other emergent vegetation. Jumping spider surveys have now documented *Marpissa grata* at 13 locations in 10 counties distributed widely in the state, including 6 new locations in 4 additional counties since the species was assigned Special Concern status in 1996. These results suggest that other populations will be found. Given this new information, Special Concern status is no longer needed or reasonable for this species.

SELECTED REFERENCES:

Barnes, R. D. 1958. North American jumping spiders of the subfamily Marpissinae (Araneae, Salticidae). American Museum Novitates 1867: 1-50.

Ehmann, W. J. 2002. Conservation biology of special concern jumping spiders (Araneae: Salticidae) of Minnesota. Final Report submitted to the Natural Heritage and Nongame Research Program, Minnesota Department of Natural Resources. 11 pp.

Ehmann, W. J., and B. E. Boyd. 1997. Surveys for proposed special concern jumping spiders of Minnesota. Final report submitted to the Minnesota Department of Natural Resources. Unpaged.

Richman, D.B., and Cutler, B. 1977. A list of jumping spiders (Araneae: Salticidae) of the United States and Canada. Peckhamia 1:82-109.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Tutelina formicaria*

COMMON NAME: A Species of Jumping Spider

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Minnesota represents the western range limit of *Tutelina formicaria*, which has been documented as sparsely distributed in low numbers in six states to the east. In Minnesota, *Tutelina formicaria* occurs in oak savanna - sand prairie habitat in association with characteristic grasses such as *Andropogon* and *Aristida*, and shows a close affinity for old seed pods of *Penstemon grandiflorus*, which are used as sites for building retreats, and particularly, for making egg sacs. Despite extensive jumping spider surveys conducted in Minnesota during the past decade, the species has been found at only two sites (Allison Savanna Nature Conservancy preserve and Cedar Creek Natural History Area) located within a 1.3 mile diameter area of each other in Anoka and Isanti Counties. Because of *Tutelina formicaria*'s very specific habitat requirements and limited distribution, designation as a Threatened species is needed and reasonable at this time.

SELECTED REFERENCES:

- Cutler, B. Manuscript in preparation on spiders associated with old seed pods of *Penstemon grandiflorus*.
- Ehmann, W. J. 2002. Conservation biology of special concern jumping spiders (Araneae: Salticidae) of Minnesota. Final Report submitted to the Natural Heritage and Nongame Research Program, Minnesota Department of Natural Resources. 11 pp.
- Kaston, B.J. 1981. The Spiders of Connecticut. Revised edition, Natural History Survey of Conn., Bull. 70. 1020pp.
- Richman, D.B. and B. Cutler. 1971. A list of the jumping spiders (Araneae: Salticidae) of the United States and Canada. *Feckhamia* 1:82-109.

BUTTERFLIES AND MOTHS

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Catocala abbreviatella*

COMMON NAME: Abbreviated Underwing

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Abbreviated Underwing occurs in the former tallgrass prairie region of the United States from North Dakota south to Texas, and east through Minnesota and Arkansas to Indiana. Historically, this species was probably very abundant throughout the prairie region of Minnesota as well as in regions like the Anoka Sand Plain where prairie vegetation was a major component. Today, the Abbreviated Underwing likely remains present in scattered prairie remnants throughout its original range where leadplant, its main larval host plant, is available. Over the past several decades, the Abbreviated Underwing has been sporadically observed in the southern half of Minnesota, from Hennepin County south and west through the prairie region of the state. Between 2006 and 2008, the Minnesota DNR's County Biological Survey documented the Abbreviated Underwing in two high quality native prairie remnants in Lincoln and Pipestone County in southwest Minnesota. During this same time period, this moth was also identified in bluff prairie habitat within five state parks in Goodhue, Winona, and Houston counties in southeast Minnesota.

The highly specialized life history and habitat requirements of the Abbreviated Underwing make it inherently sensitive to habitat loss and other land use changes. Persistence of Abbreviated Underwing populations requires a nectar source (such as milkweed) and a good population of leadplant. While the moth can tolerate some degradation of prairie habitat, small amounts of leadplant will not produce enough adults to sustain a population in isolation, making the dispersal of females among patches critical. The dispersal behavior of this moth is not understood, and many small protected prairies may eventually lose the species as neighboring unprotected remnants are destroyed. Remaining prairie habitats are under increasing pressure from human activities such as farming and residential development, especially in areas like the Anoka Sand Plain that are rapidly urbanizing. Agricultural and prairie management activities such as insecticide application, haying, grazing, and spring and fall burns may have a significant impact on developing moth eggs and larvae on leadplants. Once Gypsy Moths become established in Minnesota, treatments used to control these moths could have serious negative impacts on native lepidopterans such as Abbreviated Underwings in the forested regions of the state. Because of its specialized habitat requirements, life history characteristics, and reduced range, it is needed and reasonable to designate the Abbreviated Underwing as a species of Special Concern in Minnesota. This status will highlight the need for targeted survey work to clarify how widely distributed and abundant this moth is in the state as well as whether other *Amorpha* species besides leadplant are used as larval host plants.

SELECTED REFERENCES:

- Covell, C.V., Jr. 2005. A field guide to moths of eastern North America. Virginia Museum of Natural History Special Publication Number 12. Martinsville, VA. 496pp.
- Huber, Ronald L. 1981. Checklist of Minnesota Butterflies. James Ford Bell Museum of Natural History, University of Minnesota. Minneapolis, MN.
- Metzler, E.H., J.A. Shuey, L.A. Ferge, R.A. Henderson, & P.Z. Goldstein. 2005. Contributions to the understanding of tallgrass prairie-dependent butterflies and moths (Lepidoptera) and their biogeography in the United States. Bulletin of the Ohio Biological Survey, New Series. 15(1):1-143.
- Quinn, E.M., and R. Danielson. 2009. A survey of Lepidoptera in three priority areas of the Minnesota state parks system. Final report submitted to the State Wildlife Grants Program, Minnesota Department of Natural Resources. 49 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Catocala whitneyi*

COMMON NAME: Whitney's Underwing

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Whitney's Underwing occurs in the former tallgrass prairie region of the United States from southern Manitoba to Nebraska, east through Minnesota and Arkansas to Kentucky and Indiana. Historically, this species was probably very abundant throughout the prairie region of Minnesota as well as in regions like the Anoka Sand Plain where prairie vegetation was a major component. Today, the Whitney's Underwing likely remains present in scattered prairie remnants throughout its original range in Minnesota where leadplant, its main larval host plant, is available. The Whitney's Underwing is the least common of the leadplant-feeding *Catocala* species and is much less common than the Abbreviated Underwing, a species that appears to be nearly ecologically identical. Over the past several decades, the Whitney's Underwing has been sporadically observed at widely scattered locations in the southern two-thirds of Minnesota, most in the prairie region of the state as well as in Chisago and Ramsey counties. Between 2006 and 2008, the Minnesota DNR's County Biological Survey documented the Whitney's Underwing in three large-to-moderately large high quality native prairie remnants in Lincoln, Lyon, and Pipestone counties in southwest Minnesota. However, this moth was not reported during surveys of bluff prairie habitat within state parks in southeast Minnesota over this same time period.

The highly specialized life history and habitat requirements of the Whitney's Underwing make it inherently sensitive to habitat loss and other land use changes. Persistence of Whitney's Underwing populations requires a nectar source (such as milkweed) and a good population of leadplant. While the moth can tolerate some degradation of prairie habitat, small amounts of leadplant will not produce enough adults to sustain a population in isolation, making the dispersal of females among patches critical. The dispersal behavior of this moth is not understood, and many small protected prairies may eventually lose the species as neighboring unprotected remnants are destroyed. Remaining prairie habitats are under increasing pressure from human activities such as farming and residential development, especially in areas like the Anoka Sand Plain that are rapidly urbanizing. Agricultural and prairie management activities such as insecticide application, haying, grazing, and spring and fall burns may have a significant impact on developing moth eggs and larvae on leadplants. Once Gypsy Moths become established in Minnesota, treatments used to control these moths could have serious negative impacts on native lepidopterans such as Whitney's Underwing in the forested regions of the state. Because of its rarity, specialized habitat requirements and life history characteristics, and reduced range, it is needed and reasonable to designate the Whitney's Underwing as a species of Special Concern in Minnesota. This status will highlight the need for targeted survey work to clarify how widely distributed and abundant this moth is in the state as well as whether other *Amorpha* species besides leadplant are used as larval host plants.

SELECTED REFERENCES:

- Metzler, E.H., J.A. Shuey, L.A. Ferge, R.A. Henderson, & P.Z. Goldstein. 2005. Contributions to the understanding of tallgrass prairie-dependent butterflies and moths (Lepidoptera) and their biogeography in the United States. *Bulletin of the Ohio Biological Survey, New Series*. 15(1):1-143.
- NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 16 June 2009.
- Opler, P.A., K. Lotts, and T. Naberhaus, coordinators. 2009. *Butterflies and Moths of North America*. Bozeman, MT: Big Sky Institute. <<http://www.butterfliesandmoths.org>>. Accessed 17 June 2009.
- Quinn, E.M., and R. Danielson. 2009. A survey of Lepidoptera in three priority areas of the Minnesota state parks system. Final report submitted to the State Wildlife Grants Program, Minnesota Department of Natural Resources. 49 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Hesperia dacotae*

COMMON NAME: Dakota Skipper

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: The Dakota Skipper is a northern prairie endemic that has disappeared from much of its historical range south and east of Minnesota due to the conversion of native prairie habitat to agriculture, with most known extant occurrences in western Minnesota and the eastern Dakotas. In Minnesota, the Dakota Skipper inhabits native dry-mesic to dry prairie with some topographic variation, where mid-height grasses such as little bluestem, prairie dropseed, and side-oats grama, are a major component of the vegetation. The Dakota Skipper was listed as a Threatened species in Minnesota in 1984 because only two healthy colonies had been consistently documented in the state. It has also been a candidate species for federal listing since 2002.

Today, the Dakota Skipper appears to be rapidly disappearing from remnant prairie habitat in Minnesota. Since listing in 1984, the Minnesota DNR has conducted and supported extensive survey efforts to find new locations of Dakota Skippers and update information for known locations. In pre-agricultural Minnesota, the Dakota Skipper occurred in the Des Moines Lobe drift where prairie predominated, and historical records exist for 17 counties, most along the west edge of the state. While recent surveys have confirmed the presence of Dakota Skippers in 11 of these counties, they have disappeared from their only known locations in 3 counties where they are presumed extirpated. Only four strong populations have been identified, and all other occurrences appear to involve small populations or colonies.

Habitat destruction is the primary threat to the Dakota Skipper, as it is completely dependent upon native prairie habitat for survival. Although habitat for some skipper populations is protected from destruction due to ownership by government or private conservation organizations, many prairie remnants remain vulnerable to plowing, overgrazing, gravel mining, or development. Long-term grazing can degrade prairie to the point that it is no longer suitable skipper habitat, and there are concerns that episodes of heavy grazing may eliminate the Dakota Skipper even if the prairie is not degraded; however, research investigating the effects of cattle grazing on this species is badly needed. Use of herbicides to control weeds or shrubs can eliminate critical nectar sources, and insecticide drift from nearby agricultural fields may kill this skipper. Conservation management of prairie remnants is also an important concern. In some locations in Minnesota the habitat is seriously threatened by shrub and tree invasion, but intense, large-scale prescribed burning of prairie habitat can result in high mortality of immature Dakota Skippers. Small, isolated colonies are susceptible to loss of genetic diversity as well as extirpation from natural events, human caused events, and the vagaries associated with small population sizes. Now that extensive surveys have been conducted, only two additional large colonies have been identified, and several previously known colonies have been extirpated, it is reasonable and needed to reclassify the Dakota Skipper as Endangered in Minnesota.

SELECTED REFERENCES:

- Britten, H.B., and J.W. Glasford. 2002. Genetic population structure of the Dakota Skipper (Lepidoptera: *Hesperia dacotae*): a North American native prairie obligate. *Conservation Genetics* 3:363-374.
- Cochrane, J.F., and P. Delphey. 2002. Status assessment and conservation guidelines: Dakota Skipper, *Hesperia dacotae* (Skinner) (Lepidoptera: Hesperidae), Iowa, Minnesota, North Dakota, South Dakota, Manitoba, and Saskatchewan. Department of the Interior, U.S. Fish and Wildlife Service, Twin Cities Field Office, Minneapolis, Minnesota. 77 pp.
- Dana, R.P. 1991. Conservation management of the prairie skippers *Hesperia dacotae* and *Hesperia ottoe*: basic biology and threat of mortality during prescribed burning in spring. *Station Bulletin* 594-199. Minnesota Agricultural Experiment Station, University of Minnesota, St. Paul, Minnesota. 63 pp.
- Minnesota Department of Natural Resources, Division of Ecological Resources. 2008. Rare species guide: an online encyclopedia of Minnesota's rare native plants and animals [Web Application]. Minnesota Dept. of Natural Resources, St. Paul, Minnesota. <<http://www.dnr.state.mn.us/rsg>>. Accessed 24 June 2009.
- Selby, G. 2009. 2007-2008 prairie butterfly surveys in Minnesota. Final report submitted to the Natural Heritage and Nongame Research Program, Minnesota Dept. of Natural Resources. 28 pp. + appendices.
- Swengel, A.B., and S.R. Swengel. 1999. Observations of prairie skippers (*Oarisma poweshiek*, *Hesperia dacotae*, *H. ottoe*, *H. leonardus pawnee*, and *Atrytone arogos iowa*) (Lepidoptera: Hesperidae) in Iowa, Minnesota, and North Dakota during 1988-1997. *The Great Lakes Entomologist* 32(4):267-292.
- U.S. Fish and Wildlife Service. 2009. Species assessment and listing priority assignment form - Dakota skipper. U.S. Fish and Wildlife Service, Bloomington, Minnesota. 48 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Hesperia ottoe*

COMMON NAME: Ottoe Skipper

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Although the Ottoe Skipper still occupies much of its historical range in central North America, it is now spottily distributed and generally uncommon throughout. Prior to the destruction of native prairie and barrens habitats, it was apparently a fairly common butterfly. For example, Lindsey (1942) reported that it was "moderately plentiful... on virgin prairie" in Iowa. In Minnesota, the Ottoe Skipper inhabits native dry-mesic to dry prairie where mid-height grasses such as little bluestem, prairie dropseed, and side-oats grama are a major component of the vegetation. This includes prairies on deep sands, on steep bedrock-controlled slopes, and on slopes and hills in unsorted glacial till, though adult skippers will range into low prairie for nectar. The Ottoe Skipper was listed as a Threatened species in Minnesota in 1984 because actively reproducing colonies had only been reported from four sites and remaining prairie habitat was vulnerable to destruction.

Since listing in 1984, the Minnesota DNR has conducted and supported extensive survey efforts to find new locations of Ottoe Skippers and update information for known locations. Despite these efforts, there have been no observations of this species in the state since 1995. Historical documentation of the Ottoe Skipper's distribution and abundance in Minnesota is lacking, but it was likely fairly common before the disappearance of prairie habitat. Since the first Minnesota report in 1965, the Ottoe Skipper has only been identified at 12 locations in nine different counties, with unverified records from two additional counties. All locations lie south of a line from Dakota County west to Big Stone County, which is probably the northern limit of the species' natural range. Strong populations have been observed at only two large sites, one in Lincoln County and one in Wabasha County. However, numbers had greatly diminished by the 1990s, and no individuals have been documented during recent surveys. One site in Pipestone County near the Lincoln County site seems to have supported a small population from 1975-1995, but it may have disappeared. Most other Ottoe Skipper records in the state are in small habitat remnants with one to a few individuals observed on a single visit to a site.

Habitat destruction is the primary threat to the Ottoe Skipper, as it is completely dependent upon native prairie and barrens habitat for survival. Although habitat for some of the historical Ottoe Skipper populations is protected from destruction due to ownership by government or private conservation organizations, many prairie remnants remain vulnerable to plowing, overgrazing, gravel mining, or development. Long-term grazing can easily degrade prairie and destroy it as skipper habitat, and episodes of heavy grazing may eliminate the Ottoe Skipper even if the prairie is not degraded. Use of herbicides to control weeds or shrubs can eliminate critical nectar sources, and insecticide drift from nearby agricultural fields may kill this skipper. In addition to protection from destructive activities, prairie requires active management to prevent invasion by trees and eventual succession to woodland, and to suppress non-native invasive species. The principal tool for this purpose is prescribed fire, which can result in high mortality of immature Ottoe Skippers in remnant habitat patches, especially small ones. Small, isolated colonies are also susceptible to loss of genetic diversity as well as extirpation from natural events, human caused events, and the vagaries associated with small population sizes. Given these threats and the disappearance of this skipper from previously known locations in the state, Endangered status is reasonable and needed.

SELECTED REFERENCES:

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SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Oarisma poweshiek*

NEW SCIENTIFIC NAME: *Oarisma poweshiek*

COMMON NAME: Poweshiek Skipperling

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: The Poweshiek Skipperling is a rare prairie-obligate skipper that is confined to the northern part of the tallgrass prairie in the United States, with nearly half of all known populations located in Minnesota. Prior to settlement this was probably one of the most abundant butterflies of Minnesota prairies, but today it occurs as small, isolated colonies in wet to dry native prairie remnants in western and southern parts of the state. This species appears to tolerate somewhat degraded grassland habitat better than other prairie skippers and is better able to persist in small or odd-shaped remnants such as railroad rights-of-way. However, because of its restricted range, rarity outside Minnesota, and dependence on prairie habitat, the Poweshiek Skipperling was listed as a Special Concern species in 1984.

Since listing in 1984, the Minnesota DNR has conducted and supported extensive survey efforts to find new locations of Poweshiek Skipperlings and update information for known locations. While these surveys have helped identify many new Poweshiek Skipperling sites and provided a much better understanding of their distribution and abundance in the state, the continued loss of prairie and grassland habitat throughout the agricultural regions of Minnesota has contributed to a significant decline of this species over the past several decades. A catastrophic decline was observed between 2001 and 2003 in a population in Polk County that had been one of Minnesota's largest. During extensive survey work in 2004-2006 in southwest MN only a single individual Poweshiek Skipperling was encountered. In 2007, prairie butterfly surveys were conducted at 70 locations across western Minnesota including 26 historic sites, and the species was observed in only 3 sites, all historical locations, with only 1 or 2 individuals sighted in each. In 2008, 51 sites including 19 historic locations were surveyed, but no Poweshiek Skipperlings were observed. In 2009, search efforts focused on two of the historically largest populations in Pipestone and Clay counties, and on the northern-most historical population, in Kittson Co, with similar negative results. Therefore, these skippers appear to be disappearing from habitats where they used to be abundant.

Small colony sizes, isolation due to past habitat loss, and continuing conversion and fragmentation of prairie habitat are the primary threats facing the Poweshiek Skipperling in Minnesota. All prairie remnants that are not protected by permanent dedication for conservation are at risk of destruction for agricultural production, aggregate mining, or development. Even where protected, prairie in Minnesota is strongly susceptible to woodland and non-native species invasion. The principal prevention tool is prescribed fire, which can result in high mortality of immature Poweshiek Skipperlings in remnant habitat patches, especially small ones. Small, isolated colonies are also susceptible to loss of genetic diversity as well as extirpation from natural events, human caused events, and the vagaries associated with small population sizes. Dispersal capabilities and propensities have not been investigated, but field observations suggest that non-prairie habitats are a strong barrier. As such, immigration is unlikely to help sustain small colonies or to reestablish colonies in suitable habitat after extirpation events. Because of its demonstrated rarity, the continued threats to populations in Minnesota, and concerns about its long-term global persistence, it is needed and reasonable to designate the Poweshiek Skipperling as a Endangered species at this time.

SELECTED REFERENCES:

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- Opler, P.A., K. Lotts, and T. Naberhaus, coordinators. 2009. Butterflies and Moths of North America. Bozeman, MT: Big Sky Institute. <<http://www.butterfliesandmoths.org>>. Accessed 17 June 2009.
- Selby, G. 2005. Status assessment and conservation guidelines: Poweshiek Skipperling (*Oarisma poweshiek* (Parker) (Lepidoptera: Hesperidae). Prepared for Twin Cities Field Office, U.S. Fish and Wildlife Service, Bloomington, MN. 53 pp.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Schinia lucens*

COMMON NAME: Leadplant Flower Moth

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Leadplant Flower Moth occurs throughout the former tallgrass prairie region, parts of the southwest, and scattered locations in the southeast United States. Historically, this species was probably very abundant throughout the prairie region of Minnesota as well as in regions like the Anoka Sand Plain where prairie vegetation was a major component. Today, the Leadplant Flower Moth likely remains present in scattered prairie remnants throughout its original range where leadplant, its main larval host plant, is available. Over the past several decades, the Leadplant Flower Moth has been sporadically observed in the southern half of Minnesota and up into the northwest part of the state around Polk County. Between 2006 and 2008, the Minnesota DNR's County Biological Survey documented the Leadplant Flower Moth in three high quality native prairie remnants in Lincoln, Lyon, and Pipestone counties in southwest Minnesota as well as in two degraded former pastures in Nobles and Rock counties where leadplant remains common along the roadsides. During this same time period, this moth was also identified in bluff prairie habitat within three state parks in Goodhue and Winona counties in southeast Minnesota.

The highly specialized life history and habitat requirements of the Leadplant Flower Moth make it inherently sensitive to habitat loss and other land use changes. Persistence of Leadplant Flower Moth populations requires a nectar source and a good population of leadplant. While the moth can tolerate some degradation of prairie habitat, small amounts of leadplant will not produce enough adults to sustain a population in isolation, making the dispersal of females among patches critical. The dispersal behavior of this moth is not understood, and many small protected prairies may eventually lose the species as neighboring unprotected remnants are destroyed. Remaining prairie habitats are under increasing pressure from human activities such as farming and residential development, especially in areas like the Anoka Sand Plain that are rapidly urbanizing. Agricultural and prairie management activities such as insecticide application and grazing may have a significant impact on developing moth eggs and larvae on leadplants. Once Gypsy Moths become established in Minnesota, treatments used to control these moths could have serious negative impacts on native lepidopterans such as Leadplant Flower Moths in the forested regions of the state. Because of its specialized habitat requirements, life history characteristics, and reduced range, it is needed and reasonable to designate the Leadplant Flower Moth as a species of Special Concern in Minnesota. This status will highlight the need for targeted survey work to clarify how widely distributed and abundant this moth is in the state.

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Opler, P.A., K. Lotts, and T. Naberhaus, coordinators. 2009. Butterflies and Moths of North America. Bozeman, MT: Big Sky Institute. <<http://www.butterfliesandmoths.org>>. Accessed 17 June 2009.

Quinn, E.M., and R. Danielson. 2009. A survey of Lepidoptera in three priority areas of the Minnesota state parks system. Final report submitted to the State Wildlife Grants Program, Minnesota Dept. of Natural Resources. 49 pp.

CADDISFLIES

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Anabolia ozburni*

COMMON NAME: A Species of Northern Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Anabolia* typically inhabit lakes, marshes, and low gradient rivers. Cases are composed of organic material, including leaves, twigs, and pieces of bark, usually arranged lengthwise. Mature larvae range 20–30 mm in length depending on the species, with cases up to 50 mm. Larvae consume decaying plant tissue and are important processors of allochthonous debris. Adult males are about 15 mm in length, with mottled wings.

In Minnesota, *Anabolia ozburni* is known prior to 1950 from the northwestern third of the state. Extensive recent surveys, however, have located it from only single sites in Hubbard and Douglas County, and a series of three adjacent sites in Becker and Mahanomen Counties. All collections were of adults in June and July 2000. All recent populations have been found in low gradient streams, often right at their lentic headwaters. Specimens of this genus tend to be conspicuous and easy to collect, so it is unlikely that many additional populations have been missed by recent collecting. Little is known about the specific habitat requirements of *A. ozburni*. *Anabolia* species tend to be intolerant of habitat disturbance, especially that of the riparian zone since they depend on terrestrial input for their food source. The apparent decrease in distribution of *A. ozburni*—especially in the northwestern portion of its Minnesota range—is alarming and likely due to habitat loss in these areas. Until more is known about the specific habitat needs and population status of this species, Special Concern status is reasonable and needed.

SELECTED REFERENCES:

- Houghton, D.C. 2007. The effects of landscape-level disturbance on the composition of caddisfly (Insecta: Trichoptera) trophic functional groups: evidence for ecosystem homogenization. *Environmental Monitoring and Assessment* 135: 253–264.
- University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.
- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Asynarchus rossi*

NEW SCIENTIFIC NAME: *Limnephilus rossi*

COMMON NAME: A Species of Northern Caddisfly

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Limnephilus* feed primarily on coarse detritus, and are commonly found in lentic habitats including ponds, lake margins, and marshes; some have been reported from streams and cold springs. Mature *Limnephilus* larvae are up to 29 mm in length; cases may be constructed from sand, pebbles, bark, wood, and leaves in various arrangements. Adult males are about 15 mm in length, wings irrorate, dark brown and pale yellow.

When assigned Special Concern status in 1996, *Limnephilus rossi* had only been documented in Minnesota by the collection of a single male specimen from Valley Creek in Washington County in 1965. After extensive recent sampling throughout the state, this species has now been relocated in Valley Creek and has also been discovered in Grand Portage Creek in Cook County. This caddisfly appears to be fairly abundant at the former locality; many adults have been collected there in October of 1996 and September of 1997. The latter locality has yielded only a single adult specimen, in late August 2000. Species of *Limnephilus* are usually very conspicuous and easy to collect, so it is unlikely that many additional populations have been missed by recent survey efforts. *Limnephilus* species tend to be intolerant of habitat disturbance, especially modification of the riparian corridor since they depend on terrestrial input for their food source. The two collecting sites are separated by nearly 500 km, but are both high gradient, rocky, second order streams. Grand Portage Creek has good riparian protection from the national monument and tribal lands that surround it. Valley Creek, however, is in an area of intense urban development. The observed disjunct distribution pattern has been noted previously in Michigan, Wisconsin, and Quebec where *L. rossi* is also rare and highly localized. Little is known about the specific habitat needs of this species and why it exhibits this distribution pattern. Due to the rarity of *L. rossi* in Minnesota, the high rate of urban development around Valley Creek, and the low abundance of this species in Grand Portage Creek, reclassification from Special Concern to Threatened status is reasonable and needed.

SELECTED REFERENCES:

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- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Ceraclea brevis*

COMMON NAME: A Species of Long Horned Caddisfly

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Ceraclea* are found in lentic and lotic waters, usually on bottom substrates. Many species feed on detritus; some are specialized for feeding on freshwater sponges and are found burrowing within these colonies. Mature *Ceraclea* larvae are about 12 mm in length, stout bodied, with abdominal gills arranged in clusters. Cases are usually constructed of sand with a flanged dorsal lip and are wide anteriorly, tapered, and curved distally; species associated with sponges are usually made entirely of silk and may incorporate pieces of sponge. Adult males are between 11-16 mm. in length, brownish in color, with irregular scattering of hyaline spots.

Ceraclea brevis is known worldwide from a single adult specimen, which was collected in August 1965 at the Garrison Ranger Station in Crow Wing County, Minnesota. Despite extensive recent collecting in that area and elsewhere, the species has yet to be rediscovered. Moreover, *C. brevis* is very similar in appearance to *C. tarsipunctata*, a very common species in Minnesota. Thorough recent examination of the only known *C. brevis* specimen suggests that it may, in fact, be an aberrant specimen of *C. tarsipunctata*. Thus, Special Concern status of *C. brevis* should be withdrawn until both its legitimacy as a distinct species and its continued presence in Minnesota can be confirmed.

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- Etnier, D.A. 1968. Range extensions of Trichoptera into Minnesota, with descriptions of two new species. *Entomological News* 79:188-192.
- Luedeman, J. 1991. A preliminary survey for endemic species, and restricted or disjunct populations of caddisflies in Minnesota. Unpubl. final report to Minnesota DNR, Nongame Wildlife Program.
- Morse, J.C. 1975. A phylogeny and revision of the caddisfly genus *Ceraclea* (Trichoptera, Leptoceridae). *Contributions of the American Entomological Institute* 11:1-97.
- University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.
- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Ceraclea vertreesi*

COMMON NAME: Vertrees's Ceraclea Caddisfly

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Ceraclea* are found in lentic and lotic waters, usually on bottom substrates. Many species feed on detritus; some are specialized for feeding on freshwater sponges and are found burrowing within these colonies. Mature *Ceraclea* larvae are about 12 mm in length, stout bodied, with abdominal gills arranged in clusters. Cases are usually constructed of sand with a flanged dorsal lip and are wide anteriorly, tapered, and curved distally; species associated with sponges are usually made entirely of silk and may incorporate pieces of sponge. Adult males are between 11-16 mm in length, brownish in color, with irregular scattering of hyaline spots.

Ceraclea vertreesi is known in Minnesota from a series of collections of adults made in 1989 in and around Lake Itasca State Park in Clearwater and Hubbard counties. It is typically found in high gradient montane habitats of the western United States. Not only are the known Minnesota habitats atypical for the species, but they are separated from other known *C. vertreesi* populations by over 1000 km. Furthermore, *C. vertreesi* is very similar in appearance to *C. resurgens*, a fairly common species in Minnesota. A thorough recent examination of specimens from Minnesota suggests that all Minnesota populations of *C. vertreesi* may be *C. resurgens*. Thus, Special Concern status for this species should be withdrawn until a definite identification can be confirmed.

SELECTED REFERENCES:

- Denning, D.G. 1966. New and interesting Trichoptera. *The Pan-Pacific Entomologist* 12:228-238.
- Monson, M.P. 1994. The caddisflies (Insecta: Trichoptera) of the Lake Itasca Region, Minnesota, and a preliminary assessment of the conservation status of Minnesota Trichoptera. Unpubl. M.S. Thesis, Univ. of Minnesota, St. Paul. 135 pp.
- Morse, J.C. 1975. A phylogeny and revision of the caddisfly genus *Ceraclea* (Trichoptera, Leptoceridae). *Contributions of the American Entomological Institute* 11:1-97.
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- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Chilostigma itascae*

COMMON NAME: Headwaters Chilostigman Caddisfly

CURRENT MINNESOTA STATUS: Endangered

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Until very recently, this endemic species was known worldwide only from Nicollet Creek, in Itasca State Park, Clearwater County, Minnesota, where seventeen males and one female were collected in February and March, 1974. The adult males are about 8-10 mm. in length, wings brownish with black setae and dense setal fringe around periphery, with some distinct brown markings. The *Chilostigma itascae* adults were found on sunny days on the surface of the snow in a wetland meadow adjacent to a slow-flowing creek; minimum air temperature was below -17.8°C (0°F) the night before one collection was made. Adults of this species were recollected at the same location in 1995 and 2001. Attempts to find the immature stage of this species have been numerous but unsuccessful.

In March 2005, entomologist Kyle Johnson happened upon a hatch of caddisflies on the snow within Sand Lake Peatland, Lake County, Minnesota. Four voucher specimens were later confirmed to be *Chilostigma itascae*. In March of 2011, amateur naturalist Cassie Novak discovered a third location of the species on the shore of 8th Crow Wing Lake, Hubbard County, Minnesota. Identification of specimens from this site have also been confirmed by a University of Minnesota entomologist.

Not only is *Chilostigma itascae* one of very few species of animal or plant known to be endemic to Minnesota, but its occurrence here is the only record of the genus *Chilostigma* in North America; previously, this genus had been represented by a single species from Scandinavia and Finland, *C. sieboldi*. While the recent discoveries of *C. itascae* have expanded the species' range in the state, its known distribution is still limited to only three sites, and Threatened status remains needed and reasonable to insure, as much as possible, that any extant populations of this species are protected from local extirpation.

SELECTED REFERENCES:

- Houghton, D.C. and R.W. Holzenthal. 2003. Updated conservation status of protected Minnesota caddisflies. *The Great Lakes Entomologist* 36: 35–40.
- Monson, M.P. 1994. The caddisflies (Insecta: Trichoptera) of the Lake Itasca Region, Minnesota, and a preliminary assessment of the conservation status of Minnesota Trichoptera. Unpubl. M.S. Thesis, Univ. of Minnesota, St. Paul. 135pp.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Goera stylata*

COMMON NAME: A Species of Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Goera* typically inhabit fast-moving, cold, clean streams where they feed on algae, diatoms, and small detrital particles from the surfaces of rocks in areas of high current. Cases are composed of small mineral fragments, with larger pebbles on the outer edges serving as ballast. Mature larvae are around 10 mm in length; cases range 15–25 mm.

Despite extensive recent sampling throughout the state, *Goera stylata* is known in Minnesota from only seven adult specimens found at LaSalle Creek in Lake Itasca State Park, Hubbard County in June of 1996. Little is known about the specific habitat requirements of *G. stylata*. Species of *Goera* tend to be coldwater stenothermic and very sensitive to changes in water clarity and flow regime. LaSalle Creek is a sand bottomed stream flowing from LaSalle Lake to the Mississippi River, and the stream and riparian zone appear to be fairly well protected within the park. Due to the known sensitivity of *Goera stylata* to disturbance and its extreme rarity in Minnesota, Threatened status is reasonable and needed for this species.

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- Coffman, W.P., K.W. Cummins, and J.C. Wuycheck. 1971. Energy flow in a woodland stream: I. Tissue support structure of the autumnal community. *Archiv für Hydrobiologie* 68: 232–276.
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- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Hydroptila novicola*

COMMON NAME: A Species of Purse Casemaker Caddisfly

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Hydroptila* live in lentic and lotic habitats and feed on algae and diatoms. Mature larvae have laterally compressed cases up to 5.5 mm in length, constructed of two silken valves typically covered with a single layer of sand grains, or occasionally with diatoms or algae. Adult males are about 2.5 mm in length.

Historically, *Hydroptila novicola* was known in Minnesota from adult specimens collected in July 1965 from the cities of Isabella in Lake County, Tower in St. Louis County, and Eaglehead in Pine County. Due to its apparent rarity in the state, this caddisfly was listed as a species of Special Concern in 1996. During extensive sampling from 1999 to 2001, however, 29 additional populations were discovered throughout northern Minnesota. Because these collections occurred at a variety of sizes and types of lakes and streams, *H. novicola* does not appear to be dependent on a particular habitat type. The species is considerably more widespread in Minnesota than was thought in 1996 when its Special Concern status was assigned. Based on the recent data, it appears that *H. novicola* is secure within Minnesota and thus should be removed from Special Concern status.

SELECTED REFERENCES:

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- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Hydroptila quinola*

COMMON NAME: A Species of Purse Casemaker Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Hydroptila* live in lentic and lotic habitats and feed on algae and diatoms. Mature larvae have laterally compressed cases up to 5.5 mm in length, constructed of two silken valves typically covered with a single layer of sand grains, or occasionally with diatoms or algae. Adult males are about 2.5 mm in length.

Until recently, *Hydroptila quinola* was known in Minnesota only from a July 1965 collection from the city of Finland in Lake County. In 1999, during an extensive collecting effort, adults were also located in Reilly Brook and Lost River in Koochiching County and Rose Creek in Mower County, thus confirming the extant status of this species in Minnesota. All collection sites are low gradient, silt-bottomed third to fourth order streams. The Koochiching County sites are fairly well protected by Pine Island State Forest. Rose Creek, however, is in an area of intense agricultural development. The Minnesota populations of *H. quinola* are separated from each other by over 600 km, and are over 1000 km from the remainder of the species' known distribution localities in the eastern and southeastern United States. Little is known about the specific habitat needs of this species beyond the dependence of the larva on filamentous algae as a food source. Due to the rarity and disjunct distribution of *H. quinola* populations in Minnesota, and the vulnerability of the Rose Creek population to human disturbance, Special Concern status is reasonable and needed.

SELECTED REFERENCES:

- Blickle, R.L. 1979. Hydroptilidae (Trichoptera) of America north of Mexico. New Hampshire Agricultural Experiment Station Bulletin 509. University of New Hampshire, Durham.
- Houghton, D.C. 2007. The effects of landscape-level disturbance on the composition of caddisfly (Insecta: Trichoptera) trophic functional groups: evidence for ecosystem homogenization. *Environmental Monitoring and Assessment* 135: 253–264.
- University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.
- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Hydroptila rono*

COMMON NAME: A Species of Purse Casemaker Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Hydroptila* live in lentic and lotic habitats and feed on algae and diatoms. Mature larvae have laterally compressed cases up to 5.5 mm in length, constructed of two silken valves typically covered with a single layer of sand grains, or occasionally with diatoms or algae. Adult males are about 2.5 mm in length.

Despite extensive statewide sampling, *Hydroptila rono* is known in Minnesota from only two adult specimens collected from Minneopa Creek in Minneopa State Park, Blue Earth County, in June of 2000. The species is typically found in western montane streams, but has also been collected from high gradient rivers in Pennsylvania and Québec. Minneopa Creek is, likewise, a high gradient stream, fairly atypical of southern Minnesota rivers. Little else is known about the specific habitat needs of *H. rono* except for the dependence of the larva on filamentous algae as a food source. Minneopa Creek is one of only a few rivers in southern Minnesota with some degree of riparian protection as it flows through the state park. Elsewhere, however, Minneopa Creek has been badly degraded by agriculture and urban development. Due to the extreme rarity of *H. rono* in Minnesota, its documentation in only one stream, and the high degree of habitat disturbance in southern Minnesota, Threatened status is reasonable and needed.

SELECTED REFERENCES:

- Blickle, R.L. 1979. Hydroptilidae (Trichoptera) of America north of Mexico. New Hampshire Agricultural Experiment Station Bulletin 509. University of New Hampshire, Durham.
- Houghton, D.C. 2007. The effects of landscape-level disturbance on the composition of caddisfly (Insecta: Trichoptera) trophic functional groups: evidence for ecosystem homogenization. *Environmental Monitoring and Assessment* 135: 253–264.
- University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.
- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Hydroptila waskesia*

COMMON NAME: A Species of Purse Casemaker Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Hydroptila* live in lentic and lotic habitats and feed on algae and diatoms. Mature larvae have laterally compressed cases up to 5.5 mm in length, constructed of two silken valves typically covered with a single layer of sand grains, or occasionally with diatoms or algae. Adult males are about 2.5 mm in length.

Until recently, *Hydroptila waskesia* was known in Minnesota only from a July 1964 and an early August 1965 collection from the city of Garrison in Crow Wing County. Despite extensive collecting in the area, the species has not been collected there since. During a statewide collecting effort, however, a single adult specimen was collected in July of 2000 from Hanson Creek in Roseau County, confirming its extant status in the state. The two collecting sites are separated by around 300 km. Likewise, the known Minnesota population is over 1000 km disjunct from other known populations of *H. waskesia* in the eastern and southern United States. Little is known about the specific habitat needs of this species beyond the dependence of the larva on filamentous algae as a food source. Hanson Creek is a low gradient, silt-bottomed second order tributary of the Roseau River. Agricultural disturbance is heavy in the region, and Hanson Creek is one of the few Roseau tributaries with some degree of riparian protection remaining. Due to the extreme rarity of *H. waskesia* in Minnesota, its recent documentation at only one location in the state despite extensive survey efforts, and the apparent scarcity of suitable undisturbed habitats, Endangered status is reasonable and needed for this species.

SELECTED REFERENCES:

- Blickle, R.L. 1979. Hydroptilidae (Trichoptera) of America north of Mexico. New Hampshire Agricultural Experiment Station Bulletin 509. University of New Hampshire, Durham.
- Houghton, D.C. 2007. The effects of landscape-level disturbance on the composition of caddisfly (Insecta: Trichoptera) trophic functional groups: evidence for ecosystem homogenization. *Environmental Monitoring and Assessment* 135: 253–264.
- University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.
- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Ironoquia punctatissima*

COMMON NAME: A Species of Northern Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Ironoquia* are often associated with temporary habitats, from springs to ephemeral pools. Larvae consume mostly decaying plant material, with some filamentous algae as well. Cases are tubular and curved, and typically composed of organic fragments, usually pieces of bark and leaves. Larvae are around 20 mm in length with cases up to 25mm.

Ironoquia punctatissima is widespread in the eastern United States where it is restricted to very small springs. Despite an extensive statewide sampling effort, this species is known in Minnesota from only a handful of sites in the southern portion of the state. Adults have been found in September of 1994, 1999, and 2000. All collecting sites are small (<1 m) spring habitats in Lyon, Martin, Watonwan, and Washington counties. Larvae are cold water stenotherms and are dependent on terrestrial input for their food source. Thus, they are extremely sensitive to changes in the riparian corridor or forest canopy adjacent to the stream. Small cold water spring habitats are very scarce in southern Minnesota and are extremely vulnerable to urban and agricultural development. Due to the rarity of *I. punctatissima* in Minnesota, and the rarity and vulnerability of suitable habitats, Threatened status is reasonable and needed.

SELECTED REFERENCES:

- Houghton, D.C. 2007. The effects of landscape-level disturbance on the composition of caddisfly (Insecta: Trichoptera) trophic functional groups: evidence for ecosystem homogenization. *Environmental Monitoring and Assessment* 135: 253–264.
- Schmid, F. 1951. Le genre *Ironoquia* Banks (Trichoptera: Limnephilidae). *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* 24: 317–328.
- University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.
- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Lepidostoma libum*

COMMON NAME: A Species of Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Lepidostoma* are typically found in cool springs and streams, where they inhabit areas of low current, such as within piles of decaying plant debris. Detritus composes the majority of the diet, and larvae are very important processors of allochthonous material. Cases are quadrate and composed of pieces of wood, although immature larvae often construct cases from small mineral particles. Mature larvae range from 10–13 mm with cases around 15 mm.

Despite extensive statewide sampling, *Lepidostoma libum* is known in Minnesota from only a single adult specimen collected from Minneopa Creek in Minneopa State Park, Blue Earth County, in June of 2000. The species is stenothermic and typically found in small spring habitats with dense canopy cover. It is also highly sensitive to changes in riparian habitat, as it is dependent on terrestrial input for its food source. Minneopa Creek is one of only a few rivers in southern Minnesota with some degree of riparian protection where it flows through the state park. Elsewhere, however, Minneopa Creek has been badly degraded by agriculture and urban development. Due to the extreme rarity of *L. libum* in Minnesota, its documentation in only one stream, its sensitivity to habitat disturbance, and the high degree of habitat degradation in southern Minnesota, Threatened status is reasonable and needed for this species.

SELECTED REFERENCES:

- Houghton, D.C. 2007. The effects of landscape-level disturbance on the composition of caddisfly (Insecta: Trichoptera) trophic functional groups: evidence for ecosystem homogenization. *Environmental Monitoring and Assessment* 135: 253–264.
- University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.
- Weaver, J.S. 1988. A synopsis of the North American Lepidostomatidae (Trichoptera). *Contributions of the American Entomological Institute* 24: 1–141.
- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Limnephilus janus*

COMMON NAME: A Species of Northern Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Limnephilus* feed primarily on coarse detritus and are commonly found in lentic habitats including ponds, lake margins, and marshes; some have been reported from streams and cold springs. Mature larvae are up to 29 mm in length, and cases may be constructed from sand, pebbles, bark, wood, and leaves in various arrangements. Adult males are about 15 mm in length, wings irrorate, dark brown and pale yellow.

Historically, *Limnephilus janus* was known only from a single adult collected from the city of Guthrie in Hubbard County in July of 1965. Despite an extensive sampling effort, the species has not been rediscovered in that area. In July 2001, however, another adult was discovered in Little Elbow Creek in Mahanomen County confirming the extant status of the species within Minnesota. The two sites are about 75 km apart. Species of *Limnephilus* are conspicuous and easy to collect, so it is unlikely that many additional populations of *L. janus* have been overlooked. Although the specific habitat requirements of *L. janus* have not been established, species of *Limnephilus* are very sensitive to changes in the riparian corridor since they depend on terrestrial input for their food source. Little Elbow Creek is a low gradient, second order stream with good riparian protection. Many of the small streams in the area, however, have been disturbed by agricultural development. Due to its extreme rarity, recent documentation at only one location in the state despite extensive surveys, sensitivity to riparian disturbance, and vulnerability of its habitats, Endangered status is reasonable and needed for this species.

SELECTED REFERENCES:

- Houghton, D.C. 2007. The effects of landscape-level disturbance on the composition of caddisfly (Insecta: Trichoptera) trophic functional groups: evidence for ecosystem homogenization. *Environmental Monitoring and Assessment* 135: 253–264.
- Ruiter, D.E. 1995. The genus *Limnephilus* Leach (Trichoptera: Limnephilidae) of the New World. *Ohio Biological Survey Bulletin, New Series* Volume 11. 200 pp.
- University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.
- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Limnephilus secludens*

COMMON NAME: A Species of Northern Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Limnephilus* feed primarily on coarse detritus and are commonly found in lentic habitats including ponds, lake margins, and marshes; some have been reported from streams and cold springs. Mature larvae are up to 30 mm in length, and cases may be constructed from sand, pebbles, bark, wood, and leaves in various arrangements. Adult males are about 15 mm in length, wings irrorate, dark brown and pale yellow.

Limnephilus secludens is common in prairie habitats of the western United States and was the single most widespread caddisfly in northwestern Minnesota prior to 1950. It was also collected sporadically from the southern and northern portions of the state. Despite extensive recent sampling for caddisflies throughout the state, only a single specimen of *L. secludens* has been found. This adult specimen was discovered in a small (<0.5m wide) unnamed spring stream into Watkins Lake in Martin County in September of 1999. Species of *Limnephilus* are conspicuous and easy to collect, so it is unlikely that many additional populations of *L. secludens* have been overlooked in modern collections. Although the specific habitat requirements of *L. secludens* have not been established, species of *Limnephilus* are very sensitive to changes in the riparian corridor since they depend on terrestrial input for their food source. Undisturbed small stream habitats are now extremely rare in the northwestern and southern regions of Minnesota due to agricultural and urban development, and the documented precipitous decline of *L. secludens* populations within Minnesota is almost certainly a direct result of this habitat loss. Thus, Endangered status is reasonable and needed for this species.

SELECTED REFERENCES:

- Houghton, D.C. 2007. The effects of landscape-level disturbance on the composition of caddisfly (Insecta: Trichoptera) trophic functional groups: evidence for ecosystem homogenization. *Environmental Monitoring and Assessment* 135: 253–264.
- Houghton, D.C., and R.W. Holzenthal. In press. Comparison of historical and contemporary Minnesota caddisfly biodiversity. *Journal of the North American Benthological Society*.
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- University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.
- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Ochrotrichia spinosa*

COMMON NAME: A Species of Purse Casemaker Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Ochrotrichia* live in virtually all types of flowing water habitats, from small springs to large rivers. Larvae are thought to be algal piercers, feeding on filamentous algae. Immature larvae do not construct cases. Mature larvae have laterally compressed cases, constructed of two silken valves typically covered with a single layer of sand grains, or occasionally with diatoms or algae. Larvae and cases are both around 6 mm in length.

Historically, *Ochrotrichia spinosa* is known from sporadic collections in both northern and southern Minnesota. Despite extensive statewide sampling, however, it has yet to be rediscovered from any of its historical Minnesota habitats and has only been documented once since 1965. In July 2001, five adults were collected from Valley Creek in Washington County. Little is known about the specific habitat needs of *O. spinosa* beyond its dependence on filamentous algae for food. Valley Creek is a high gradient, rocky, second order stream with sporadic riparian protection. Washington County, however, is an area of rapid urban development, and other suitable *O. spinosa* habitats are likely highly vulnerable to imminent disturbance. Due to the extreme rarity of this species, its recent documentation at only one location in the state despite extensive survey efforts, and the vulnerability of its only known extant habitat, Endangered status is reasonable and needed.

SELECTED REFERENCES:

Houghton, D.C. 2007. The effects of landscape-level disturbance on the composition of caddisfly (Insecta: Trichoptera) trophic functional groups: evidence for ecosystem homogenization. *Environmental Monitoring and Assessment* 135: 253–264.

University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.

Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Oecetis ditissa*

COMMON NAME: A Species of Long Horned Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Oecetis* are found within the benthos of both lakes and streams. Larvae are predatory and are dependent on a robust food chain to survive. Cases are elongate and slender, and can be composed of either mineral or organic particles. Mature larvae range from 10–15 mm in length, depending on the species.

Little is known about the specific habitat requirements of *Oecetis ditissa*; specimens have been found at a variety of habitats in the southeastern United States, and Minnesota appears to lie at the northwestern edge of its known continental distribution. Despite extensive statewide sampling, *Oecetis ditissa* is known from only a single adult specimen collected from Minneopa Creek in Minneopa State Park, Blue Earth County, in June of 2000. Minneopa Creek is one of only a few rivers in southern Minnesota with some degree of riparian protection where it flows through the state park. Elsewhere, however, Minneopa Creek has been badly degraded by agriculture and urban development. Due to the extreme rarity of *O. ditissa* in Minnesota, its documentation in only one stream, and the high degree of habitat degradation in southern Minnesota, Threatened status is reasonable and needed for this species.

SELECTED REFERENCES:

- Floyd, M.A. 1995. Larvae of the caddisfly genus *Oecetis* (Trichoptera: Limnephilidae) in North America. Ohio Biological Survey Bulletin, New Series Volume 10. 85 pp.
- Houghton, D.C. 2007. The effects of landscape-level disturbance on the composition of caddisfly (Insecta: Trichoptera) trophic functional groups: evidence for ecosystem homogenization. Environmental Monitoring and Assessment 135: 253–264.
- University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.
- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Oxyethira ecornuta*

COMMON NAME: A Species of Purse Casemaker Caddisfly

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Oxyethira* live in lakes and other lotic habitats or in areas of slow current in rivers, where they are often found within beds of submerged aquatic plants and feed on filamentous algae. Mature *Oxyethira* larvae are up to 4 mm in length and are recognized primarily by their exceptionally long, slender mid- and hind legs and long antennae, which are characteristic for the genus. They are easily identified by their flattened, bottle-shaped cases constructed entirely of silk. Adult males are about 2.5 mm in length.

When assigned Special Concern status in 1996, most of the potential *Oxyethira ecornuta* habitats in northern Minnesota had not been sampled representatively. After such extensive sampling, this species is now known in Minnesota only from three sites: Pike Creek in Becker County, LaSalle Creek in Clearwater County, and the White Earth River in Mahnomen County. Collections of adult specimens occurred in late June of 1988 and early July of 2000. All three sites are low gradient third to fourth order streams, are within 50 km of each other, and have fairly good riparian protection. These collections also represent the only known occurrences of *O. ecornuta* within the United States. The species is known to occur in Ontario and portions of Europe, where it similarly exhibits a rare and highly localized distribution pattern. Little is known about the specific habitat requirements of *O. ecornuta* beyond the dependence on the larva on filamentous algae for its food source. Due to the extreme rarity of *O. ecornuta* in Minnesota, reclassification from Special Concern to Threatened status is reasonable and needed for the species.

SELECTED REFERENCES:

- Kelley, R.W. 1985. Revision of the micro-caddisfly genus *Oxyethira* (Trichoptera: Hydroptilidae). Part II: Subgenus *Oxyethira*. Transactions of the American Entomological Society 111:223-253.
- Monson, M.P., and R. W. Holzenthal. 1993. A New Species and New Records of *Oxyethira* (Trichoptera: Hydroptilidae) from Minnesota. Journal of the North American Benthological Society 12: 438-443.
- Morton, K.J. 1893. Notes on Hydroptilidae belonging to the European fauna, with descriptions of new species. Transactions of the Royal Entomological Society of London (1893): 75-82.
- University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.
- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Parapsyche apicalis*

COMMON NAME: A Species of Netspinning Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Parapsyche* inhabit small coldwater streams, typically in areas of fast current. They construct fixed retreats composed of mineral particles, and silken nets to collect coarse organic particles suspended in the water column. Mature larvae are around 20 mm in length. Despite extensive statewide sampling, *Parapsyche apicalis* is only known in Minnesota from adult specimens collected in May 2001 from Mill Creek in William O'Brien State Park in Washington County. The species appears to be at the western edge of its range in Minnesota. It is a coldwater stenotherm and requires fast moving current and rocky substrates. Furthermore, it is almost exclusively found in very small (<1 m wide) streams with dense canopy cover. Thus, the species is extremely sensitive to changes in canopy cover, riparian corridor, substrate, or water temperature or clarity. Mill Creek is fairly well protected by the park. In general, however, small coldwater streams appropriate for *P. apicalis* are very rare in eastcentral Minnesota, and those that remain are under imminent threat of urban development. Thus, Threatened status is reasonable and needed for this species.

SELECTED REFERENCES:

- Houghton, D.C. 2007. The effects of landscape-level disturbance on the composition of caddisfly (Insecta: Trichoptera) trophic functional groups: evidence for ecosystem homogenization. *Environmental Monitoring and Assessment* 135: 253–264.
- Mackay, R.J. 1969. Aquatic insect communities of a small stream on Mont St. Hilaire, Québec. *Journal of the Fisheries Research Board of Canada* 26: 1157–1183.
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- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Polycentropus glacialis*

COMMON NAME: A Species of Tube Casemaker Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Polycentropus* are reported from most types of freshwater lentic and lotic habitats, including temporary vernal pools. Larvae are commonly predatory and live in silken tubes on the undersides of rocks. Mature *Polycentropus* larvae are up to 25 mm in length. Adult males are about 7.5 mm in length, with mottled dark brown wing coloration.

Despite extensive statewide sampling, *Polycentropus glacialis* has been found at only one location within Minnesota: Lake Carlos in Lake Carlos State Park, Douglas County. Five adults were collected during June and August 2000. Little is known about the specific habitat needs of this species. Lake Carlos is a large meso- to eutrophic lake surrounded by considerable agricultural and commercial development, although portions of it are protected by the state park. Most of the surrounding aquatic habitats are, likewise, threatened by agricultural and commercial development. Due to the extreme rarity of *Polycentropus glacialis* and the vulnerability of its only known habitat locality in Minnesota, Threatened status it is reasonable and needed for this species.

SELECTED REFERENCES:

- Armitage, B.J., and S.W. Hamilton. 1990. Diagnostic atlas of the North American caddisfly adults. II. Ecnomidae, Polycentropodidae, Psychomyiidae, and Xiphocentronidae. The Caddis Press, Athens, AL.
- Houghton, D.C. 2007. The effects of landscape-level disturbance on the composition of caddisfly (Insecta: Trichoptera) trophic functional groups: evidence for ecosystem homogenization. *Environmental Monitoring and Assessment* 135: 253–264.
- University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.
- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Polycentropus milaca*

COMMON NAME: A Species of Tube Casemaker Caddisfly

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Polycentropus* are recorded from most types of freshwater lentic and lotic habitats, including temporary vernal pools. Larvae are commonly predatory and live in silken tubes on the undersides of rocks. Mature *Polycentropus* larvae are up to 25 mm in length. Adult males are about 7.5 mm in length, with mottled dark brown wing coloration.

When assigned Special Concern status in 1996, the extant status of *Polycentropus milaca* within Minnesota had not been confirmed. In fact, until recently *Polycentropus milaca* was known worldwide from only a single specimen collected in July 1965 from the Link Lake Ranger station in Itasca County. In late June of 2000, two other very small populations were discovered in Mable and Big Rice Lakes in Cass County, confirming the extant status of the species in Minnesota. Despite extensive sampling of aquatic habitats throughout Minnesota, *P. milaca* has not been found anywhere else within the state. Little is known about the specific habitat needs of this species. All three *P. milaca* collecting sites are within 75 km of each other, and are small mesotrophic lakes with abundant littoral vegetation. Such habitats can be easily degraded by human activity. *Polycentropus milaca* remains known worldwide exclusively from the four specimens collected in Minnesota. Due to the rarity, low abundance, Minnesota endemism, and the sensitivity of its habitat, reclassification from Special Concern to Endangered status is reasonable and needed for this species.

SELECTED REFERENCES:

- Armitage, B.J., and S.W. Hamilton. 1990. Diagnostic atlas of the North American caddisfly adults. II. Ecnomidae, Polycentropodidae, Psychomyiidae, and Xiphocentronidae. The Caddis Press, Athens, AL.
- Houghton, D.C. and R.W. Holzenthal. 2003. Updated conservation status of protected Minnesota caddisflies. The Great Lakes Entomologist 36: 35–40.
- Etnier, D.A. 1968. Range extensions of Trichoptera into Minnesota, with descriptions of two new species. Entomological News 79:188-192;
- University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.
- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Protophila erotica*

COMMON NAME: A Species of Saddle Casemaker Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Protophila* inhabit streams and graze upon fine particulate organic matter, algae, and diatoms, often on the exposed surfaces of rocks. Mature *Protophila* larvae are up to 3.5 mm in length and incorporate relatively large stones in each side of their tortoise-shaped cases. Adult males are about 4 mm in length.

Historically, *Protophila erotica* is known in Minnesota only from three adult specimens collected in June 1937 from the city of Fridley in Anoka County. Despite extensive survey efforts, the species has not been rediscovered in the area. Four adults, however, were collected in late June 2001 from the Kettle River in Banning State Park in Pine County, confirming the extant status of the species in Minnesota. Little is known about the specific habitat requirements of *P. erotica*. The species is common in the arid western regions of the United States and is typically found in large, slow-moving rivers. The Kettle River is a large deep river designated as "Wild and Scenic". The collection of *P. erotica* occurred at a large rocky riffle with good riparian protection. Until more information can be determined about its habitat requirements, Special Concern status is reasonable and needed due to the rarity of this species in Minnesota.

SELECTED REFERENCES:

University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.

Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Protophila talola*

COMMON NAME: A Species of Saddle Casemaker Caddisfly

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Protophila* inhabit streams and graze upon fine particulate organic matter, algae, and diatoms, often on the exposed surfaces of rocks. Mature *Protophila* larvae are up to 3.5 mm in length and incorporate relatively large stones in each side of their tortoise-shaped cases. Adult males are about 4 mm in length.

Protophila talola is known worldwide from only a single specimen collected in May 1941 from the Snake River in Pine County. Despite extensive recent collecting in that area and elsewhere, the species has yet to be rediscovered. Moreover, *P. talola* is very similar in appearance to *P. maculata*, a common species in Minnesota. Thorough recent examination of the only known *P. talola* specimen suggests that it may, in fact, be an aberrant specimen of *P. maculata*. Thus, Special Concern status of *P. talola* should be withdrawn until both its legitimacy as a distinct species and its continued presence in Minnesota can be confirmed.

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Denning, D.G. 1947. New species of Trichoptera from the United States. *Entomological News* 58:249-257.

Luedeman, J. 1991. A preliminary survey for endemic species, and restricted or disjunct populations of caddisflies in Minnesota. Unpubl. final report to Minnesota DNR, Nongame Wildlife Program.

University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.

Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Setodes guttatus*

COMMON NAME: A Species of Caddisfly

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: When this caddisfly was designated a Special Concern species in 1996, its only known occurrence in Minnesota was documented by two females collected from Cass Lake in Cass County in 1934 and 1936. However, a recent reexamination of the specimens indicated that they had been previously misidentified and were instead determined to be individuals of a more widespread species, *Setodes oligius*, which is known from scattered locations in the central and north-central portions of the state. The species *Setodes guttatus* is no longer thought to occur in Minnesota. For this reason, Special Concern status is no longer needed or reasonable.

SELECTED REFERENCES:

- Denning, D.G. 1947. New species of Trichoptera from the United States. Entomological News 58:249-257.
- Luedeman, J. 1991. A preliminary survey for endemic species, and restricted or disjunct populations of caddisflies in Minnesota. Unpubl. final report to Minnesota DNR, Nongame Wildlife Program.
- University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.
- Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Triaenodes flavescens*

COMMON NAME: A Species of Long Horned Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Triaenodes* live within plant beds of both lakes and streams where they feed almost exclusively on living plants. Cases are very slender, tapered, and composed of various types of plant material arranged in a spiral. Mature larvae are around 15 mm in length, and cases may be up to 35 mm long, more than twice the length of the larvae.

Triaenodes flavescens is widespread in the eastern United States and is known prior to 1950 from several sites in the northwestern third of Minnesota. Extensive, recent statewide sampling, however, has located adults only from Sucker Brook in Clearwater County during July of 1988. While little is known about the specific habitat requirements of *T. flavescens*, the species' dependence on living aquatic plants limits its distribution to habitats that can support such plants. Thus, it is probably sensitive to changes in water quality and clarity. Sucker Brook is a designated trout stream with good riparian protection. The apparent decrease in distribution of *T. flavescens*—especially in the northwestern portion of its Minnesota range—is alarming and likely due to habitat loss in these areas. Until more is known about the specific habitat needs and population status of this species, Special Concern status is reasonable and needed.

SELECTED REFERENCES:

Glover, J.B. 1996. Larvae of the caddisfly genera *Triaenodes* and *Ylodes* (Trichoptera: Leptoceridae) in North America. Ohio Biological Survey Bulletin, New Series Volume 11. 89 pp.

Houghton, D.C. 2007. The effects of landscape-level disturbance on the composition of caddisfly (Insecta: Trichoptera) trophic functional groups: evidence for ecosystem homogenization. Environmental Monitoring and Assessment 135: 253–264.

Monson, M.P. 1994. The caddisflies (Insecta: Trichoptera) of the Lake Itasca Region, Minnesota, and a preliminary assessment of the conservation status of Minnesota Trichoptera. Unpubl. M.S. Thesis, Univ. of Minnesota, St. Paul. 135 pp.

University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.

Wiggins, G.B. 1996. Larvae of the North American caddisfly genera (Trichoptera). Second edition. University of Toronto Press, Ontario. 457 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Ylodes frontalis*

COMMON NAME: A Species of Long Horned Caddisfly

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Larvae of the genus *Ylodes* occur in living plant beds within lakes and slow-moving areas of streams. Larvae feed on living plant material and form cases composed of pieces of leaves or roots arranged in a spiral. Mature larvae range from 10–12 mm in length, and their cases can be up to 25 mm in length.

Ylodes frontalis is common in the northwestern United States and into Canada and Alaska, and it appears to be on the edge of its range in Minnesota. Despite extensive statewide sampling, *Ylodes frontalis* is known from only two collections of adult specimens in the western third of Minnesota: Glacial Lake in Glacial Lake State Park, Pope County in 1972 and Hayes Lake in Hayes Lake State Park, Roseau County in 1999. The two sites are separated by over 300 km. While little is known about the specific habitat requirements of *Y. frontalis*, the species' dependence on living aquatic plants limits its distribution to habitats that can support such plants. Thus, it is probably sensitive to changes in water quality and clarity. Both known collecting localities in Minnesota have fairly good riparian protection within the state parks. The vast majority of lakes within western Minnesota, however, have been disturbed by agricultural development. Appropriate habitats for *Y. frontalis* are probably limited and under increasing pressure from development. Due to the extreme rarity of the species within Minnesota and the vulnerability of its habitat, Threatened status is reasonable and needed.

SELECTED REFERENCES:

- Glover, J.B. 1996. Larvae of the caddisfly genera *Triaenodes* and *Ylodes* (Trichoptera: Leptoceridae) in North America. Ohio Biological Survey Bulletin, New Series Volume 11. 89 pp.
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- University of Minnesota Insect Collection. 2009. UMSP Trichoptera Biota database. University of Minnesota, St. Paul, Minnesota. <<http://www.entomology.umn.edu/museum/databases/>>. Accessed 05 August 2009.
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TIGER BEETLES

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Cicindela denikei*

COMMON NAME: Laurentian Tiger Beetle

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: *Cicindela denikei* is a regional endemic restricted to southeast Manitoba, southwest Ontario and extreme northern Minnesota, where it prefers sandy or rocky openings in northern hardwood forest communities. At the time that the species was designated as Threatened in 1996, it had been documented at only three localities in northern Lake and St. Louis counties. Since that time, however, targeted surveys conducted by the DNR and the U.S. Forest Service have discovered populations of *Cicindela denikei* at 44 additional locations distributed over a 220 mile diameter area in Cook, Koochiching, Lake, Lake of the Woods, and St. Louis Counties. Given this new information, Threatened status is no longer appropriate for this species, and it is needed and reasonable to reclassify it as a Species of Special Concern.

SELECTED REFERENCES:

- Brown, W.J. 1934. New species of Coleoptera. V. Canad. Ent. 66:22-24.
- Coffin, B. and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. Univ. of Minnesota Press. Minneapolis.
- Freitag, R. 1999. Catalogue of the tiger beetles of Canada and the United States. NRC Research Press, Ottawa, Ontario, Canada. vii + 195p.
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- Wallis, J.B. 1961. Cicindelidae of Canada. Univ. Toronto Press. 74pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Cicindela hirticollis rhodensis*

COMMON NAME: Hairy-necked Tiger Beetle

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: *Cicindela hirticollis rhodensis* is found from New England and the Maritime Provinces west to the Great Lakes, where it is limited to the lakes' sandy shorelines. Records are available from the south shore of Lake Superior, the entire shoreline of Lake Michigan, the western shore of Lake Huron, the south shore of Lake Erie and the west shore of Lake Ontario. At the time the species was assigned to Special Concern status in 1996, it was known in Minnesota from two sites in the Duluth Harbor area (Minnesota Point and the Port Terminal on Rice's Point) separated by approximately five miles, and representing the western periphery of the beetle's continental range. However, surveys were considered incomplete. Subsequent surveys have focused on this species, and have produced dismaying results. No new populations have been found within the state, and the population at the Port Terminal site now appears to be extirpated. The Minnesota Point site has recently been covered with dredge spoil and shows evidence of heavy foot traffic. Given the questionable fate of the remaining Minnesota population and the vulnerability of its habitat to disturbance, Endangered designation is now needed and reasonable.

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- Graves, R.C. 1988. Geographic distribution of the North American tiger beetle *Cicindela hirticollis* Say. *Cicindela* 20(1):1-21.
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- Steffens, W. P. 2004. Surveys for Tiger Beetles: *Cicindela hirticollis rhodensis*. Report to Minnesota DNR dated March 2, 2004. 4 pp.
- Steffens, W. P. 2009. Update on the status of *Cicindela hirticollis rhodensis* habitat in Minnesota. Report to Minnesota DNR dated June 10, 2009. 6 pp.

LEAFHOPPERS

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Attenuipyga vanduzeei*

COMMON NAME: Hill Prairie Shovelhead Leafhopper

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Hill Prairie Shovelhead Leafhopper is a flightless insect known historically from collections at only four sites in Iowa, Kansas, and Illinois, and discovered over the past decade at an additional four sites in southern and eastern Wisconsin. The species was found at Great River Bluffs State Park, Winona County, Minnesota during a 2005 bluff prairie insect survey. Habitat at the Minnesota and Wisconsin sites consists of dry, rocky prairie remnants on limestone bedrock commonly referred to as "goat prairies," which are very limited in distribution within the state. Although surveys for leafhoppers are incomplete, this species' distinctive shape and size ensures that it will not be easily overlooked. However, given its restricted habitat and likely very limited distribution within the state, designation of the Hill Prairie Shovelhead Leafhopper as Species of Special Concern is needed and reasonable.

SELECTED REFERENCES:

- Bess, J. 2005. A Report on Insect Surveys at Six Minnesota Bluff Prairie Complexes and Recommendations for Natural Area Management and Future Sampling. Report to Minnesota DNR, Division of Parks and Recreation. 29 pp. + tables.
- Hamilton, K. G. A. 2000. Five genera of New-World "shovel-headed" and "spoon-bill" leafhoppers (Hemiptera: Cicadellidae: Dorycephalini and Hecalini). Can. Entomol. 132: 429-503.
- Medler, J.T. 1942. The leafhoppers of Minnesota, Homoptera: Cicadellidae. Univ. MN Agric. Expt. Stn. 196 pp.
- Sauer, S. B. and E. D. Maurer. 2001. Notes on the Distribution, Behavior and Life History of *Attenuipyga vanduzeei* (Osborn & Ball) (Hemiptera: Cicadellidae) in Wisconsin. Am Midl. Nat. 146:434-438.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Macrosteles clavatus*

COMMON NAME: Caped Leafhopper

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Caped Leafhopper is a flightless insect endemic to northern tallgrass prairie. Its known distribution is limited to a 1915 collection from New Jersey, a 1948 record from Illinois, and more recent collections from 3 sites in Minnesota: Town Hall Prairie, Wilkin County; Sedan, Pope County; and Mora, Kanabec County. The Wilkin County site has been reconfirmed as recently as 2006, but given the distinctive color pattern of this species, it is very unlikely that it would be overlooked in prairie invertebrate sampling efforts. Although further surveys for this species are needed, given its restricted habitat and likely very limited distribution within the state, designation of the Caped Leafhopper as Species of Special Concern is needed and reasonable at this time.

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- Beirne, B.P. 1952. The nearctic species of *Macrosteles* (Homoptera: Cicadellidae). *Canad. Entomol.* 84 (7): 208-232.
- Hamilton, K.G.A. 2006. Unpublished correspondence to Minnesota DNR.
- Medler, J.T. 1942. The leafhoppers of Minnesota, Homoptera: Cicadellidae. *Univ. MN Agric. Expt. Stn.* 196 pp.

DRAGONFLIES

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Aeshna sitchensis*

COMMON NAME: Zigzag Darner

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Zigzag Darner is a boreal species of dragonfly that occurs in Canada and parts of the northern United States, including regions of mixed conifer and deciduous forest habitat in Minnesota. It breeds in small, open, sometimes temporarily dry *Sphagnum* pools of 10 square yards or less, and can also utilize evenly vegetated sedge and moss wetlands with small areas of open water. Single specimens or very small populations of the Zigzag Darner have been recorded in only six Minnesota counties (Beltrami, Koochiching, Lake of the Woods, Roseau, St. Louis, and Lake counties). While insufficient information is available at this time to assess populations trends of the Zigzag Darner in Minnesota, a statewide volunteer survey effort is currently underway to collect new records and gain a better understanding of the distribution, abundance, and habitat requirements of this and other sensitive species of dragonflies. Based on the very specific habitat needs of the Zigzag Darner and the few, isolated populations encountered in Minnesota, a status of Special Concern is reasonable and needed.

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- Abbott, J.C. 2007. OdonataCentral: An online resource for the distribution and identification of Odonata. Texas Natural Science Center, The University of Texas at Austin. <<http://www.odonatacentral.org>>. Accessed June 28 2009.
- NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 25 June 2009.
- Steffens, W.P., and W.A. Smith. 1999. Status survey for special concern and endangered dragonflies of Minnesota: population status, inventory and monitoring recommendations. Final report submitted to the Natural Heritage and Nongame Research Program, Minnesota Department of Natural Resources. 54 pp.
- Wisconsin Odonata Survey. 2009. Wisconsin Dragonflies and Damselflies. Wisconsin Aquatic and Terrestrial Resources Inventory and Wisconsin Dept. of Natural Resources. <<http://wiatri.net/inventory/odonata/index.cfm>>. Accessed 25 June 2009.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Aeshna subarctica*

COMMON NAME: Subarctic Darner

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Subarctic Darner is a large species of dragonfly that occurs in Canada and parts of the northern United States where its distribution is sometimes spotty. In Minnesota, it has been reported from seven counties in the northern half of the state (Beltrami, Douglas, Koochiching, Lake, Lake of the Woods, Pine, and Roseau counties) where it breeds in swamps as well as acidic bog and fen pools. This species is sensitive to the eutrophication of its breeding waters, such as can occur when detritus-rich sediments, fertilizers, human or animal waste enter aquatic habitat. While insufficient information is available at this time to assess population trends of the Subarctic Darner in Minnesota, both a survey of the Superior National Forest and a statewide volunteer survey effort are currently underway to collect new records and gain a better understanding of the distribution, abundance, and habitats of this and other sensitive species of dragonflies. Based on the few, isolated populations of Subarctic Darner encountered in Minnesota, its very specific habitat needs, and the potential danger of the eutrophication of its breeding waters, a status of Special Concern is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Boyeria grafiana*

COMMON NAME: Ocellated Darner

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Ocellated Darner is a common species of dragonfly that is distributed throughout much of eastern North America, but is either rare or absent from all of the states and provinces surrounding Minnesota. It occurs at the westernmost limit of its known continental range in Minnesota, where it has been found exclusively in Carlton, Cook, Lake, and St. Louis counties in the Arrowhead region of the state. The Carlton and St. Louis county records are recent finds and each consists of a single individual. Ocellated Darner larvae require cold, clear, shallow, rocky, fast-flowing waters, and in some parts of their range, they are exclusively found in such streams shaded by the tree canopy. In other areas they have also been found in large, cool, rocky oligotrophic lakes. While insufficient information is available at this time to assess populations trends of the Ocellated Darner in Minnesota, a statewide volunteer survey effort is currently underway to collect new records and gain a better understanding of the distribution, abundance, and habitat requirements of this and other sensitive species of dragonflies. Based on the few, isolated populations of Ocellated Darner encountered in Minnesota and their specific and pristine habitat needs, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

- Abbott, J.C. 2007. OdonataCentral: An online resource for the distribution and identification of Odonata. Texas Natural Science Center, The University of Texas at Austin. <<http://www.odonatacentral.org>>. Accessed June 28 2009.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Ophiogomphus howei*

COMMON NAME: Pygmy Snaketail

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Pygmy Snaketail is a rare, diminutive species of dragonfly that is sporadically distributed in parts of northeastern North America. It inhabits large rivers in predominantly forested watersheds that are characterized by large water volumes, stable flows, and high water quality. The larvae develop in cobble and gravel substrate and are sensitive to siltation, runoff, river impoundments and channelization. Adults can be difficult to locate as they establish territories and mate in the tops of riverside trees. The Pygmy Snaketail has been found in only four Minnesota counties (Chisago, Kanabec, Pine and Itasca), three of which are bordered by the St. Croix River and contain the prime habitat for this species in the state. While all four records are recent discoveries, the Itasca County location is from a single exuvia (larval exoskeleton) and thus does not necessarily indicate the presence of a viable breeding population. Insufficient information is available at this time to assess populations trends of the Pygmy Snaketail in Minnesota. However, a statewide volunteer survey effort is currently underway to collect new records and gain a better understanding of the distribution, abundance, and habitat requirements of this and other sensitive species of dragonflies. Because evidence of breeding has only been documented from one river in Minnesota and populations are vulnerable to habitat degradation and sediment load, a status of Special Concern for the Pygmy Snaketail is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Ophiogomphus susbehcha*

COMMON NAME: St. Croix Snaketail

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The St. Croix Snaketail is a recently discovered species of dragonfly whose known global range is restricted to the Chippewa, Flambeau, and St. Croix rivers in Minnesota and Wisconsin. The larvae require deep pools with cobble, gravel, and sand substrate in large, fast, warm-water streams that flow through forested watersheds. As of the mid-1990s, this species had only been identified at eight sites along a 70-mile reach of the St. Croix River in Minnesota. Based on its very limited and near-endemic distribution in the state, the St. Croix Snaketail was designated a species of Special Concern in 1996.

Since its listing in 1996, surveys to locate additional populations of St. Croix Snaketail in Minnesota have been unsuccessful. To date, this species has been documented in only three counties along the St. Croix River: Chisago, Pine, and Washington counties. Research underway in Wisconsin since the early 1990s has indicated a decline in St. Croix Snaketail populations. Although the known St. Croix Snaketail populations in Minnesota fall inside the St. Croix River's protective corridor, this dragonfly is potentially vulnerable to water quality impacts from tributaries of the St. Croix River. Agricultural and municipal non-point pollution, siltation, large-scale logging projects within the watershed, low dissolved oxygen conditions, and water-level fluctuations caused by upstream impoundments all pose potential threats to the St. Croix Snaketail. While insufficient information is available at this time to assess populations trends of the St. Croix Snaketail in Minnesota, a statewide volunteer survey effort is currently underway to collect new records and gain a better understanding of the distribution, abundance, and habitat requirements of this and other sensitive species of dragonflies. Given that the St. Croix Snaketail appears to be breeding in only one river in Minnesota and is vulnerable to changes in habitat conditions, reclassification from Special Concern to Threatened status is reasonable and needed.

SELECTED REFERENCES:

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Somatochlora brevicincta*

COMMON NAME: Quebec Emerald

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Quebec Emerald is only known in Minnesota from one small area in Lake County near the St. Louis County border near the old town site of Whyte. The species was first identified in the state through a photographic voucher of a netted specimen in 2005. Several subsequent excursions to this area in 2006 resulted in the collection of a single adult individual and one larval exuvia in a nearby poor fen, confirming breeding in Minnesota. This finding extends the known range for the Quebec Emerald east of British Columbia and west of Maine and the Canadian Maritimes. The species occurs in mineral poor fens with short sedges where the sphagnum mat is suspended or water saturated. Potential threats to the Quebec Emerald include the harvesting of peat moss, cranberry farming, air pollution, and alteration of water levels such as can occur during the construction of roads and motorized trails. While insufficient information is available at this time to assess populations trends of the Quebec Emerald in Minnesota, a statewide volunteer survey effort is currently underway to collect new records and gain a better understanding of the distribution, abundance, and habitat requirements of this and other sensitive species of dragonflies. Given the documentation of only one population in the state and the extreme rarity of this species at other established locations across its North American range, a status of Special Concern for the Quebec Emerald in Minnesota is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Somatochlora ensigera*

COMMON NAME: Plains Emerald

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Plains Emerald is a Great Plains species of dragonfly that breeds in small prairie and woodland streams with a regular seasonal drop in water levels. In Minnesota, it has been reported from six counties in the northwest and northeast parts of the state as well as from the Twin Cities metro area (Anoka, Cook, Isanti, Lake of the Woods, Norman and Polk counties). This species has never been reported from southern Minnesota despite being considered quite common in northwest Iowa. Threats to the Plains Emerald include deterioration in water quality due to agricultural runoff, siltation, clear-cutting of trees along riverbanks, stream impoundments and channelization, dredging, and other impediments to the natural seasonal drop in water levels. While insufficient information is available at this time to assess populations trends of the Plains Emerald in Minnesota, a statewide volunteer survey effort is currently underway to collect new records and gain a better understanding of the distribution, abundance, and habitat requirements of this and other sensitive species of dragonflies. Based on the disjunct, isolated distribution of known populations of the Plains Emerald encountered in Minnesota and their vulnerability to habitat modification and degradation, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

- Haarstad, J. 1994. The dragonflies of selected Eastern Minnesota River. Technical report, Nongame Wildlife Program, MN DNR.
- Mead, K. 2003. Dragonflies of the north woods. Kolath-Stensaas Publishing, Duluth, Minnesota. 203 pp.
- NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 25 June 2009.
- Steffens, W.P., and W.A. Smith. 1999. Status survey for special concern and endangered dragonflies of Minnesota: population status, inventory and monitoring recommendations. Final report submitted to the Natural Heritage and Nongame Research Program, Minnesota Department of Natural Resources. 54 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Somatochlora forcipata*

COMMON NAME: Forcipate Emerald

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Forcipate Emerald is a widespread species in North America, but populations are usually localized and occur in low numbers in the Upper Midwest. This species breeds in small, spring-fed, boggy streams and sphagnum pools in forested habitat and has been recorded from four counties in Minnesota (Itasca, Koochiching, Lake and St. Louis counties). The Itasca and St. Louis county records are recent additions and represent single specimens. Threats to the Forcipate Emerald include disruptions to groundwater supplies which feed springs, and watershed disturbances such as clear-cutting and impoundments. While insufficient information is available at this time to assess population trends of the Forcipate Emerald in Minnesota, a statewide volunteer survey effort is currently underway to collect new records and gain a better understanding of the distribution, abundance, and habitat requirements of this and other sensitive species of dragonflies. Given the restricted range and isolation of known populations of Forcipate Emeralds in Minnesota and the low abundance of individuals in each population, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 27 June 2009.

Steffens, W.P. and W.A. Smith. 1999. Status survey for special concern and endangered dragonflies of Minnesota: population status, inventory and monitoring recommendations. Final report submitted to the Natural Heritage and Nongame Research Program, Minnesota Department of Natural Resources. 54 pp.

Wisconsin Odonata Survey. 2009. Wisconsin Dragonflies and Damselflies. Wisconsin Aquatic and Terrestrial Resources Inventory and Wisconsin Dept. of Natural Resources. <<http://wiatri.net/inventory/odonata/index.cfm>>. Accessed 25 June 2009.

VASCULAR PLANTS

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Adlumia fungosa* (Ait.) Greene ex B.S.P.

FAMILY: Fumariaceae

COMMON NAME: Allegheny Vine

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This biennial, herbaceous vine was known to occur in nearby Wisconsin and Ontario but until recently the evidence for it occurring as a native species in Minnesota was ambiguous. Three collections from small populations in Cass and Cook counties in 2000, 2006, and 2008 have now confirmed the presence of Allegheny Vine in the state. The species is usually associated with rocky or sandy soils in hardwood and coniferous forests, although it probably does not survive in the deep shade found under a forest canopy. Instead, it appears to be an edge species or perhaps a disturbance-dependent species that follows fire. Insufficient information is available at this time to detect population trends, but given that extensive botanical surveys have been conducted in appropriate habitat within the species' potential range in the state and only a handful of locations have been found, it is reasonable to conclude that Allegheny Vine is rare in Minnesota. Further survey work is needed to clarify the species' distribution and abundance but based on the small number of documented populations and the small size of those populations, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

- Boufford, D. E. 1997. *Adlumia*. Page 347 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 3. Oxford University Press, New York, New York.
- Judziewicz, E. J. 2001. Flora and vegetation of the Grand Traverse Islands (Lake Michigan), Wisconsin and Michigan. *Michigan Botanist* 40:81-208.
- NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 7 May 2009.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Adoxa moschatellina* L.

FAMILY: Adoxaceae

COMMON NAME: Moschatel

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: When designated a Special Concern species in 1984, this small, herbaceous plant was primarily known from southeast-facing slopes in remnant stands of northern hardwoods along the North Shore of Lake Superior. A few populations had also been documented on wooded, north-facing slopes and algific talus slopes in southeastern Minnesota. The main concern leading to its listing was the reduction of available habitat resulting from forest clearing for timber harvest and agricultural purposes. However, targeted rare plant surveys over the past two decades have resulted in the discovery of nearly 100 additional populations, including some populations with thousands of plants. Moschatel is now known to be more common and widely distributed in Minnesota than was formerly believed. For these reasons, Special Concern status is no longer needed or reasonable.

SELECTED REFERENCES:

- Cochrane, T. S., and P. J. Salamun. 1974. Preliminary reports on the flora of Wisconsin No. 64. Adoxaceae - moschatel family. Transactions of the Wisconsin Academy of Sciences, Arts and Letters 62:247-252.
- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
- Ostlie, W. R. 1990. Completion of the algific slope/moderate cliff landsnail survey in Minnesota. Final report submitted to the Nongame Wildlife Program, Minnesota Department of Natural Resources. Unpaged.
- United States Department of Agriculture, Forest Service. 2008. Superior National Forest Rare Plant Guide: Moschatel [web application]. United States Forest Service, Duluth, Minnesota.
<<http://www.fs.fed.us/r9/forests/superior/documents/Moschatel.pdf>>. Accessed 11 June 2009.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Agrostis geminata* Trin.

FAMILY: Poaceae

COMMON NAME: Rough Bentgrass

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: When this perennial grass was designated a Special Concern species in 1984, only nine collections were documented from Minnesota and all but one of them dated from the late 1800s and early 1900s. Recent taxonomic studies have determined that this species is not separable from Rough Bentgrass (*Agrostis scabra*), which is relatively common in Minnesota. For this reason, Special Concern status is no longer needed or reasonable.

SELECTED REFERENCES:

Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.

Harvey, M. J. 2007. *Agrostis*. Pages 633-662 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 24. Oxford University Press, New York, New York.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 8 July 2009.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Agrostis hyemalis* (Walt.) B.S.P.

FAMILY: Poaceae

COMMON NAME: Winter Bentgrass

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Winter Bentgrass is perennial grass species that was first discovered in Minnesota in 1902 in Winona County; that site has never been relocated. It was not seen again in the state until 1996 when a small population was found in a remnant sand savanna in Fillmore County. With only one recently known occurrence in the state, the range of habitats the species could occupy is not definitively known. It can be said with a fair degree of confidence, however, that it occurs in native habitats that are characterized by dry, sandy soil, direct sunlight, and little competition from other plants. This likely includes sand savannas, sand barrens, and possibly sand dunes and bluff prairies. All of these habitats are rare in Minnesota, so habitat availability is likely a limiting factor for the species. Another indication of the species' rarity is the fact that all of the suspected habitats have been extensively targeted for botanical searches by the Minnesota County Biological Survey and still no additional locations of Winter Bentgrass have been found.

The single extant occurrence of Winter Bentgrass is located in the rapidly developing city limits of Rushford. Consequently, this population is threatened by encroaching housing developments and associated residential activities. The sandy soil in which the species is rooted is too fragile to support much recreational activity and soil disturbance caused by vehicles almost always results in an increase of non-native, invasive species such as Spotted Knapweed (*Centaurea stoebe*) and Hoary Alyssum (*Berteroa incana*), which can out-compete and displace native species. Given the limited amount of potential habitat for the species in the state, the documentation of only one population in the past 100 years, the absence of the species in apparently suitable habitat, and the vulnerability of the only known population to degradation or destruction, a status of Endangered is reasonable and needed.

SELECTED REFERENCES:

Harvey, M. J. 2007. *Agrostis*. Pages 633-662 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 24. Oxford University Press, New York, New York.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 26 June 2009.

Randall, J. M., and J. Marnelli. 1996. Invasive plants: Weeds of the global garden. Brooklyn Botanic Gardens, Inc., Brooklyn, New York. 111 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Alisma gramineum* Lej.

FAMILY: Alismataceae

COMMON NAME: Narrow-leaved Water Plantain

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: In the past twenty years of aquatic plant inventories including surveys of more than 1,500 lakes, this species has been documented only 16 times. Most of the locations are from the central part of the state. There are also a handful of records from the prairie region of western Minnesota, but most of these are from the first half of the 20th Century and they have not been relocated. Narrow-leaved Water Plantain is associated with sandy, gravelly lake shorelines and is typically submersed in shallow water less than 1 meter deep. Most of the lakes where it has been found have good water clarity and it appears to inhabit areas that are sparsely vegetated.

The primary threat to the species is loss or degradation of habitat, principally through impaired water quality (pollution), non-compatible recreational activities (e.g., uprooting by motor boats, trampling), and destructive shoreline practices (e.g., use of weed-rollers, increased sedimentation, herbicide run-off). Intense agricultural expansion in the prairie region of the state likely resulted in the decline or loss of many of the western Narrow-leaved Water Plantain populations, although more survey work in this part of the state is needed to confirm this. In addition to the threats mentioned above, the western populations likely face additional risks from livestock grazing, which often leads to nutrient enrichment of lakes and wetlands. Until further survey work clarifies the species' distribution and abundance in the state, Special Concern status is needed and reasonable based on the small number of documented populations and the increasing pressure on lakeshore habitats.

SELECTED REFERENCES:

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Haynes, R. R., and C. B. Hellquist. *Alisma*. Pages 23-25 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 22. Oxford University Press, New York, New York.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Allium cernuum* Roth

FAMILY: Liliales

COMMON NAME: Nodding Wild Onion

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This small woodland plant is restricted to southeast Minnesota, where it typically occurs on north- or northwest facing slopes above creeks or rivers. Its presence in the state was unknown until 1981 when a population was discovered at Lake Louis State Park in Mower County. This remained the only known population when Nodding Wild Onion was designated a Threatened species in 1984. Since that time, more than 40 additional populations have been documented in Fillmore, Mower, Olmsted, and Winona counties. The species is now known to be more common and widely distributed in Minnesota than was formerly believed and Threatened status is no longer necessary. However, Special Concern status is still needed and reasonable given the species' restricted range in the state and the threats posed by timber harvest, livestock grazing, and invasive species.

SELECTED REFERENCES:

- McNeal, D. W., Jr., and T. D. Jacobsen. 2002. *Allium*. Pages 224-276 in *Flora of North America* Editorial Committee, editors. *Flora of North America north of Mexico*. Volume 26. Oxford University Press, New York, New York.
- Coffin, B., and L. Pfannmuller, editors. 1988. *Minnesota's endangered flora and fauna*. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
- Jacobsen, T. D. 1979. Numerical analysis of variation between *Allium cernuum* and *Allium stellatum* (Liliaceae). *Taxon* 28:517-523.
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- Nekola, J. C. 1990. Rare Iowa plant notes from the R. V. Drexler Herbarium. *Journal of the Iowa Academy of Sciences* 97(1):55-73.
- Ownbey, G. B., and T. Morley. 1991. *Vascular plants of Minnesota: a checklist and atlas*. University of Minnesota Press, Minneapolis, Minnesota. 307 pp.

SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Allium schoenoprasum* var. *sibiricum* (L.) Hartman

NEW SCIENTIFIC NAME: *Allium schoenoprasum* L.

FAMILY: Liliaceae

COMMON NAME: Wild Chives

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This circumboreal species occurs in Minnesota along the southern margin of its range and is apparently limited to a very specific habitat type. It has been documented just eleven times from the rocky shorelines and ledges along Lake Superior and the north-facing, rocky ridges above the St. Louis River. While the species' rarity was apparent when it was designated a Threatened species in 1996, northeastern Minnesota had not yet been systematically surveyed for rare plant species. Now, after several years of targeted field inventories by the Minnesota County Biological Survey, only four additional populations have been documented. The species was absent from many apparently suitable sites, and several of the previously documented populations could not be relocated. Furthermore, the significant increase in development pressures and recreational activities in the vicinity of the known populations could threaten the long-term viability of the species. Activities as seemingly innocuous as hiking can result in serious damage to the species' fragile shoreline habitats. For these reasons, a status of Endangered is reasonable and needed.

SELECTED REFERENCES:

- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
- Gleason, H. A., and A. Cronquist. 1991. Manual of vascular plants of northeastern United States and adjacent Canada. Second Edition. New York Botanical Garden, Bronx, New York. 910 pp.
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- Lakela, O. 1965. A flora of northeastern Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 541 pp.
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- Ownbey, G.B. and T. Morley. 1991. Vascular plants of Minnesota: A checklist and atlas. University of Minnesota Press. 306pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Arabis laevigata* var. *laevigata* (Muhl. ex Willd.) Poir.

FAMILY: Brassicaceae

COMMON NAME: Smooth Rock Cress

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This species is restricted to southeastern Minnesota, where it occurs on steep slopes in mesic, deciduous forests. In most cases, the slopes are composed of talus and occur at the base of tall cliffs. Extensive searches of forested habitats in the region have revealed Smooth Rock Cress to be quite rare. It appears to be dependent on a narrow range of environmental conditions that are not well understood, and has only been documented 24 times since its initial collection in 1880. Furthermore, all of the populations are small and sparsely scattered. The loss of canopy cover from development or forest management activities and the invasion of aggressive, non-native species, especially Common Buckthorn (*Rhamnus cathartica*) and Eurasian Honeysuckle shrubs (*Lonicera* spp.), have been identified as the primary threats to the species. On the basis of the small number of known populations and the small size of those populations, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 12 June 2009.

Robert W. Freckmann Herbarium, University of Wisconsin, Stevens Point. 2009. *Plants of Wisconsin* web site. <<http://wisplants.uwsp.edu>>. Accessed 8 July 2009.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Arisaema dracontium* (L.) Schott

FAMILY: Araceae

COMMON NAME: Green Dragon

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Green Dragon is a perennial forb that is found in active floodplain forests dominated by Cottonwood (*Populus deltoides*) and Silver Maple (*Acer saccharinum*) and in floodplain forest communities on elevated river terraces. As such, it only occurs in southeastern Minnesota. Targeted botanical surveys conducted in this region since 1987 have resulted in the discovery of only 48 Green Dragon occurrences. Furthermore, most of the occurrences are small, containing fewer than 30 individuals.

Perhaps the most notable feature of Green Dragon is its ability to survive in flood-prone habitats. In fact, it appears to be restricted to habitats that flood at least intermittently and in some cases, every spring. The flooding can be severe, resulting in large quantities of silt being scoured from the forest floor in one area and deposited in other areas. Habitats that are deprived of their normal flood cycles would likely not continue to support this species. Outright loss of remnant floodplain forest habitats as a result of increased development pressures and the gradual degradation of habitats is also a concern. At some sites, disturbance associated with the loss of tree canopy cover has resulted in the spread of Reed Canary Grass (*Phalaris arundinacea*), a destructive non-native grass species that quickly invades and displaces native flora. Given the species' restrictive habitat requirements and limited geographic range in the state, the historic loss and degradation of floodplain forest habitats, and the current threats posed by land use changes and invasive species, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

- Minnesota Department of Natural Resources. 2006. Tomorrow's habitat for the wild and rare: An action plan for Minnesota wildlife, comprehensive wildlife conservation strategy. Division of Ecological Services, Minnesota Department of Natural Resources. 297 pp. + appendices.
- Randall, J. M., and J. Marnelli. 1996. Invasive plants: Weeds of the global garden. Brooklyn Botanic Gardens, Inc., Brooklyn, New York. 111 pp.
- Thompson, S. A. 2000. *Arisaema*. Pages 139-141 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 22. Oxford University Press, New York, New York.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Aristida longespica* var. *geniculata* (Raf.) Fern.

FAMILY: Poaceae

COMMON NAME: Slimspike Three-awn

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Slimspike Three-awn is an annual, warm season grass of open, sandy, wet meadow habitats. It was first discovered in Minnesota in 1999 when a single population comprised of four patches was documented on the Anoka Sandplain in Anoka County. Despite targeted surveys of wet meadow habitats since the species' initial discovery, no additional populations have been located in the state. Land conversion is the most imminent threat facing Slimspike Three-awn since the only known population is located in an area that is experiencing intense development pressure. In addition, Slimspike Three-awn is an early successional species that appears to be adapted to fire and the seasonal fluctuations of groundwater. In the absence of wildfire, the species will likely require active management such as prescribed burns or brush control in order to maintain its open habitat conditions.

Given the limited amount of potential habitat for the species in the state, the documentation of only one population despite intensive surveys, the absence of the species in apparently suitable habitat, the vulnerability of the only known population to degradation or destruction, and the need for active management, a status of Endangered is reasonable and needed.

SELECTED REFERENCES:

Allred, K. W. *Aristida*. 2003. Pages 315-342 in *Flora of North America* Editorial Committee, editors. *Flora of North America north of Mexico*. Volume 25. Oxford University Press, New York, New York.

Minnesota Department of Natural Resources. 2006. *Tomorrow's habitat for the wild and rare: An action plan for Minnesota wildlife, comprehensive wildlife conservation strategy*. Division of Ecological Services, Minnesota Department of Natural Resources. 297 pp. + appendices.

Wovcha, D. S., B. C. Delaney, and G. E. Nordquist. 1995. *Minnesota's St. Croix River Valley and Anoka Sandplain, a guide to native habitats*. University of Minnesota Press, Minneapolis, Minnesota. 234 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Aristida tuberculosa* Nutt.

FAMILY: Poaceae

COMMON NAME: Seaside Three-awn

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Seaside Three-awn is a small, tufted, annual grass that occurs exclusively in sand savanna, sand prairie, and dune habitats in southeastern Minnesota. It requires open, sparsely vegetated areas where there is dry, shifting sand (blow-outs). The natural, active processes that create and maintain such unstable sand habitats are essential to the survival of Seaside Three-awn. Under normal conditions, competing vegetation in these habitats is maintained by wildfire and perhaps periodic drought; grazing by bison and elk was once also probably important. These processes keep the dunes from becoming overgrown by woody vegetation or dense thatches of herbaceous vegetation, which would eliminate the habitat for Seaside Three-awn. In the absence of such natural processes, active management in the form of prescribed burns or brush control will be necessary in order to maintain open habitat conditions.

When Seaside Three-awn was originally listed as a Special Concern species in 1984, it was known to be rare and to have unique habitat requirements but targeted botanical surveys had not been conducted to determine the extent of its rarity, and threats to its persistence had not been fully assessed. Since that time, a comprehensive biological survey of the region has been completed by the Minnesota County Biological Survey. Less than 20 populations were documented and all are located in small, remnant habitats. Furthermore, threats from pipeline construction, utility corridor maintenance, residential development, golf course expansion, county landfill development, campground construction, tree planting, recreational activities, and invasive species were identified at many of the documented locations. More than 99% of the prairie and savanna habitat that was present in the state before settlement has already been destroyed or degraded so any further habitat loss or degradation seriously jeopardizes the viability of Seaside Three-awn in Minnesota.

Given the small number of documented populations despite targeted botanical surveys, the limited amount of remaining habitat for the species in the state, its restrictive/unique habitat requirements and limited geographic range in the state, the historic and present loss of prairie and savanna habitats, and the current threats posed by land use changes, succession, and invasive species, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Allred, K. W. 2003. *Aristida*. Pages 315-342 in *Flora of North America* Editorial Committee, editors. *Flora of North America north of Mexico*. Volume 25. Oxford University Press, New York, New York.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Arnoglossum reniforme* (Hook.) H.E. Robins.

FAMILY: Asteraceae

COMMON NAME: Great Indian Plantain

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial forb occurs at the northwestern periphery of its range in southeastern Minnesota. Since 1980 a comprehensive botanical survey of most of the species' potential habitat has been conducted, during which only 17 populations were located in just five counties (Houston, Fillmore, Mower, Olmsted, and Winona). Furthermore, all of the populations are quite small. As this species is distinctive, it is unlikely that it would have been overlooked during any surveys. Great Indian Plantain is typically associated with floodplain forest communities on alluvial terraces along smaller streams. It appears to prefer areas with a patchy canopy and is rarely found in dense shade. Since settlement times, large expanses of floodplain forests in southern Minnesota have been lost due to conversion to agriculture, urbanization, and the damming and channelization of rivers. Unfortunately, this trend is continuing and habitat loss still poses an eminent threat to the species.

Given the limited amount of potential habitat for the species in the state and its limited geographic range, the small number of documented populations despite intensive surveys and the small size of those populations, the historic loss and degradation of floodplain forest habitat, and the current threats posed by competing land use practices, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Anderson, L. C. 2006. *Arnoglossum*. Pages 622-625 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 20. Oxford University Press, New York, New York.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Asclepias amplexicaulis* Sm.

FAMILY: Asclepiadaceae

COMMON NAME: Clasping Milkweed

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Clasping Milkweed reaches the northwestern limit of its range in Minnesota where it occurs exclusively in dry, sandy, sparsely vegetated soil in savannas and prairies in the southeastern part of the state. As more than 99% of the prairie and savanna habitat that was present in the state before settlement has now been destroyed or severely degraded, habitat availability is extremely limited and often consists of tiny, isolated remnants of larger habitats. Much of this information was known when Clasping Milkweed was listed as a Special Concern species in 1984, however targeted botanical surveys had not yet been completed to determine the extent of its rarity, and threats to its populations had not been fully assessed. Since that time, a comprehensive biological survey of the region has been completed by the Minnesota County Biological Survey during which only 24 occurrences of the species were documented. Furthermore, the small number of remaining populations are threatened by conversion to agricultural, grazing, sand and gravel mining, urban development, and the disruption of natural ecological processes.

The open and minimally treed conditions of prairie and savanna habitats developed under a regime of periodic wildfire started by lightning strikes. This favored herbaceous vegetation and discouraged woody vegetation. Since uncontrolled wildfires are essentially a thing of the past, prairie and savanna habitats are frequently degraded by encroaching woody vegetation, which shades out herbaceous plants. The invasion of non-native, sod-forming grasses, such as Smooth Brome (*Bromus inermis*), is especially detrimental to Clasping Milkweed as they are able to outcompete the native species for light, space, nutrients, and/or water. The loss or degradation of any additional habitat seriously jeopardizes the viability of Clasping Milkweed in Minnesota.

Given the limited amount of remaining habitat for the species in the state, its restrictive/unique habitat requirements and limited geographic range in the state, the historic and present loss of prairie and savanna habitats, and the current threats posed by habitat conversion and invasive species, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

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SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Aster shortii* Lindl.

NEW SCIENTIFIC NAME: *Symphotrichum shortii* (Lindl.) Nesom

FAMILY: Asteraceae

COMMON NAME: Short's Aster

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This woodland aster was known from only 15 sites in southeastern Minnesota when it was designated a Threatened species in 1996. Since that time, it has been found at an additional ten sites in Fillmore and Winona counties. Furthermore, Short's Aster is a late-flowering species that may have been overlooked because it is less likely to be noticed during the typical botanical field season. The species appears to prefer mesic to dry-mesic, forested slopes and level terrain dominated by White Oak (*Quercus alba*), Northern Red Oak (*Q. rubra*), Sugar Maple (*Acer saccharum*), and Basswood (*Tilia americana*). It typically grows in somewhat closed canopy forests, often in gaps or where partial sunlight reaches the forest floor. Given that the species is more abundant than previously thought, Threatened status is no longer necessary. However, because its habitat is threatened by residential development, livestock grazing, timber harvest, and invasive species, a status of Special Concern is still needed and reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Bacopa rotundifolia* (Michx.) Wettst.

FAMILY: Scrophulariaceae

COMMON NAME: Water-hyssop

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Water-hyssop is a small, aquatic species that is restricted to the prairie region of southwestern Minnesota. It is primarily found in small rainwater pools that form in depressions on rock outcrops and occasionally along the margins of shallow ponds. During the course of the growing season, the habitat of Water-hyssop changes from aquatic to terrestrial as the water in these ephemeral pools evaporates leaving sediments at the bottom of the pools moist or sometimes dry and cracked.

Between 1888 and 1981, only seven locations of this species were recorded in Minnesota. At the time it was listed as a Special Concern species in 1984, it was assumed that this very small and inconspicuous plant had been overlooked, and that its habitat was probably secure. However, since then a comprehensive biological survey of potential habitat in southwestern Minnesota has been completed by the Minnesota County Biological Survey. Only 22 occurrences of the species were documented and many of the populations are relatively small. Furthermore, all of the occurrences are in areas where human land use practices are intensifying and conflicting with conservation of the species. Rock quarrying, cattle grazing, and herbicide application are the most prominent threats. Mining in particular has been a growing issue over the past decade, fueled by federal highway construction standards now requiring crushed bedrock instead of gravel. Another recent threat evidenced in Rock County is the conversion of rocky pastures to cornfields by excavating the bedrock.

Given the limited amount of potential habitat for the species in the state and its limited geographic range, the small number and size of documented populations, its specialized habitat requirements and unique life history characteristics, and the current threats posed by competing land use practices, a status of Threatened is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Berula erecta* (Huds.) Coville

FAMILY: Apiaceae

COMMON NAME: Stream Parsnip

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Stream Parsnip is associated with calcareous, hydrologically active habitats such as the margins of small, spring-fed streams and pools. These may occur in forest ravines, in wet seepage meadows, and in calcareous fens within southern Minnesota. Rarely does the species occur more than a few meters from where spring water flows from the ground. Several of these habitats are suspected of having been recently degraded or destroyed, mostly by road construction and water appropriation projects. Since the habitats are sustained by groundwater aquifers, which can be regional in extent, they can be damaged by projects many miles away. Any activity that interferes with normal groundwater dynamics, such as large-capacity wells, the dewatering of gravel pits or rock quarries, or deep roadcuts, could have a deleterious and irreversible effect on the species and its habitat.

Nearly half of the Stream Parsnip specimens at the J. F. Bell Museum of Natural History Herbarium were collected prior to 1975. Only a dozen new locations have been documented over the last two decades, suggesting that the species remains rare in the state. Given the species very restrictive habitat requirements, the significant threats posed by hydrological alterations, and the low rate of discovery of new locations despite botanical surveys in much of the species' potential habitat, a status of Threatened is needed and reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Bidens discoidea* (Torr. & Gray) Britt.

FAMILY: Asteraceae

COMMON NAME: Discoid Beggarticks

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Discoid Beggarticks occurs on hummocks and along the edges of a variety of wetland habitats including marshes, pond margins, and river sloughs. Seasonal fluctuations in water levels may be an important characteristic of suitable habitat while strong currents or wave action could be counter-indicative. There are only 33 confirmed records of this species from Minnesota. Most are from lakes and marshes in the northeast part of the state, but three are from the Mississippi River in the southeast. Given its sporadic and widespread collection history, it is difficult to assess the status of Discoid Beggarticks in Minnesota. The small number of records may be an indication of rarity, but it is also possible that the species has been overlooked due to its superficial resemblance to two common species of *Bidens*. This is most likely true in Mississippi River habitats south of the Twin Cities, where other river species have been poorly surveyed and documented. Until a targeted botanical survey has been completed, a status of Special Concern is needed and reasonable based on the small number of occurrences.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Botrychium acuminatum* W.H. Wagner

FAMILY: Ophioglossaceae

COMMON NAME: Tailed Grapefern

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This small, perennial fern has a highly restricted range, having only been documented in Ontario, Michigan, and Minnesota. Its occurrence in Minnesota is known by a single confirmed record from Minnesota Point near the Duluth Harbor. Two specimens were found in 1995 growing in sand among the grasses and shrubs of the dune/sandbar habitat. The Tailed Grapefern plants were located among thousands of Matricary Grapefern (*Botrychium matricariifolium*) plants, which is the species it is most similar to and often confused with. In fact, Tailed Grapefern is so similar to Matricary Grapefern, a relatively common species, that any suspected specimens must be reviewed by an authority to confirm their identification. Given the great difficulty in identifying this species and the possibility that it has been overlooked, a status of Special Concern has been deemed most appropriate at this time. A more protective status may be warranted in the future if additional targeted surveys confirm the species' suspected rarity in the state.

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- Wagner, W. H., Jr., and F. S. Wagner. 1993. *Botrychium*. Pages 86-101 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 2. Oxford University Press, New York, New York.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Botrychium ascendens* W.H. Wagner

FAMILY: Ophioglossaceae

COMMON NAME: Upswept Moonwort

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This small, perennial fern is primarily a western species, with only a handful of records east of the Rocky Mountains. A single population of two patches was discovered in Minnesota in 1998 near Trommald in Crow Wing County and confirmed by electrophoresis in 2005. Since that time, three other populations have been reported; one from the same general area as the original find, one near Leetonia in St. Louis County, and one near Oaks Corner, Lake of the Woods County. All of the sites are associated with drained sediment basins that had previously been used to dispose of mine tailings. Over the past 30-50 years, the basins have evolved into young forests with scattered groves of early successional tree species and a patchy ground-layer of grasses and broad-leaved forbs. It is not known exactly which aspect of this habitat is so attractive to moonworts, but several different species of rare or unusual moonworts have been documented at each of the sites. The fact that the sediment basin habitats were man-made, coupled with how rapidly the species was able to colonize them, leads us to believe that a stable source of propagules may occur in more natural habitats nearby. This is supported by the occurrence of Upswept Moonwort in natural habitats in other parts of its range including coniferous forests, mesic meadows, and maritime beaches.

While several species in the genus *Botrychium* are very difficult to identify and require genetic testing that can only be performed in a laboratory, this does not appear to be the case with Upswept Moonwort. It does closely resemble several other moonwort species, however, a trained botanist can differentiate it using relatively simple morphological characters. Considering the increased interest in *Botrychium* species in recent years and the number of surveys conducted, the finding of only three populations seems to indicate that this is a very rare species in Minnesota. Like most moonwort species, Upswept Moonwort is disturbance-dependent and it tends to occur in open to partially open habitats. Habitat conditions at the Minnesota sites are presumably in a state of flux, or at least in a state of vegetational succession. In the absence of natural disturbances (e.g., wildfire, floods, rock slides, blowdowns) that periodically delay or restart succession, these habitats will turn into more mature, forested habitats that are unsuitable for Upswept Moonwort. It should be noted that the intensity, scale, and frequency of disturbance needed for the perpetuation of the species is not yet known, and it would be incorrect to assume that all types of disturbance are beneficial. Natural and man-made disturbances can have very different effects and very intense disturbances, such as those associated with development projects or heavy machinery use, may eliminate favorable habitat conditions for the species. The persistence of the species likely depends on landscape level dynamics in which patches of open habitats are continually created and lost by disturbances of varying degrees.

Given the documentation of only three populations despite targeted botanical surveys, the small size of those populations, the vulnerability of the populations to habitat succession, and the potential need for active management to maintain habitat conditions, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Botrychium lineare* W.H. Wagner

FAMILY: Ophioglossaceae

COMMON NAME: Slender Moonwort

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This small, perennial fern is still relatively new to science, having only been officially described in 1994. It was first discovered in Minnesota in Crow Wing County in 2005, and has only been recorded from one other location in St. Louis County. Both of the sites are associated with drained sediment basins that had previously been used to dispose of mine tailings. The fact that these basins are man-made, coupled with how rapidly the species was able to colonize them, leads us to believe that a stable source of propagules may occur in natural habitats nearby. This is supported by the occurrence of the species in grassy meadows, woodlands, and cliffs and scree slopes in other parts of its range.

While several species in the genus *Botrychium* are very difficult to identify and require genetic testing that can only be performed in a laboratory, this does not appear to be the case with Slender moonwort, which can be readily differentiated by several morphological characters by a trained botanist. Considering the increased interest in *Botrychium* species in recent years and the number of surveys conducted, the finding of only two populations seems to indicate that this is a very rare species in Minnesota. Slender Moonwort is a disturbance-dependent species that tends to occur in open to partially open habitats. However, the intensity, scale, and interval of disturbance needed for the perpetuation of the species is not yet known. Given what we do know, threats to the species would include habitat succession, the intentional planting of trees, invasive species, particularly Hawkweeds (*Hieracium* spp.), and herbicide spraying. The natural forces that periodically reset successional processes to an earlier stage, such as fire, floods, insect infestations, and windstorms, are large-scale ecological processes that do not appear to function in artificial tailings basins. As such, the long-term viability of the two known Minnesota populations is questionable. It should be noted that natural and man-made disturbances can have very different effects and it would be incorrect to assume that all types of disturbance are beneficial. Very intense disturbances, such as those associated with development projects or heavy machinery use, may eliminate favorable habitat conditions for the species. The persistence of Slender moonwort likely depends on landscape level dynamics in which patches of open habitats are continually created and lost by disturbances of varying degrees.

The hope is that additional surveys will result in the species being found in a more natural habitat in Minnesota, or at least in a habitat that can be maintained by natural disturbances. Until that time, the extremely small number of known populations, the small size of those populations, the vulnerability of the populations to habitat succession, and the potential need for active management makes a status of Endangered reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Botrychium mormo* W.H. Wagner

FAMILY: Ophioglossaceae

COMMON NAME: Goblin Fern

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This small fern is endemic to Minnesota, Wisconsin, Michigan, and possibly Quebec. Most of the records in Minnesota are from the north-central part of the state, particularly in the Chippewa National Forest, where it occurs in undisturbed, mature mesic hardwood forests dominated by Sugar Maple (*Acer saccharum*). The species requires an intact tree canopy in order to have consistently shaded, moist conditions. While concerns over habitat loss and degradation from timber management activities and land clearing prompted the species' listing as Special Concern in 1984, an even more insidious threat has emerged in recent years. The invasion of non-native earthworms is responsible for an accelerating and alarming rate of habitat degradation. The worms, which were introduced from Europe, rapidly consume the humus layer of the soil thereby rendering the habitat unsuitable for Goblin Fern. A significant number of populations of this fern have disappeared within the last decade and the trend appears to be continuing. In light of this new information, a status of Threatened is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Botrychium oneidense* (Gilbert) House

FAMILY: Ophioglossaceae

COMMON NAME: Blunt-lobed Grapefern

CURRENT MINNESOTA STATUS: Endangered

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Blunt-lobed Grapefern was discovered in Minnesota in 1991 in Aitkin County. This sparked the beginning of an intensive search to determine the species' range and habitat preferences in the state. By the time it was designated an Endangered species in 1996, only a handful of populations had been documented. Since that time, additional botanical surveys have been conducted and a total of 43 populations have now been located. Most of the populations are located in moist depressions in hardwood forests in the central part of the state, with a few populations recorded in extreme southeastern Minnesota. This new information indicates that this species is not as rare as previously thought, and Endangered status is no longer necessary. However, because most of the populations are small and localized around small forest wetlands, they are vulnerable to certain forest management activities, particularly practices that create significant canopy openings. Hydrologic changes and exotic earthworms may also pose a threat to the species and its habitat. Given these concerns, it is needed and reasonable to retain the species in Threatened status.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Botrychium pallidum* W.H. Wagner

FAMILY: Ophioglossaceae

COMMON NAME: Pale Moonwort

CURRENT MINNESOTA STATUS: Endangered

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This tiny fern has been found in a diversity of habitats including open fields, dry sand and gravel ridges, roadsides, wet depressions, marshy lakeshores, and tailings basins, as well as second-growth forests and shaded, moist, mixed hardwood forests. The species had recently been discovered in the state and very few populations were known to exist when it was designated an Endangered species in 1996. Since that time, our understanding of the species' habitat preferences has evolved and nearly 60 additional populations have been discovered in northern Minnesota. Pale Moonwort is now known to be more widely distributed and occur in a broader range of habitats than was formerly believed, and Endangered status is no longer necessary. However, it is needed and reasonable to retain the species in Special Concern status given its vulnerability to habitat encroachment, habitat succession, and invasive species.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Botrychium rugulosum* W.H. Wagner

FAMILY: Ophioglossaceae

COMMON NAME: St. Lawrence Grapefern

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This small fern grows in low, moist habitats in brushy or grassy areas and in forest openings. It is easily confused with two other *Botrychium* species, and consequently has often been misidentified. When designated a Threatened species in 1996, it was known from less than 20 locations in northern Minnesota. Since that time, our understanding of the species' habitat preferences has evolved and nearly 50 additional populations have been discovered. St. Lawrence Grapefern is now known to be more widely distributed in Minnesota than was formerly believed, and Threatened status is no longer necessary. However, it is needed and reasonable to retain the species in Special Concern status given its vulnerability to habitat alteration and habitat succession.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Botrychium spathulatum* W.H. Wagner

FAMILY: Ophioglossaceae

COMMON NAME: Spatulate Moonwort

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This small, perennial fern has a widespread yet limited distribution, with scattered localities across Montana, Michigan, Wisconsin, Minnesota, and Canada. It was not known to occur in Minnesota until 1998, when a single population was found near Trommald in Crow Wing County. One other population was discovered in the same general area in 2008. Both of the sites are associated with drained sediment basins that had previously been used to dispose of mine tailings. Over the past 30-50 years, the basins have evolved into young forests with scattered groves of early successional tree species and a patchy ground-layer of grasses and broad-leaved forbs. The fact that the basins were man-made, coupled with how rapidly the species was able to colonize them, leads us to believe that a stable source of propagules may occur in more natural habitats nearby. This is supported by the occurrence of the species in natural habitats in other parts of its range including grassy meadows and sand dunes along lake and maritime shores, grassy riverbanks, shrub-grassland complexes, and subalpine slopes.

While several species in the genus *Botrychium* are very difficult to identify and require genetic testing that can only be performed in a laboratory, this does not appear to be the case with Spatulate Moonwort. It does closely resemble several other moonwort species, however, it can be readily differentiated by several morphological characters by a trained botanist. Considering the increased interest in *Botrychium* species in recent years and the number of surveys conducted, the finding of only two populations seems to indicate that this is a very rare species in Minnesota. Like most moonwort species, Spatulate Moonwort is disturbance-dependent and it tends to occur in open to partially open habitats. Habitat conditions at the only Minnesota sites are presumably in a state of flux, or at least in a state of vegetational succession. In the absence of natural disturbances (e.g., wildfire, floods, rock slides, blowdowns) that periodically delay or restart succession, these habitats will turn into more mature, forested habitats that are unsuitable for Spatulate Moonwort. It should be noted that the intensity, scale, and frequency of disturbance needed for the perpetuation of the species is not yet known, and it would be incorrect to assume that all types of disturbance are beneficial. Natural and man-made disturbances can have very different effects and very intense disturbances, such as those associated with development projects or heavy machinery use, may eliminate favorable habitat conditions for the species. The persistence of the species likely depends on landscape level dynamics in which patches of open habitats are continually created and lost by disturbances of varying degrees.

Given the documentation of only two populations despite targeted botanical surveys, the small size of those populations, the vulnerability of the populations to habitat succession, and the potential need for active management to maintain habitat conditions, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Calamagrostis purpurascens* R. Br.

FAMILY: Poaceae

COMMON NAME: Purple Reedgrass

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Within the state, this extremely rare grass species is only known by four collections from the Border Lakes region of northeastern Minnesota, where it occurs in crevices and ledges of tall cliffs. While its rarity was apparent when it was designated a species of Special Concern in 1996, the lack of current data prevented it from being assigned a more protective status at that time. However, northeastern Minnesota has recently been the subject of a comprehensive biological inventory during which only one of the previously documented populations was relocated. No new populations of Purple Reedgrass were discovered. Although there are relatively few human threats to the species' habitat, logging activities or other major disturbance on the land above occupied cliffs could result in increased erosion. In addition, recreational rock climbing, an increasingly popular activity, can dislodge the small vegetation mats growing in rock crevices and on narrow ledges. Given the documentation of only two populations since 1938 despite intensive surveys, the limited amount of potential habitat in the state, and the vulnerability of the extant populations to degradation or destruction, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Callitriche heterophylla* Pursh

OLD FAMILY: Callitrichaceae

NEW FAMILY: Plantaginaceae

COMMON NAME: Larger Water Starwort

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Larger Water Starwort is a small, aquatic plant with two disjunct ranges and habitats in Minnesota. Plants in the southwest part of the state (Big Stone, Nicollet, Pipestone, and Rock counties) occur in shallow rainwater pools on Sioux Quartzite outcrops. Plants in the northeast (Lake and St. Louis counties) occur in the shallow margins of protected bays of lakes. With only five known collections, four of which hadn't been seen since the 1940s and 1950s, Larger Water Starwort was suspected of being rare when it was designated a species of Special Concern in 1996. However, lack of current data and the amount of potential habitat that had not been adequately surveyed prevented it from being assigned a more protective status at that time. Extensive botanical surveys have now been conducted in appropriate habitat within the species' potential range, and only five additional populations have been found. In addition, one of the historical locations is suspected of having been destroyed by a quartzite mine.

Water quality degradation, herbicide treatments, and the invasion of non-native aquatic species currently threaten the lake populations of Larger Water Starwort. The rainwater pool habitats in the southwest are much smaller and more fragile than the lake habitats, and they face additional issues. Since these habitats are usually in agricultural regions, they are often subjected to cattle grazing, which can cause nutrient enrichment from manure and trampling of exposed sediments that may harbor the plant's seed bank. Herbicide drift from the routine aerial application of agricultural herbicides is another concern. Most recently, mining of rock outcrops has emerged as a serious threat, fueled by federal highway construction standards now requiring crushed bedrock instead of gravel. Given the documentation of only four populations since 1984 despite intensive surveys and the vulnerability of the extant populations to degradation and destruction, a status of Threatened is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Cardamine pratensis* var. *palustris* Wimm. & Grab.

FAMILY: Brassicaceae

COMMON NAME: Cuckoo Flower

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This rare, perennial forb is known from several widely scattered and diverse locations in northern Minnesota. There are a total of ten known populations, only six of which have been located since 1964. A comprehensive biological survey of potential habitat in the region has been nearly completed by the Minnesota County Biological Survey, so it is unlikely that many additional populations will be found. The species' marsh, bog, swamp, and streamside habitats do not appear to be particularly unusual or limited, but for unknown reasons, Cuckoo Flower is absent from most apparently suitable habitat. This leads us to believe that some unknown but unique microhabitat characteristics might be a factor in the species' distribution. Potential threats to the known populations include hydrologic changes in adjacent streams and drainages, forest management activities that would result in significant canopy removal or soil disturbances, and the expansion of mining operations and associated impacts (road building, infrastructure improvements, wetland drainage, etc.) in northern Minnesota.

Given the small number of documented populations despite targeted botanical surveys, the small size of those populations, the absence of the species in apparently suitable habitat, and the vulnerability of the known populations to land use changes, a status of Threatened is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Carex careyana* Torr. ex Dewey

FAMILY: Cyperaceae

COMMON NAME: Carey's Sedge

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial sedge reaches the northwestern limit of its range in southeastern Minnesota. It has only been documented from six locations in Houston, Fillmore, Wabasha, and Winona counties. All of the populations are on cool, shaded slopes and narrow valley bottomlands. While the species' extreme rarity was known when it was designated a Threatened species in 1996, it was hoped that a few more populations might be found with additional surveys. A comprehensive botanical survey of the region has been completed by the Minnesota County Biological Survey, and unfortunately no additional locations of Carey's Sedge have been located in the past 13 years. It is now clear that this is one of the rarest species in the state. The species' habitats are fragile and vulnerable to a variety of incompatible land use practices including canopy removal, livestock grazing, and road and trail construction. Furthermore, the invasion of nonnative species, particularly Wild Garlic Mustard (*Alliaria petiolaris*), poses a significant threat to the few remaining populations. For these reasons, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Carex crus-corvi* Shuttlw. ex Kunze

FAMILY: Cyperaceae

COMMON NAME: Raven's Foot Sedge

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None, and Probably Extirpated from Minnesota

BASIS FOR PROPOSED MINNESOTA STATUS: When this distinctive sedge was designated a Special Concern species in 1996, only two populations had ever been recorded in Minnesota. The collections dated 1885 and 1926, respectively and both were from bottomland areas of the Mississippi River. Some potential habitat still remained to be surveyed at the time of listing, and it was hoped that additional inventory efforts would result in the discovery of remnant populations. Unfortunately, this has not been the case and Raven's Foot Sedge is now considered extinct in Minnesota. For this reason, Special Concern status is no longer needed or reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Carex grayi* Carey

FAMILY: Cyperaceae

COMMON NAME: Gray's Sedge

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This sedge reaches the northwestern limits of its range in Minnesota where it is found predominately along the Mississippi River from about Hastings (Dakota County) downstream to the Iowa border. It is also found near the mouths of major tributaries such as the Zumbro and Cannon rivers. In all cases, it is very rare and dependent on complex and dynamic riverine processes. Under natural conditions, the alluvial forests in which it occurs would be flooded nearly every spring. However, because the Mississippi River is currently maintained as a navigation channel and its water levels are controlled by a series of locks and dams, this natural flooding cycle has been disrupted. This may limit the species' dispersal ability as its large, inflated seeds likely float downstream and establish in new areas during flood events. The increasing demands being placed upon the river for recreation, transportation, and industry uses is also a concern. Lastly, although not as big of a threat, logging and other land clearing activities would be destructive to the species' forest habitat. For these reasons, a status of Special Concern is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Carex hookerana* Dewey

FAMILY: Cyperaceae

COMMON NAME: Hooker's Sedge

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial sedge is considered rare or uncommon throughout its North American range. It has been known from North Dakota for some time, but its presence in Minnesota was unknown until its discovery at a single site in Becker County in 2005. In general, Hooker's Sedge is considered a prairie species. The Becker County population, which consists of approximately 25 plants, occurs in roughly one acre of habitat comprised of non-native perennial grasses and brushy oak woodland. It may be a remnant of a larger population that declined following contraction and degradation of its prairie and savanna habitat. Ongoing surveys are attempting to find other populations of Hooker's Sedge nearby. Until such surveys can clarify the species' abundance and distribution in the state, a status of Special Concern is reasonable and needed.

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SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Carex katahdinensis* Fern.

NEW SCIENTIFIC NAME: *Carex conoidea* Schkuhr ex Willd.

FAMILY: Cyperaceae

COMMON NAME: Field Sedge

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: When this sedge was designated a Threatened species in 1996, it appeared to be restricted to the sandy beaches of two large lakes in the Boundary Waters Canoe Area Wilderness. Subsequent taxonomic research has indicated that Katahdin Sedge may be a dwarf race of the more widespread prairie species, Field sedge (*Carex conoidea*). It appears that Katahdin Sedge has some level of genetic and ecological uniqueness, but it is no longer appropriate to consider it a separate species. For this reason, Threatened status is no longer needed or reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Carex media* R. Br.

FAMILY: Cyperaceae

COMMON NAME: Intermediate Sedge

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This rare perennial occurs primarily on the shore rocks of Lake Superior, specifically in boggy vegetation mats that develop in rock crevices and along the margins of small rock pools. There is surprisingly little of this habitat along the shore; most of the shoreline consists of jumbled rocks, boulders, or cobblestones, which are not suitable habitats for this species. Intermediate Sedge also occurs, although less commonly, in similar habitats inland from the lake and along the Kettle River in Pine County. There is some potential for the species to be found on algific talus slopes in the southeast part of the state, as has been the case in Wisconsin, but to date no Minnesota populations have been found in this type of habitat. All of the habitats in which the species occurs are small, fragile and vulnerable to a number of recreational activities and forest management practices. Only a decade ago it was assumed that rare plants along the bedrock shoreline of Lake Superior were adequately protected by the remoteness and inaccessibility of their habitat. Since then, the region has experienced a tremendous residential, recreational, and commercial boom. This has raised new concerns about the conservation needs of shore plants. The small vegetation mats where Intermediate Sedge occurs are very fragile and easily destroyed. Activities as benign as hiking can become a serious threat if concentrated along the rocky shore. For these reasons, a status of Special Concern is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Carex muskingumensis* Schwein.

FAMILY: Cyperaceae

COMMON NAME: Muskingum Sedge

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This rare sedge occurs infrequently in alluvial forests along the Mississippi River, north to about Little Falls (Morrison County). There is an 1885 herbarium specimen labeled "Center City" Chisago County, which ostensibly came from the St. Croix River valley, but that particular occurrence has never been confirmed on the ground. The initial construction and operation of locks and dams on the Mississippi River in the 1930s was responsible for the destruction of most of the floodplain forests that remained at that time. Even today, all but one of the approximately 30 known Muskingum Sedge populations occurs in remnant habitat that is directly or indirectly influenced by dam operations. In many cases, the dams prevent the seasonal flooding that sustains the floodplain forests, thereby degrading this species' habitat and the habitat of similar species that rely on periodic flooding to create optimal habitat conditions. Although not nearly as serious a threat as water level manipulation, logging occasionally occurs in the species' habitat and can be problematic if there is significant canopy removal or soil disturbance. For these reasons, a status of Special Concern is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Carex novae-angliae* Schwein.

FAMILY: Cyperaceae

COMMON NAME: New England Sedge

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial sedge went undiscovered in Minnesota until 2001 when it was found in a moist conifer/hardwood forest in Lake County. Since then, there has been a concerted effort to determine how rare this species is in Minnesota and what its habitat requirements are. Only 28 populations have been found in moist upland forests, particularly mixed conifer/hardwood stands, and in wetland/upland ecotones. Most of the populations are small and all are concentrated within the southern half of Lake County. This represents the western edge of the species' range in North America. Furthermore, all of the known sites are in forests that are actively managed for timber production. Of particular concern is the rapid conversion of the species' mixed forest habitat to stands of spruce. Although New England Sedge has been found in forest gaps near intermediate disturbances such as old trails or blow downs, large disturbances that result in substantial canopy removal (clear-cutting) and a corresponding loss of shade and moisture could threaten the long-term viability of this species. In addition, New England Sedge may not be able to compete with the more aggressive weedy or invasive species that tend to establish after large timber harvests.

Given the small number of documented populations despite targeted botanical surveys, the small size and restricted range of those populations, the current threats posed by competing land use practices, and the vulnerability of known populations to habitat loss and degradation, a status of Threatened is reasonable and needed.

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- United States Department of Agriculture, Forest Service, Eastern Region (Region 9). 2006. Regional Forester Sensitive Plants. United States Forest Service, Milwaukee, Wisconsin; 21 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Carex ormostachya* Wieg.

FAMILY: Cyperaceae

COMMON NAME: Necklace Sedge

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial sedge occurs sporadically in upland hardwood and hardwood-conifer forests in northeastern Minnesota, typically in areas with mesic, loamy soils and moderate shade. The species has been suspected of being rare in Minnesota for a long time, but because it is somewhat of a habitat generalist and because it occurs in a relatively large portion of the state, it was thought that intensive searches would likely discover many more populations. This has not been the case. Targeted searches in more than half of the species' potential range have been completed and only 16 populations were located. Critical aspects of the species' habitat are still poorly known, but it is clearly dependent on hardwood forests of the type that are being increasingly utilized for timber production. When surveys are completed, it may be necessary to reassess the status of this species. Until that time, the small number of known occurrences in combination with perceived threats to the species' habitat makes it reasonable and needed to list Necklace Sedge as Special Concern.

SELECTED REFERENCES:

Bryson, C. T., and R. F. C. Naczi. 2002. *Carex* sect. *Laxiflorae*. Pages 431-440 in *Flora of North America* Editorial Committee, editors. *Flora of North America north of Mexico*. Volume 23. Oxford University Press, New York, New York.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Carex rossii* Boott

FAMILY: Cyperaceae

COMMON NAME: Ross' Sedge

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial sedge was first documented in Minnesota in 1896 at an unknown location in Carlton County. In spite of intensive searches, it was not found again until 1999 when three small populations were discovered in Cook County. Since that time, only two additional populations have been documented; one in Carlton County and one in Lake County. This brings the total number of historical and recent discoveries to just six. All of the known populations occur in isolated south-facing cliff habitats, where the species typically roots in shallow crevices and ledges where small quantities of wind- or water-borne soil accumulate. Although cliffs themselves are generally permanent and indestructible, the highly specialized plants that occur on them and their microhabitats are often vulnerable to human activities. Recreational rock climbing, logging on adjacent upslope habitats, and the routing of recreational trails along cliff tops have been identified as the major potential threats to Ross' Sedge.

Given the small number of documented populations despite targeted botanical surveys, the species' restrictive/unique habitat requirements and limited geographic range in the state, the limited amount of suitable habitat, and the vulnerability of the known populations to degradation or destruction, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.

Crins, W. J., and J. H. Rettig. 2002. *Carex* sect. *Montanae*. Pages 532-545 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 23. Oxford University Press, New York, New York.

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Minnesota Department of Natural Resources. 2003. Field guide to the native plant communities of Minnesota: the Laurentian mixed forest province. Ecological Land Classification Program, Minnesota County Biological Survey, and Natural Heritage and Nongame Research Program. Minnesota Department of Natural Resources, St. Paul, Minnesota. 352 pp.

SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Carex supina* var. *spaniocarpa* (Steud.) Boivin

NEW SCIENTIFIC NAME: *Carex supina* ssp. *spaniocarpa* (Steud.) Hulten

FAMILY: Cyperaceae

COMMON NAME: Weak Arctic Sedge

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: When this sedge was listed as Special Concern in 1996, it was only known by two old records (1889 and 1936) from cliffs adjacent to lakes in northern Cook County. It was not assigned a more protective status at that time because not enough inventory work had been completed in that portion of the state to evaluate the significance of the two populations. Now, after several years of targeted field surveys in potential cliff habitats, no additional populations have been discovered, indicating that it is very rare in the state.

The cliff habitat at Clearwater Lake occurs in the Boundary Waters Canoe Area Wilderness and is apparently secure from most human disturbance. The site at South Fowl Lake is just outside the federal wilderness boundary and logging operations have occurred on state land nearby. It is not certain what affect logging would have on the cliff habitat, but increased erosion is a possibility. Recreational rock climbing on the sensitive cliff faces could potentially pose a threat to both populations.

Given the limited amount of potential habitat for the species in the state, the documentation of only two populations despite intensive surveys, the absence of the species in apparently suitable habitat, and the vulnerability of just two populations to degradation or destruction, a status of Endangered is reasonable and needed.

SELECTED REFERENCES:

- Ball, P. W., and D. F. Murray. 2002. *Carex* sect. *Lamprochlaenae*. Pages 556-557 in *Flora of North America* Editorial Committee, editors. *Flora of North America north of Mexico*. Volume 23. Oxford University Press, New York, New York.
- Butters, F. K., and E. C. Abbe. 1953. A floristic study of Cook County, northeastern Minnesota. *Rhodora* 55:21-201.
- Coffin, B., and L. Pfannmuller, editors. 1988. *Minnesota's endangered flora and fauna*. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Carex woodii* Dewey

FAMILY: Cyperaceae

COMMON NAME: Wood's Sedge

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: When designated a Special Concern species in 1984, this perennial sedge was believed to be restricted to a handful of sites in mature forests in southeastern Minnesota. An increased awareness of the species and targeted rare plant surveys over the past two decades have resulted in the discovery of over 90 additional populations in mesic hardwood forests, including several unexpected populations in the central and northeast part of the state. Wood's Sedge is now known to be much more common and widely distributed in Minnesota than was formerly believed. For these reasons, Special Concern status is no longer needed or reasonable.

SELECTED REFERENCES:

Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.

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Rothrock, P. E., and A. A. Reznicek. 2002. *Carex* sect. Paniceae. Pages 426-431 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 23. Oxford University Press, New York, New York.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Cheilanthes lanosa* (Michx.) D.C. Eat.

FAMILY: Pteridaceae

COMMON NAME: Hairy Lip-fern

CURRENT MINNESOTA STATUS: Endangered

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: This small fern was thought to occur at a single location in Winona County when it was listed as Endangered in 1996. The specimen collected from this site has since been determined to be a closely related species, Slender Lip Fern (*Cheilanthes feei*). There is also a 19th Century herbarium specimen of Hairy Lip-fern labeled "Dalles of the St. Croix", but this could place the location in either Minnesota or Wisconsin. While it is possible that Hairy Lip-fern occurs in the state, the evidence at this time is too tenuous to justify it remaining on the state endangered species list. For this reason, Endangered status is no longer needed or reasonable.

SELECTED REFERENCES:

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- Windham, M. D., and E. W. Rabe. 1993. *Cheilanthes*. Pages 152-169 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 2. Oxford University Press, New York, New York.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Claytonia caroliniana* Michx.

FAMILY: Portulacaceae

COMMON NAME: Carolina Spring Beauty

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: When designated a Special Concern species in 1984, this small woodland plant was believed to be largely restricted to old growth northern hardwood forests along the North Shore of Lake Superior. While the species' range is limited to extreme northeastern Minnesota, targeted rare plant surveys over the past two decades have resulted in the discovery of more than 100 populations in a broader range of forested habitats. Furthermore, many of the populations are quite large numbering in the hundreds and thousands of plants. Carolina Spring Beauty is now known to be more common and widely distributed in Minnesota than was formerly believed. For these reasons, Special Concern status is no longer needed or reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Commelina erecta* L.

FAMILY: Commelinaceae

COMMON NAME: Slender Dayflower

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This species is known to occur at only one location in Minnesota: a sand prairie in Wabasha County that is characterized by both stabilized and active sand dunes. Based on information from adjacent states, the species may also be found in habitats associated with dry bluff prairies, talus, or rock outcrops. All potential habitats in the state have been extensively targeted for botanical searches by the Minnesota County Biological Survey and unfortunately no additional locations of Slender Dayflower were found. This is not too surprising since more than 99% of the prairie and savanna habitat that was present in the state before settlement has now been destroyed or severely degraded.

Given the limited amount of potential habitat for the species in the state, the documentation of only one population despite years of systematic botanical surveys, and the vulnerability of a single population to degradation or destruction, a status of Endangered is reasonable and needed.

SELECTED REFERENCES:

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Minnesota Department of Natural Resources. 2005. Field guide to the native plant communities of Minnesota: the eastern broadleaf forest province. Ecological Land Classification Program, Minnesota County Biological Survey, and Natural Heritage and Nongame Research Program. Minnesota Department of Natural Resources, St. Paul, Minnesota. 394 pp.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Crataegus calpodendron* (Ehrh.) Medik.

FAMILY: Rosaceae

COMMON NAME: Late Hawthorn

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This large shrub has been documented from less than 15 widely-scattered sites in southeastern Minnesota, and only four small populations in Le Sueur, Rice, Mower, and Wabasha counties are known to be extant. The species presents some unusual conservation and management challenges. It is clearly associated with remnants of the large expanse of mesic hardwood forest that once spread from the southeast corner of the state to the Twin Cities area. Yet it does not reproduce well, if at all, under a dense canopy of Sugar Maple (*Acer saccharum*), which is the tree that typically dominates these habitats. Since conservation of such habitat remnants typically favors sites with a uniform, unbroken canopy of Sugar Maple, the specific habitat for Late Hawthorn is often unintentionally excluded. Larger habitat tracts that have a significant amount of topographical relief and a greater amount of microhabitat included within the forest would provide much better conservation value for the species. The continuing loss of habitat to residential, commercial, and industrial development, and the spread of invasive species, particularly Common Buckthorn (*Rhamnus cathartica*), also pose threats to the species. Further survey work is needed to clarify the species' current distribution in the state but based on the small number and size of known populations, Special Concern status is needed and reasonable at this time.

SELECTED REFERENCES:

- Minnesota Department of Natural Resources. 2006. Tomorrow's habitat for the wild and rare: An action plan for Minnesota wildlife, comprehensive wildlife conservation strategy. Division of Ecological Services, Minnesota Department of Natural Resources. 297 pp. + appendices.
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- Smith, W. R. 2008. Trees and shrubs of Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 703 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Crataegus douglasii* Lindl.

FAMILY: Rosaceae

COMMON NAME: Black Hawthorn

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This thorny shrub occurs along rocky/gravelly stream banks, lakeshores, shrub thickets, forest margins, and rock outcrops near the Lake Superior shore. When it was designated a Threatened species in 1996, it had only been documented a handful of times and all of the populations were quite small. Since then, Black Hawthorn has been discovered at approximately 20 additional sites. This new information indicates that this species is not as rare as previously thought, and Threatened status is no longer necessary. However, it is needed and reasonable to retain the species in Special Concern status given its unique habitat preferences and restricted geographic range in the state.

SELECTED REFERENCES:

- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
- Judziewicz, E. 1995. Inventory and establishment of monitoring programs for special floristic elements at Isle Royale National Park, Michigan. Unpublished report submitted to the National Park Service, Houghton, Michigan. 772 pp.
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- Minnesota Department of Natural Resources, Division of Fish and Wildlife. 1995. Statement of need and reasonableness in the matter of proposed amendment of Minnesota Rules, Chapter 6134: endangered and threatened species. Minnesota Department of Natural Resources, St. Paul, Minnesota. 336 pp.
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- U.S. Forest Service. 2000. Population viability assessment in forest plan revision. Questions for plant population viability assessment panel: *Crataegus douglasii*. United States Forest Service, Region 9, Duluth, Minnesota.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Crotalaria sagittalis* L.

FAMILY: Fabaceae

COMMON NAME: Rattlebox

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Historically, this species is known to have occurred in five counties in east central and southeast Minnesota, but the only recent records are from Washington and Houston counties. Its native habitat appears to be sand prairies and sand savannas, which are in very short supply. These habitats have always been relatively rare in Minnesota, but since settlement times they have been nearly eliminated by agriculture and urban and suburban developments. Only small fragments of habitat remain and it is unclear if they can support viable populations of Rattlebox. Further survey work is needed to clarify the species' abundance and distribution in Minnesota, but given the small number of known populations and the significant loss of prairie and savanna habitats, a status of Special Concern is reasonable and needed at this time.

SELECTED REFERENCES:

Minnesota Department of Natural Resources. 2006. Tomorrow's habitat for the wild and rare: An action plan for Minnesota wildlife, comprehensive wildlife conservation strategy. Division of Ecological Services, Minnesota Department of Natural Resources. 297 pp. + appendices.

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Wisconsin Department of Natural Resources. 2007. Arrow-headed Rattle-box (*Crotalaria sagittalis*) factsheet. <<http://dnr.wi.gov/org/land/er/biodiversity/index.asp?mode=info&Grp=20&SpecCode=PDFAB160E0>>. Accessed 26 June 2009.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Deparia acrostichoides* (Sw.) M. Kato

FAMILY: Dryopteridaceae

COMMON NAME: Silvery Spleenwort

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial fern reaches the northwestern limits of its range in Minnesota, where it occurs in bluffland and bottomland forest habitats in the southeastern corner of the state. Most of the species' potential habitat in the region has been systematically surveyed by the Minnesota County Biological Survey, during which approximately three dozen populations were found. The species is distinctive, so it unlikely that it was overlooked or that many more populations will be found. Woodland and bluffland habitats are becoming exceedingly rare and fragmented in southeastern Minnesota, so habitat availability is likely a limiting factor for the species. Furthermore, the species is vulnerable to livestock grazing, forest clearing, and residential development. In addition to reducing available habitat, these activities also often result in the spread of invasive species, particularly Common Buckthorn (*Rhamnus cathartica*) and Eurasian Honeysuckle shrubs (*Lonicera* spp.). Given the species' restricted range in the state, the historic loss and degradation of its bluffland and woodland habitats, and the current threats posed by land use changes and invasive species, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

Masahiro, K. 1993. *Deparia*. Pages 254-255 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 2. Oxford University Press, New York, New York.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Deschampsia flexuosa* (L.) Trin.

FAMILY: Poaceae

COMMON NAME: Slender Hair Grass

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial grass of dry, sandy, or rocky soils, often under or in association with pine forests, has only been documented seven times in Minnesota. Most of the records are from an 8-mile area between Grand Portage and Pigeon Point in northeastern Cook County. The other two records are from central Cook County near Grand Marais and Minnesota Point in St. Louis County. Six of the seven records were known when Slender Hair Grass was designated a Special Concern species in 1984, but none of them had been seen since 1975. The Minnesota Point and Pigeon Point collection sites are at the extreme eastern and western extent of Lake Superior shoreline in Minnesota, a distance of about 150 miles. It was hoped that future botanical searches of suitable near-shore habitat between these two areas would discover additional populations. This has not been the case. A comprehensive biological survey of most of the intervening area has now been completed by the Minnesota County Biological Survey, and only one additional population (Grand Marais) was found. A small, remnant population was relocated at Minnesota Point, but it is threatened by increasing development pressures and recreational activities.

Given the limited amount of potential habitat for the species in the state, the small number of documented populations despite targeted botanical surveys, the even smaller number of extant populations, and the vulnerability of those populations to degradation or destruction, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Barkworth, M. E. 2007. *Deschampsia*. Pages 624-633 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 24. Oxford University Press, New York, New York.
- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Desmodium cuspidatum* var. *longifolium* (Torr. & Gray) Schub.

FAMILY: Fabaceae

COMMON NAME: Big Tick Trefoil

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial forb inhabits mesic, deciduous forests in the southeast portion of the state, particularly in the region that has traditionally been called the "Big Woods". When it was listed as Special Concern in 1996, it was only known to occur at nine sites in three counties and it was believed to be extirpated from at least four other counties. However, some potential habitat remained unsearched in the Minnesota River valley and in several south central counties, and the hope was that more populations would be located when further surveys were completed. A comprehensive botanical survey of the region has now been completed by the Minnesota County Biological Survey, and unfortunately no additional locations of Big Tick Trefoil were found.

At least 90% of the species' forest habitat in the "Big Woods" has been cleared for agriculture and housing, and much of the remaining 10% has been degraded by livestock grazing and timber cutting. In addition, the invasion of non-native species, particularly Common Buckthorn (*Rhamnus cathartica*), Eurasian Honeysuckle shrubs (*Lonicera* spp.), and Wild Garlic Mustard (*Alliaria petiolaris*) seriously threatens the few remaining Big Tick Trefoil populations, which can't compete with these aggressive species. White-tailed Deer (*Odocoileus virginianus*) can also cause considerable damage to the species from grazing.

Given the small number of documented populations despite targeted botanical surveys, the limited amount of remaining habitat in the state, and the current threats posed by competing land use practices and invasive species, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
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- Randall, J. M., and J. Marnelli. 1996. Invasive plants: Weeds of the global garden. Brooklyn Botanic Gardens, Inc., Brooklyn, New York. 111 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Desmodium nudiflorum* (L.) DC.

FAMILY: Fabaceae

COMMON NAME: Stemless Tick Trefoil

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial forest forb occurs primarily in mature, mesic oak forests. When it was listed as Special Concern in 1996, a total of 15 populations were known from Fillmore, Houston, Pine, Washington, Wabasha, and Winona counties. A comprehensive botanical survey of the region has now been completed by the Minnesota County Biological Survey, but only a handful of additional populations have been documented, including two populations in Chisago County.

Mature, mesic forests were widespread and extensive in the southeastern part of the state at the time of settlement. However, agricultural and urban expansion have subsequently fragmented and isolated these forested habitats into small postage stamp size remnants. Stemless Tick Trefoil occurs in only a small percentage of the surviving habitats and even where it does occur, the number of individuals is typically low. The primary threats to the long-term viability of the species include residential and commercial development, timber harvest, cattle grazing, and the invasion of aggressive, non-native species, particularly Common Buckthorn (*Rhamnus cathartica*), Eurasian Honeysuckle shrubs (*Lonicera* spp.), and Wild Garlic Mustard (*Alliaria petiolaris*).

Given the small number of documented populations despite targeted botanical surveys, the small size of those populations, the limited amount of remaining habitat in the state, and the current threats posed by competing land use practices and invasive species, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Diarrhena obovata* (Gleason) Brandenburg

FAMILY: Poaceae

COMMON NAME: Obovate Beakgrain

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: When this woodland grass was listed as Special Concern in 1996, it had just recently been discovered in the state in a mature, mesic hardwood forest in Fillmore County. Many questions regarding its range in the state, habitat requirements, and threats to its survival remained unanswered. A comprehensive botanical survey of the region, and what is presumed to include the species' potential habitat, has now been completed by the Minnesota County Biological Survey. Unfortunately, no additional populations of Obovate Beakgrain were found. Furthermore, several potential threats to the only known population have been identified. These include forest clearing, livestock grazing, and the invasion of aggressive, non-native species, especially Common Buckthorn (*Rhamnus cathartica*) and Wild Garlic Mustard (*Alliaria petiolaris*).

Given the documentation of only one population despite intensive surveys, the absence of the species in apparently suitable habitat, and the vulnerability of the only known population to degradation or destruction, a status of Endangered is reasonable and needed.

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Brandenburg, D. M., J. R. Estes, and S. L. Collins. 1991. A revision of *Diarrhena* (Poaceae) in the United States. Bulletin of the Torrey Botanical Club 118:128-136.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Draba cana* Rydb.

FAMILY: Brassicaceae

COMMON NAME: Hoary Whitlow Grass

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This arctic disjunct was first discovered in Minnesota in 2001 on a small, bedrock island along the Lake Superior shore. A second population was subsequently located in the Boundary Water Canoe Area Wilderness in 2002. In both cases, the plants were found in crevices and shelves of cliff faces adjacent to water bodies. This habitat preference essentially limits the potential range of the species in Minnesota to the northeast corner of the state. The unique flora associated with cliff habitats has attracted botanists for decades resulting in extensive surveys of potential habitat. This combined with the distinctive nature of the plant makes it unlikely that the species has been overlooked or that many, if any, additional populations will be found. Furthermore, recreation rock climbing poses a potential threat to the Boundary Waters population, and the accumulation of guano from a large, nesting gull colony threatens the Lake Superior island population.

Given the documentation of only two populations despite intensive surveys, the small size of those populations, the species' unique/restrictive habitat requirements and limited geographic range in the state, and the vulnerability of the known populations to degradation or destruction, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Dryopteris marginalis* (L.) Gray

FAMILY: Dryopteridaceae

COMMON NAME: Marginal Shield Fern

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial fern was first discovered in Minnesota in 1981 on a sandstone bluff in Houston County. When it was designated a Threatened species in 1984, this was the only known population in the state. It was assumed that the species had been overlooked because of its rarity and its superficial resemblance to other members of the genus *Dryopteris*, but not enough inventory work had been completed at that time to confirm these suspicions. Now, after years of targeted field inventories by the Minnesota County Biological Survey, only one additional population of Marginal Shield Fern has been documented on a steep sand terrace in Fillmore County. It is clear that Marginal Shield Fern is one of the rarest species in the state. For this reason, a status of Endangered is reasonable and needed.

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- Cobb, B. 1984. A field guide to ferns and their related families, northeastern and central North America. Houghton Mifflin Company, Boston, Massachusetts. xv + 281 pp.
- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Elatine triandra* Schkuhr

FAMILY: Elatinaceae

COMMON NAME: Three-stamened Waterwort

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This tiny aquatic plant has been documented just 32 times in Minnesota, from two distinct habitat types and ranges. Approximately half of the records are from shallow rainwater pools that form in depressions on rock outcrops in the southwestern portion of the state. These habitats are under considerable pressure from cattle grazing, herbicide application, and rock quarrying. Mining in particular has been a growing issue over the past decade, fueled by federal highway construction standards now requiring crushed bedrock instead of gravel. The excavation of bedrock outcrops in order to plant corn for ethanol is another emerging threat.

The remainder of the Three-stamened Waterwort records are from clear, soft-water lakes with sandy substrates in the northeastern part of the state. While this habitat type is not as threatened as the species' rock outcrop habitat, it is susceptible to lakeshore development and the activities that often accompany such development. Furthermore, there appears to be an important microhabitat characteristic associated with the species' lake habitat that is not yet understood. This is suggested by the absence of the species in many seemingly suitable lakes. Because the species is so small, it may have been overlooked in both habitat types during some surveys. Further inventory work is needed to clarify the species' abundance and distribution in Minnesota. Until that time, the small number of known occurrences in combination with perceived threats from agricultural activities, mining, and lakeshore development make it needed and reasonable to list Three-stamened Waterwort as Special Concern.

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NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 25 June 2009.

Wisconsin Department of Natural Resources. 2007. Longstem Water-wort (*Elatine triandra*) factsheet. <<http://dnr.wi.gov/org/land/er/biodiversity/index.asp?mode=info&Grp=20&SpecCode=PDEL02090>>. Accessed 25 June 2009.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Eleocharis nitida* Fern.

FAMILY: Cyperaceae

COMMON NAME: Neat Spikerush

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This short sedge occurs in both wet soil and in shallow water, but is absent from deeper water and marshy areas where there is dense vegetation. Though historically it was found along Lake Superior, the preferred habitat is not the typical rocky shoreline favored by many Lake Superior species. Rather, Neat Spikerush appears to be primarily associated with moist or wet peat, silt, or loam in brushy or marshy habitats. It may also occur in moist, disturbed sites, such as logging roads that cut through wetlands, ruts in trails where water collects, and shallow ditch bottoms where rainwater drains slowly. When it was designated a Threatened species in 1996, it was known by six historical records, only two of which had been relocated. Since that time, a renewed interest in the species has resulted in the discovery of over 40 additional populations. Neat Spikerush is now known to be more common and widely distributed in Minnesota than was formerly believed, and Threatened status is no longer necessary. However, it is needed and reasonable to retain the species in Special Concern status given its restricted range in the northeast corner of the state.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Eleocharis robbinsii* Oakes

FAMILY: Cyperaceae

COMMON NAME: Robbins' Spikerush

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This aquatic perennial was first documented in Minnesota in 1995, but after more than a decade of statewide floristic inventories of over 1,500 lakes, it is still known from just 16 sites in 8 northeastern Minnesota counties. Each of the sites supports a very fragile habitat occupied by a relatively small population of Robbin's Spikerush. Habitat conditions include shallow water (less than 1.5 meters deep) along sandy/gravelly shorelines and in protected bays of lakes in northern Minnesota. These habitats are increasingly threatened by lakeshore development and the nutrient enrichment, herbicide application, recreational activity, and vegetation management that almost always accompanies such development.

Given the small number of documented populations despite targeted botanical surveys, the limited amount of potential habitat for the species in the state, the increasing pressure on lakeshore habitats, and the vulnerability of the known populations to degradation or destruction, a status of Threatened is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Elodea bifoliata* St. John

FAMILY: Hydrocharitaceae

COMMON NAME: Two Leaf Waterweed

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This aquatic species reaches the eastern edge of its North American range in Minnesota. It has only been documented twice in the state at two widely disjunct locations: Crystal Lake in Blue Earth County and the St. Louis River near Duluth. These collections are dated 1958 and 1949, respectively, and have not been recently relocated. Aquatic plant surveys of more than 1,500 lakes have been conducted over the past decade, but no additional locations of Two Leaf Waterweed have been found. This lack of recent records gives reason to suspect a population decline. A decline is further indicated by a general degradation of aquatic habitats resulting from the significant statewide increase in lakeshore and river developments. Activities typically associated with such developments, namely nutrient enrichment, increased sedimentation, herbicide application, and vegetation management, could all pose a serious threat to the long-term viability of the species. The spread of invasive species is also a serious concern. In light of significant efforts to restore and protect the St. Louis River over the past decade, there is hope that a remnant population of Two Leaf Waterweed will be relocated in this system.

Given the extremely small number of documented populations despite targeted botanical surveys, the absence of the species in seemingly suitable habitats, the increasing statewide pressure on lakeshore habitats, and the vulnerability of aquatic species to degradation or destruction, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Gaylussacia baccata* (Wangenh.) K. Koch

FAMILY: Ericaceae

COMMON NAME: Black Huckleberry

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This understory shrub is common in eastern states but quite rare in Minnesota, where it has historically been documented from seven eastern counties as far north as Pine County. The occurrences are from well-drained, sandy soil or dry sandstone outcrops in forests of Northern Pin Oak (*Quercus ellipsoidalis*), Jack Pine (*Pinus banksiana*), or Red Pine (*P. resinosa*), usually in full or partial shade. Forest habitats in the eastern part of the state have been greatly reduced by more than a century of agriculture and urban development, and today only isolated fragments of suitable habitat remain. A large percentage of these fragments have been extensively searched for Black Huckleberry, yet only five populations have been located in the past 35 years. Furthermore, the species likely needs active fire management in order to maintain favorable habitat conditions. When wildfires are suppressed, as is now often the case, fire-sensitive tree species begin to invade the understory and take over the canopy. These fire-sensitive trees, typically Red Maple (*Acer rubrum*), cast more shade than the fire-dependent species they replace, and create conditions where Black Huckleberry is at a competitive disadvantage with species that are more shade-tolerant. Consequently, prescribed burns will likely be needed if this rare species is to survive in Minnesota.

Given its limited geographic range in the state, the limited amount of remaining potential habitat, the small number of documented populations despite targeted botanical surveys, the vulnerability of the known populations to successional changes, and the need for active management, a status of Threatened is reasonable and needed.

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Matlack, G. R., D. J. Gibson, and R. E. Good. 1993. Regeneration of the shrub *Gaylussacia baccata* and associated species after low-intensity fire in an Atlantic coastal plain forest. *American Journal of Botany* 80:119-126.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Gymnocarpium robertianum* (Hoffmann) Newman

FAMILY: Dryopteridaceae

COMMON NAME: Northern Oak Fern

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial fern has been documented 14 times in Minnesota, although about a third of the populations have not been seen since the 1960s and 1970s. The species has two disjunct ranges and habitats in the state. Populations in the southeast (Fillmore and Winona counties) are found on algific talus slopes. These unique habitats, where environmental conditions simulate those normally found in boreal habitats, are very small (less than one acre each) and extremely fragile. Populations in the north (Becker, Beltrami, Cass, Clearwater, Hubbard, and St. Louis counties) are found in a type of conifer swamp known as forested rich peatlands. Habitats of the northern populations are perhaps less threatened than the southern ones, yet the species is extremely rare in the north and found in only a small percentage of seemingly suitable habitats. Both of the species' habitat types are considered stable, old growth or climax communities that develop in the absence of disturbance. Some potential habitat in the northern part of the state still remains to be surveyed, but given the small number of known populations, the species' restrictive habitat requirements, its absence in apparently suitable habitat, and the vulnerability of the known populations to degradation or destruction, a status of Special Concern is reasonable and needed at this time.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Gymnocladus dioica* (L.) k. Koch

FAMILY: Fabaceae

COMMON NAME: Kentucky Coffee Tree

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This unusual tree is found sporadically in hardwood forests on terraces of the Minnesota River, the Mississippi River below the Twin Cities, and a few major tributaries. Although it is clearly a forest tree, its seedlings do not do well in the shade of a dense forest canopy. It does produce suckers directly from its roots, which seem to do fairly well in the shade. However, because Kentucky Coffee Trees are usually either male or female, some sites are known to consist entirely of single-sex clones derived by root suckers from a single parent. This would not be an issue except that its populations are typically small and so far apart that there may be no gene flow between them. Sexual reproduction (via seed) may be necessary for the long-term viability of the species. Unfortunately, none of the populations are known to be reproducing in this manner. No animal that currently shares the tree's habitat is known to eat the seeds or disperse them. The pods simply fall from the tree and eventually rot where they land. It has been theorized that the animal that evolved to disperse the seeds may have become extinct near the end of the Pleistocene era. This could explain why Kentucky Coffee Trees have become so uncommon and the surviving populations are so isolated and scattered. Given its limited distribution in the state and the concerns over reproduction, a status of Special Concern is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Hamamelis virginiana* L.

FAMILY: Hamamelidaceae

COMMON NAME: Witch-hazel

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This large shrub reaches the northwestern periphery of its range in Minnesota, where it occurs very sporadically in the understory of dry to moist deciduous forests in the southeastern corner of the state. When it was listed as Special Concern in 1984, only four populations were known in the state, but it was hoped that unexplored potential habitat would produce more records once further surveys were conducted. A comprehensive botanical survey of the region has now been completed by the Minnesota County Biological Survey, and only eight additional Witch-hazel populations have been discovered, indicating that it is very rare in the state.

Because of the extensive loss of forested habitats in southeast Minnesota, the extant Witch-hazel populations are restricted to about a half dozen small habitat fragments. There is concern that these fragments may not have retained the ecosystem processes that are necessary to maintain ideal habitat conditions and assure the perpetuation of the species. Other identified threats to the long-term viability of the species include forest clearing, livestock grazing, and residential development. In addition to reducing available habitat, these activities also often result in the spread of invasive species, particularly Common Buckthorn (*Rhamnus cathartica*), and Eurasian Honeysuckle shrubs (*Lonicera* spp.). If Witch-hazel is to persist in Minnesota, active management in the form of manual removal of invasive species or the creation of habitat buffers may be needed at some sites.

Given the small number of documented populations despite targeted botanical surveys, the limited amount of remaining habitat for the species in the state, the absence of the species in apparently suitable habitat, the current threats posed by land use changes and invasive species, and the potential need for active management, a status of Threatened is reasonable and needed.

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- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Helianthemum canadense* (L.) Michx.

FAMILY: Cistaceae

COMMON NAME: Canada Frostweed

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This plant occurs in remnant sand savannas, sand prairies, dunes, and barrens in southeastern Minnesota. All of these habitats are rare, small, and fragile, and they have been extensively targeted for botanical searches by the Minnesota County Biological Survey. Despite this, Canada Frostweed has been documented at only 23 locations in the state, and many of these occurrences are known to have been destroyed or degraded by livestock grazing, woody encroachment, vehicle traffic, and development. The sandy soils in which the species occurs are too fragile to support much activity and soil disturbance almost always results in an increase of non-native, invasive species such as Spotted Knapweed (*Centaurea stoebe*) and Hoary Alyssum (*Berteroa incana*). Because more than 99% of the prairie and savanna habitat that was present in the state before settlement has already been destroyed or degraded, any further habitat loss or degradation could jeopardize the long-term viability of Canada Frostweed in Minnesota. For this reason, a status of Special Concern is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Hudsonia tomentosa* Nutt.

FAMILY: Cistaceae

COMMON NAME: Beach Heather

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This low, spreading, evergreen shrub requires active sand dunes, a formation that is very rare in Minnesota. While the species' rarity and restrictive habitat needs were known when it was listed as Special Concern in 1996, the degree to which its populations were threatened by accelerating habitat degradation had not yet been realized. Sand dunes are dynamic habitats with high crests and bowl-shaped depressions, called blowouts. If the blowouts are not kept open by wind, they become overgrown by grasses and other plants, rendering them unsuitable for Beach Heather. Many of the dunes in Minnesota have been planted to conifers or converted to some form of agricultural use. In addition, the increasing popularity of all-terrain vehicles, particularly in challenging sandy areas, poses an imminent threat to the species' dune habitat, which is just too fragile to sustain any vehicle use.

Given the small number of documented populations despite targeted botanical surveys, the species' restrictive/unique habitat requirements, the limited amount of remaining habitat in the state, the vulnerability of the known populations to degradation or destruction, and the potential need for active management to control competing vegetation, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Minnesota Department of Natural Resources, Division of Fish and Wildlife. 1995. Statement of need and reasonableness in the matter of proposed amendment of Minnesota Rules, Chapter 6134: endangered and threatened species. Minnesota Department of Natural Resources, St. Paul, Minnesota. 336 pp.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Huperzia appalachiana* Beitel & Mickel

FAMILY: Lycopodiaceae

COMMON NAME: Appalachian Fir Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Appalachian Fir Moss, which is actually a fern rather than a moss, has been found at approximately 20 scattered locations in four northeastern counties. However, most of the records are concentrated in a relatively small area near the shore of Lake Superior in Lake County. All of the populations are small and isolated on rather sensitive portions of cliff habitats. Although cliffs themselves are relatively permanent and indestructible, the highly specialized plants that occur on them and their microhabitats are often vulnerable to human activities. Any activities that would result in the sloughing of substrates or increased erosion, such as recreational rock climbing, logging on adjacent upslope habitats, or the routing of recreational trails along cliff tops, could threatened the long-term viability of the species. Given the limited amount of potential habitat for Appalachian Fir Moss in the state, the small number and size of documented populations, and the potential threats to the few known populations, a status of Special Concern is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Hybanthus concolor* (T.F. Forst.) Spreng.

FAMILY: Violaceae

COMMON NAME: Eastern Green-violet

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Despite targeted botanical surveys, this extremely rare member of the violet family is only known to occur at one site in Minnesota - an undisturbed hardwood forest in Winona County. The forest is a mature, mesic forest dominated by Sugar Maple (*Acer saccharum*) and Basswood (*Tilia americana*), and the Eastern Green-violet population consists of approximately 20 plants growing in rich, rocky silt on a narrow valley floor below a 180-foot, east-facing bluff. Eastern Green-violet is a shade-loving species so any disturbance that reduces the tree canopy of this forested habitat and allows additional sunlight to reach the forest floor, threatens the long-term viability of the population. In addition, the soil in which the species grows is too soft and the plants themselves are too shallowly rooted to withstand much direct disturbance, such as from motorized vehicles. Given the documentation of only one population in the state despite intensive surveys, the small size of that population, and the vulnerability of a single population to degradation or destruction, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Juglans cinerea* L.

NEW SCIENTIFIC NAME: *Juglans cinerea* var. *cinerea* L.

FAMILY: Juglandaceae

COMMON NAME: Butternut

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Butternut occurs in mesic hardwood forests in loamy or alluvial soils and is perhaps most common on elevated river terraces. Until recently, it was a fairly common forest tree in east-central and southeastern Minnesota, although it typically occurs as single individuals or in small localized stands. The species is now experiencing a rapid decline due to the spread of a lethal fungal disease known as butternut canker (*Sirococcus clavigignenti-juglandacearum*). The disease was first reported in Wisconsin in 1967 and reached southeastern Minnesota in the 1970s. It has since spread throughout the state and the species' North American range. There is no known treatment or control for butternut canker. In some areas, healthy and presumably resistant trees have been found growing adjacent to diseased trees. Unfortunately, the resistant individuals likely do not breed disease resistant progeny through sexual reproduction. This combined with the fact that butternut is a relatively short lived tree means it is unlikely that many, if any, butternut populations will be able to persist in the long-term. Cuttings may be able to be taken from the healthy trees and propagated for tree plantation or landscaping purposes, but the future for wild butternut is bleak. Given the high potential for butternut to become extirpated in Minnesota forests, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Juncus articulatus* L.

FAMILY: Juncaceae

COMMON NAME: Jointed Rush

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial rush was first documented from the shores of White Bear Lake in Ramsey County in 1926. It was not recorded again in the state until 1998, when it was found along the north bay of Glacier Lake in Aitkin County. This population represents the only recent observation of the species in Minnesota despite targeted botanical surveys of more than 1,500 lakes conducted by the Minnesota County Biological Survey. Jointed Rush is a distinctive species, so it is unlikely that it would have been overlooked during surveys. The fate of the White Bear Lake population is unknown, but presumed to have been destroyed, given the significant amount of development along the lake.

Glacier Lake is a high quality lake with only private access. Currently only a portion of the lakeshore is developed, but the entire lake is heavily used for recreational activities. The fact that the plants are located along the sandy shoreline immediately adjacent to the lake access makes them especially vulnerable to disturbance from trampling and pollution. Nutrient enrichment, herbicide application, and vegetation management, all activities typically associated with lakeshore development, also pose a serious threat to the long-term viability of this population.

Given the documentation of only one extant population despite targeted botanical surveys, the limited amount of potential habitat for the species in the state, the increasing statewide pressure on lakeshore habitats, particularly sandy lakeshores, and the vulnerability of a single population to degradation or destruction, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Juncus marginatus* Rostk.

FAMILY: Juncaceae

COMMON NAME: Marginated Rush

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Marginated Rush is a species of shallow wetlands and wetland margins on the Anoka Sandplain. These habitats develop where depressions in the land dip slightly below the water table allowing water to saturate the otherwise well-drained, sandy soil. When the species was listed as Special Concern in 1996, it was only known by a single population that had not been seen since 1927. It was feared that the species may have been extirpated in the state, but there was still some potential habitat that remained to be searched. In 1999, a cluster of small colonies was unexpectedly found in isolated habitat fragments near Blaine in Anoka County.

The habitat fragments where the species occurs are located in a rapidly developing area of the Twin Cities metropolitan area. They are in very fragile condition and need active management to survive. Protection/restoration of the natural hydrological regime is the primary concern, although non-compatible recreational uses in such areas, particularly off-road vehicle use, also pose a threat to the species' viability. Lastly, vegetation management to control encroaching shrubs and invasive species is needed since the habitat fragments have been isolated from the ecosystem processes that would normally maintain them. The spread of Common Buckthorn (*Rhamnus cathartica*) and Reed Canary Grass (*Phalaris arundinacea*) pose the greatest threat to the species.

Given the recent documentation of only one population despite targeted botanical surveys, the limited amount of potential habitat for the species in the state, the absence of the species in apparently suitable habitat, the historic and present loss of wetland habitats, the vulnerability of the known populations to degradation or destruction, and the need for active management, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Juncus subtilis* E. Mey.

FAMILY: Juncaceae

COMMON NAME: Slender Rush

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This small, aquatic rush was unknown in Minnesota until it was discovered in the Border Lakes region of Cook County in 1998. This is an ecologically unique area that has long been known to harbor a disproportionately high number of rare plant species. Scattered patches of Slender Rush were found in shallow water over a sandy substrate in a small bay of an oligotrophic lake that has exceptionally high water quality. Previous and subsequent searches of similar habitats nearby were unsuccessful in locating any additional populations of the rare rush. The species appears to have a unique adaptation that allows it to survive being submerged under several inches or feet of water when lake levels are high, and being stranded on a beach when water levels have receded. In fact, this pattern of being alternately exposed and submerged may be crucial to certain aspects of its population biology, particularly reproduction and recruitment.

Since the Minnesota population of Slender Rush is located in a federal wilderness area, it is protected from most forms of human disturbance. However, this particular wilderness area is heavily used by recreationalists, and shallow, sandy bays are a great attraction to visitors. While casual visitation, including canoeing, swimming and fishing should not threaten the population, establishing a campsite in the bay or routing a portage to or from the bay could jeopardize the viability of Minnesota's only known population.

Given the documentation of only one Slender Rush population despite intensive surveys, the absence of the species in apparently suitable habitat, its unique and potentially restrictive habitat requirements, its limited geographic range in the state, and the vulnerability of a single population to degradation or destruction, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Leersia lenticularis* Michx.

FAMILY: Poaceae

COMMON NAME: Catchfly Grass

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial grass reaches the northwestern limit of its range in Minnesota where it is restricted to forested habitats on the floodplain of the Mississippi River in three southeastern counties. It is rather unique in that it is adapted to the harsh conditions of annual flooding. When the species was listed as Special Concern in 1984, not enough inventory work had been completed to evaluate the significance of the handful of known populations. But now, after years of intensive field inventory only four additional populations have been discovered, confirming that it is very rare in the state.

Threats to the long-term viability of the few remaining Catchfly Grass populations include the manipulation of water levels on the Mississippi River to accommodate barge traffic, which disrupts the natural flood cycles of floodplain forests, and the invasion of aggressive, non-native species, particularly Reed Canary Grass (*Phalaris arundinacea*), which renders the species' habitat unsuitable. Given the small number of documented populations despite targeted botanical surveys, the species' unique/restrictive habitat requirements and limited geographic range in the state, the historic and present loss of floodplain forest habitats, and the vulnerability of the known populations to degradation or destruction, a status of Threatened is reasonable and needed.

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SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Luzula parviflora* ssp. *melanocarpa* (Michx.) Hamet-Ahti

NEW SCIENTIFIC NAME: *Luzula parviflora* (Ehrh.) Desv.

COMMON NAME: Small-flowered Woodrush

FAMILY: Juncaceae

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Small-flowered Woodrush is a short-lived perennial that is restricted to the Arrowhead region in the northeastern corner of the state. It is adapted to shaded, acidic, forest environments including conifer swamps, wet hardwood forests, and upland forests with a variety of hardwoods or conifers. When the species was listed as Special Concern in 1984, only three pre-1948 locations from the rocky shoreline of Lake Superior had been recorded. Because that part of the state had never been systematically surveyed for rare plant species, it was assigned to Special Concern status until systematic surveys could be completed. Now, after several years of targeted field inventories by the Minnesota County Biological Survey, only 23 additional populations have been documented, confirming that it is indeed very rare in the state. None of the historical records could be relocated, but all but one of the recent records is within a few miles of Lake Superior.

It is unclear why this species is so rare and why so few individuals exist at each site, but it is likely related to the biology of the species. The only immediate management consideration is the maintenance of important habitat parameters. This entails preserving the structure of the forest canopy and the integrity of the soil environment in which the species occurs. Mining, road and trail building, clearcutting and associated site preparation, and lakeshore development are all activities that could negatively impact the species' habitat and threaten its populations. Given the documentation of so few populations despite intensive surveys, the small size of those populations, the absence of the species in apparently suitable habitat, and the vulnerability of the known populations to degradation or destruction, a status of Threatened is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Minuartia dawsonensis* (Britt.) House

FAMILY: Caryophyllaceae

COMMON NAME: Rock Sandwort

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This small, loosely tufted perennial grows on sedimentary bedrock exposures in the southeastern corner of the state, and on sand and gravel deposits in the northwestern corner of the state. When it was listed as Special Concern in 1984, only eight populations had been recorded in the state, with the most recent record dated 1962. Because the species' potential habitat had never been systematically surveyed for rare plants, it was assigned to Special Concern status until such surveys could be completed. Now, after years of targeted field inventories by the Minnesota County Biological Survey, only 17 additional populations have been documented in the state, and none of the historical records could be relocated.

For unknown reasons, the vast majority of habitats that appear to be suitable do not harbor this rare species. When found, the habitats tend to be small (sometimes only a few square meters in size), fragile, and isolated from other similar habitats. Furthermore, the populations themselves tend to be small. This combination of factors allows for very little leeway when considering potential threats. The sites are simply too small to be able to withstand any competing use, even passive recreational use such as hiking or camping. Motorized vehicle use, livestock grazing, herbicide use, and extractive activity at occupied sites would all stand to threaten the long-term viability of the species in the state. The encroachment of woody vegetation due to fire suppression is also a concern since the species generally needs full sunlight, and it does not appear to compete well with more aggressive species.

Given the small number of documented populations despite targeted botanical surveys, the small size of the populations, the absence of the species in apparently suitable habitat, and the vulnerability of the known populations to degradation or destruction, a status of Threatened is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Myriophyllum heterophyllum* Michx.

FAMILY: Haloragaceae

COMMON NAME: Broadleaf Water Milfoil

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Despite botanical surveys of more than 1,500 lakes by DNR surveyors, this submerged aquatic plant has only been documented from two connected lakes in northern St. Louis County. It is uncertain if this population is a stable, long-surviving population or merely transient, although its presence in the Superior National Forest appears to support a stable history. It is also unclear why the species has been found in only these two lakes and not in any other nearby lakes. Further inventory work is needed to help answer these questions and clarify the species' distribution in the state. Until this information becomes available, a status of Special Concern is needed and reasonable based on the species' apparent rarity.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Najas guadalupensis* ssp. *olivacea* (Rosendahl & Butters) Haynes & C.B. Hellquist

FAMILY: Najadaceae

COMMON NAME: Southern Naiad

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This submerged aquatic plant is considered a Great Lakes endemic. It was first documented in Minnesota in Norway Lake, Kandiyohi County in 1932. Since that time, botanical surveys of more than 1,500 lakes have been completed by the Minnesota County Biological Survey during which Southern Naiad was recorded in about seven dozen lakes in the central part of the state. The species occurs along the margins of fairly alkaline lakes in 1-2 meters of water with sand or silt substrates. The greatest threat to the species is the rapid development of lakeshore property and the deterioration of aquatic habitats that often accompanies such development. Activities that result in acidification of lake conditions would be particularly detrimental. Given the relatively small number of documented populations despite targeted botanical surveys, the increasing statewide pressure on lakeshore habitats, and the importance of Minnesota's populations to the global security of the species, a status of Special Concern is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Nuttallanthus canadensis* (L.) D.A. Sutton

FAMILY: Scrophulariaceae

COMMON NAME: Old Field Toadflax

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Despite extensive surveys of potential habitat, this annual forb has only been documented approximately 25 times in Minnesota in 11 counties. The counties occur along a southeast to northwest line from Houston County to Benton County. Habitats vary slightly, but they are usually some type of dry, sparsely vegetated grasslands that develop on sand dunes and sandy outwash plains. This type of habitat has always been uncommon in Minnesota, but high quality examples have become quite rare since settlement times. Agriculture, urban development, and invasive species have all contributed to the loss and degradation of the species' habitat, and this trend is continuing.

As an annual, Old Field Toadflax has the capacity to take advantage of recently disturbed soils where competition has been reduced. This includes small areas such as a pocket-gopher mound or large areas such as a plowed field. However, in most cases, the species only occupies disturbed habitats that are within a larger area of native habitat. It is unclear how well the species can persist in small habitat fragments that have lost important natural ecosystem processes such as fire and, in the case of dune habitats, active wind erosion. The absence of keystone animal species such as pocket gophers, which limit competing vegetation, may also pose a problem for the long-term viability of the species. On the basis of the small number of known populations and the limited amount of potential habitat for the species in the state, a status of Special Concern is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Orobanche fasciculata* Nutt.

FAMILY: Orobanchaceae

COMMON NAME: Clustered Broomrape

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This parasitic plant completely lacks chlorophyll, deriving its nutritional needs from the roots of other plant species. It occurs in prairies and sand dunes, particularly in excessively drained, loose, sandy or gravelly soil. While severe habitat loss of these community types was apparent when Clustered Broomrape was designated a species of Special Concern in 1984, the lack of systematic surveys prevented it from being assigned a more protective status at that time. All of the northwestern and southeastern counties within the species' suspected range have now been the subject of a comprehensive botanical inventory, during which only 13 populations were discovered. This brings the total number of historical and recent discoveries to 21, confirming that this is a very rare species in Minnesota.

Furthermore, the fragmented habitat remnants in which the species survives today are threatened by the invasion of non-native species, sand and gravel mining, economic pressures to utilize grasslands for energy production, and the expansion of residential developments. And while the parasitic nature of the species does not imply any specific management or conservation needs, it does make it even more important to maintain the health of the whole community of plants in which it lives.

Given the small number of documented populations despite targeted botanical surveys, the limited amount of remaining habitat for the species in the state, the historic and present loss of prairie and sand dune habitats, its unique life history characteristics, and the current threats posed by land use changes and invasive species, a status of Threatened is reasonable and needed.

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SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Orobanche ludoviciana* Nutt.

NEW SCIENTIFIC NAME: *Orobanche ludoviciana* var. *ludoviciana* Nutt.

FAMILY: Orobanchaceae

COMMON NAME: Louisiana Broomrape

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This small plant has likely always been rare in Minnesota but it is known to have occurred sporadically in sand dunes and gravelly prairies in western and southeastern Minnesota. It is an obligate root parasite that lacks chlorophyll, and consequently it is limited to sites where suitable host plants are present. When designated a Special Concern species in 1984, it was known from just five sites in northwestern Minnesota. However, the lack of systematic surveys prevented it from being assigned a more protective status at that time. Now, after years of targeted field inventories by the Minnesota County Biological Survey only nineteen populations have been documented in the state. This is not entirely surprising given that over 99% of the prairie and savanna habitat that was present in the state before settlement has been destroyed or degraded.

Many of the known Louisiana Broomrape populations are quite small and the fragmented habitat remnants in which they occur are susceptible to the invasion of non-native species, sand and gravel mining exploits, energy production ventures, and the expansion of residential developments. Furthermore, the parasitic nature of the plant likely restricts the species to habitats where host plants have large and healthy populations. In a fragmented landscape, it may be very difficult for the species to find and colonize such habitats.

Given the small number of documented populations despite targeted botanical surveys, the limited amount of potential habitat in the state, the historic and present loss of prairie and sand dune habitats, the species' unique life history characteristics, and the current threats posed by habitat fragmentation, land use changes, and invasive species, a status of Threatened is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Orobanche uniflora* L.

FAMILY: Orobanchaceae

COMMON NAME: One-flowered Broomrape

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: As with all species in this genus, One-flowered Broomrape is a root parasite that derives its nutritional needs from other plant species. However, unlike the other two *Orobanche* species in Minnesota, this particular species is associated with woodland and bluff prairie habitats. When it was designated a Special Concern species in 1984, only seven populations had been documented from central and southeastern Minnesota and none since 1967. Because the species is small and easily overlooked, it was hoped that unexplored potential habitats would yield more records once further surveys could be conducted. Unfortunately, after more than two decades of rare plant inventories, only eight additional populations have been discovered. Furthermore, all of the populations are quite small. Woodland and bluff prairie habitats are becoming exceedingly rare in southeastern Minnesota, so habitat availability is likely a limiting factor for the species. In addition, the parasitic nature of the plant likely restricts it to habitats where host plants have large and healthy populations. In a fragmented landscape, it may be very difficult for One-flowered Broomrape to find and colonize such habitats.

Given the small number of documented populations despite targeted botanical surveys, the limited amount of potential habitat in the state, the historic and present loss of woodland and bluff habitats, the species' unique life history characteristics, and the current threats posed by habitat fragmentation, land use changes, and invasive species, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Paronychia canadensis* (L.) Wood

FAMILY: Caryophyllaceae

COMMON NAME: Canada Forked Chickweed

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Canadian Forked Chickweed is a small, herbaceous annual of dry, sandy woodlands. In Minnesota, it is associated with oak or jack pine savannas in the southeast, often on slightly raised river terraces in partial sun. It has only been documented from five locations in Houston and Fillmore counties, and one of the populations has not been successfully relocated since its last observation in 1920. The species' extreme rarity was known when it was designated a Threatened species in 1996, however it was hoped that more populations might be found with additional surveys. A comprehensive botanical survey of the region has been completed by the Minnesota County Biological Survey, and unfortunately no additional populations of Canadian Forked Chickweed have been located in the past 13 years. In addition, the known populations are threatened by further habitat loss and degradation. Current threats include residential developments, vegetation changes that remove open microhabitats, and conversion to agriculture, including tree plantations. For these reasons, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Phacelia franklinii* (R. Br.) Gray

FAMILY: Hydrophyllaceae

COMMON NAME: Franklin's Phacelia

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: When Franklin's Phacelia was listed as Special Concern in 1996, there were only five documented records of the species from Minnesota; all were from the northeast corner of the state and dated prior to 1951. The lack of current data and systematic surveys prevented it from being assigned a more protective status at that time. Now, after years of targeted field inventories by the Minnesota County Biological Survey, only four additional populations have been documented in the state (Lake and Cook counties), and none of the previously known populations could be relocated. Furthermore, each of the extant populations is extremely small, consisting of just 1-10 individuals. Since the species is relatively large and conspicuous, it is unlikely that it has been overlooked during surveys or that many additional populations will be located.

Exactly why the species is so rare is still not known. It has been documented from a number of slightly different habitat types near lakes including cliffs, talus, tip-up mounds, and rocks. All of these are considered early successional, sparsely vegetated habitats, which corresponds with the species' apparent need for small patches of disturbance. The disturbances tend to be quite small in scale; just enough to allow for direct sunlight and minimal root competition. Such disturbances are often caused by a single tree tipping over or a single boulder falling from a cliff. Large scale disturbances such as clearcutting or mining do not appear to be appropriate and may have the opposite effect of eliminating the greater habitat in which the species' microhabitat occurs. Invasive species including Spotted Knapweed (*Centaurea maculosa*) and several non-native Hawkweeds (*Hieracium* spp.) are also becoming more abundant in Franklin's Phacelia habitat, which may pose a serious risk to the long-term viability of the remaining populations.

Given the recent documentation of only four populations despite targeted botanical surveys, the extremely small size of those populations, the absence of the species in apparently suitable habitat, and the vulnerability of such a small number of populations to degradation or destruction, a status of Threatened is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Phegopteris hexagonoptera* (Michx.) Fee

FAMILY: Thelypteridaceae

COMMON NAME: Broad Beech Fern

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This woodland fern reaches the northwestern edge of its range in southeastern Minnesota. It has been documented a total of six times from Houston, Fillmore, Winona, and Wabasha counties, although three of the populations have not been seen since 1903, 1958, and 1979, respectively. All of the populations were found in rich, moist soil, primarily on north-facing, forest slopes dominated by Sugar Maple (*Acer saccharum*), Oaks, (*Quercus* spp.), and Basswood (*Tilia americana*). While the species' extreme rarity was apparent when it was designated a Threatened species in 1996, it was hoped that a few more populations might be found with additional surveys. A comprehensive botanical survey of the region has been nearly completed by the Minnesota County Biological Survey, and unfortunately only one population of Broad Beech Fern has been found in the past 14 years. Furthermore, woodlands in the southeast corner of the state are especially fragile because of their rugged, stream-dissected topography. The long-term viability of the species depends on the maintenance of cool, moist, shaded habitat conditions. Activities including canopy removal, livestock grazing, and road and trail construction would all be detrimental. Furthermore, the invasion of nonnative species, particularly Wild Garlic Mustard (*Alliaria petiolaris*), poses a significant threat to the few remaining populations. For these reasons, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Phlox maculata* L.

FAMILY: Polemoniaceae

COMMON NAME: Wild Sweet William

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Wild Sweet William was relatively widespread and perhaps even common in Minnesota at the time of settlement. In fact, its mesic prairie, wet prairie, and wet meadow habitats were once abundant in several southeastern counties. Regrettably, more than 99% of the prairie and meadow habitat that was present in that part of the state before settlement has since been destroyed or degraded. Most of the habitat was converted to agricultural purposes such as crop production and livestock grazing, although additional losses can be attributed to the expansion of urban areas and road building. Given the severe loss of habitat, it is reasonable to assume that Wild Sweet William has also suffered a significant population decline. This is further supported by the documentation of just 12 populations in the past 30 years. Further survey work is needed to clarify this species' distribution in wet meadow habitats, but given the small number of known populations and the well-documented loss of its prairie habitat, a status of Special Concern is reasonable and needed at this time.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Piptatherum canadense* (Poiret) Dorn

FAMILY: Poaceae

COMMON NAME: Canadian Ricegrass

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial grass was first discovered in Minnesota in 2003, and to date a total of eight populations have been recorded. Six of these populations are concentrated within a 3-mile area in western Lake County. All of these sites are within the Superior National Forest in areas that have undergone some harvest activity in the past. The single outlier population is located on gravelly, upland islands and knobs in a Black Spruce (*Picea mariana*) swamp in western St. Louis County. Because surveys in this part of the state have been extensive and because the species is distinctive, it is unlikely that it has been overlooked or that many additional populations will be found.

Canadian Ricegrass is likely a fire-dependent species and it occurs under scattered canopies and in small forest openings. It appears to require some level of disturbance to maintain these canopy gaps and prevent succession. While the species is presumably adapted to natural disturbances such as wildfires and windthrow, its threshold of tolerance for human-caused disturbances is unknown. The invasion of Spotted Knapweed (*Centaurea maculosa*) or Orange Hawkweed (*Hieracium aurantiacum*), which often accompany human disturbances, and herbicide use in occupied areas would certainly pose a threat to the species.

Given the small number of documented populations despite targeted botanical surveys, the relatively small size of the populations, the absence of the species in apparently suitable habitat, and the vulnerability of the few known populations to degradation or destruction, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Plagiobothrys scouleri* var. *penicillatus* (Hook. & Arn.) I.M. Johnston

FAMILY: Boraginaceae

COMMON NAME: Scouler's Popcornflower

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This small wetland plant is restricted to the prairie region of southwestern Minnesota, where it is associated with bedrock outcrops. It has been documented 11 times from a three county area. In all cases, the species has been found in and along the margins of small, ephemeral rainwater pools that form in depressions on rock outcrops. All of the populations are in areas where human land use practices are intensifying and competing with conservation practices. Rock quarrying, cattle grazing, and herbicide application are the most prominent threats to the species and its habitat. Mining in particular has been a growing issue over the past decade, fueled by federal highway construction standards now requiring crushed bedrock instead of gravel. Another recent threat evidenced in Rock County is the conversion of rocky pastures to cornfields by excavating the bedrock. Survey work for this species is still ongoing, but given its restricted range and habitat type, the small number of known occurrences, and the perceived threats from land use changes, a status of Special Concern is needed and reasonable at this time.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Plantago elongata* Pursh

FAMILY: Plantaginaceae

COMMON NAME: Slender Plantain

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This tiny, annual plant is restricted to southwest Minnesota where it occurs in seepage and rainwater pools that form on and between bedrock outcrops. When designated a Threatened species in 1984, it was known from just three records in Rock and Pipestone counties, two of which had not been seen since 1945. Since that time, both of the historical records have been relocated and an additional seven populations have been discovered. All of the populations are quite large, numbering in the hundreds and thousands of plants. Furthermore, the species appears to be tolerant of livestock grazing as evidenced by its presence in moist areas of several heavily grazed prairies. Slender Plantain is very small, and it is visible for only a short period of time before it disappears. This likely explains why it was overlooked in past surveys. This new information indicates that this species is not as rare as previously thought, and Threatened status is no longer necessary. However, Special Concern status is still needed and reasonable given the species' restricted range in the state and the potential threats from herbicide application and bedrock mining.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Platanthera flava* var. *herbiola* (R. Br. ex Ait. f.) Luer

FAMILY: Orchidaceae

COMMON NAME: Tubercled Rein Orchid

CURRENT MINNESOTA STATUS: Endangered

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This unusual orchid reaches the northwestern limit of its range in Minnesota, where it occurs in wet prairies and meadows, swales in mesic prairies, and sandy or peaty habitats along the edges of marshes, swamps, or lakeshores. When it was designated an Endangered species in 1984, only eight populations had been reported in the state and only two of those had been confirmed. Since that time, extensive surveys in potential habitats have resulted in the discovery of nearly 40 additional populations in central, northeastern, and southeastern Minnesota. Given that the species is more abundant and widely distributed than previously thought, Endangered status is no longer necessary. However, because several of the populations are known to have been destroyed, many of the others are in areas experiencing tremendous development pressures, and the species may be sought after by orchid fanciers, it is needed and reasonable to retain the species in Threatened status.

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SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Polygonum viviparum* L.

NEW SCIENTIFIC NAME: *Bistorta vivipara* (L.) S.F. Gray

FAMILY: Polygonaceae

COMMON NAME: Alpine Bistort

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This small, viviparous plant occurs in small mats of vegetation that develop primarily on the wet cobble beaches, and to a lesser extent in bedrock crevices, along the shore of Lake Superior. These habitats are generally within 30 meters of the shore and exist only because of the unique environment provided by the lake. Approximately ten populations of Alpine Bistort have been documented in the state, most of which are in a relatively small area along the shore in Cook County. All of the populations are small and confined to microhabitats that are often only a square meter in size. While the species' rarity and restrictive habitat needs were known when it was listed as Special Concern in 1984, threats to its populations from recreational activities and development along the shore had not yet materialized. The small vegetation mats where Alpine Bistort occurs are very fragile and easily destroyed. Activities as benign as hiking can become a serious threat if concentrated along the rocky shore.

Given the small number and size of populations in Minnesota, the species' restrictive habitat requirements, the limited amount of available habitat in the state, and the vulnerability of the known populations to degradation or destruction from increasing development pressures and associated activities, a status of Threatened is reasonable and needed.

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- Penskar, M. R. 2008. Special plant abstract for *Polygonum viviparum* (alpine bistort). Michigan Natural Features Inventory, Lansing, Michigan. 3 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Polystichum acrostichoides* (Michx.) Schott

FAMILY: Dryopteridaceae

COMMON NAME: Christmas Fern

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This evergreen fern reaches the northwestern edge of its range in southeastern Minnesota. It has only been documented twice in the state; once in Houston County and once in Winona County. Both times the species was found on river bluffs in mesic hardwood forests and both records are from 1979. While the species' extreme rarity was known when it was designated a Threatened species in 1996, it was hoped that some unexplored potential habitat would yield more records. A comprehensive botanical survey of the region has now been completed by the Minnesota County Biological Survey, and unfortunately no additional locations of Christmas Fern have been found. It is now clear that this is one of the rarest species in the state. Furthermore, the widespread use of this species in the horticultural trade could threaten the genetic integrity of Minnesota populations if plantings of different genetic stock are done in the vicinity of native populations. For these reasons, a status of Endangered is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Polystichum braunii* (Spenner) Fee

FAMILY: Dryopteridaceae

COMMON NAME: Braun's Holly Fern

CURRENT MINNESOTA STATUS: Endangered

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This rare fern was first discovered in Minnesota in 1966 in a gorge of the Kadunce River in Cook County. By the time it was listed as an Endangered species in 1984, it had only been found at one other location in a similar habitat approximately 4 kilometers away. Since that time, most of the species' potential habitat has been surveyed and a total of 12 populations are now known to occur in Cook and Lake counties. Most of the additional populations have been found along slopes, rocky draws, and ephemeral streams in rich hardwood forests dominated by Sugar Maple (*Acer saccharum*) and Yellow Birch (*Betula allegheniensis*). All of the known sites are cool, moist, and shaded, and occur within 8.5 kilometers of Lake Superior. The largest populations contain up to 150 plants, but most colonies have 5-30 individuals.

The recent survey results indicate that Braun's Holly Fern is not quite as rare as previously thought, and Endangered status is no longer necessary. However, given the species' restricted range in the state, its absence from apparently suitable habitats, the small size and localized nature of its populations, and the vulnerability of the populations to trampling, tree canopy removal, and water table or stream manipulations, it is needed and reasonable to retain the species in Threatened status.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Potamogeton confervoides* Reichenb.

FAMILY: Potamogetonaceae

COMMON NAME: Algae-like Pondweed

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This submersed aquatic occurs primarily in eastern North America, with disjunct populations in several Great Lakes states. It was first discovered in Minnesota in 2008 in a small bog pond in the Boundary Waters Canoe Area Wilderness. This remains the only known population in the state. Throughout its range, Algae-like Pondweed occurs in shallow waters of acidic bogs, soft water lakes, peatlands, and slow-moving streams. It is a visually distinctive species that would not be easily overlooked by a trained botanist. Considering the extensive amount of botanical work that has been completed in northern Minnesota, particularly in lake and bog habitats, this is possibly one of the rarest species in the state.

Algae-like Pondweed requires acidic environments and any activities that would result in eutrophication or increased alkalinity of its habitats would be detrimental. Such activities could include lakeshore development, peat mining, intensive timber harvest, herbicide treatment, and liming of ponds for fisheries management. While the single Minnesota population is located in a remote wilderness area and presumed to be reasonably secure, it would still be highly vulnerable to changes in water chemistry or modifications to its hydrological regime.

Given the documentation of only one population despite years of botanical surveys, the species' restrictive water chemistry requirements, and the vulnerability of a single population to degradation or destruction, a status of Endangered is reasonable and needed.

SELECTED REFERENCES:

- Crow, G.E. and C.B. Hellquist. 2000. Aquatic and Wetland Plants of Northeastern North America. Volume 1. Pteridophytes, Gymnosperms, and Angiosperms: Dicotyledons. University of Wisconsin Press, Madison. 480pp.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Potamogeton oakesianus* J.W. Robbins

FAMILY: Potamogetonaceae

COMMON NAME: Oakes' Pondweed

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This submerged aquatic plant has been documented just 18 times in central and northeastern Minnesota despite the comprehensive floristic inventory of more than 1,500 lakes conducted by the Minnesota County Biological Survey. All of the locations have been along shores and bays of small to medium size lakes that have sandy or silty bottoms and good water clarity. Several of the lake habitats are bog-shored and others have bedrock shorelines. Presently, many of the lakes have been minimally developed and some intact, wooded shorelines remain. However, roadways border portions of all of the lakes and the increasing development and recreational pressures being placed on lakeshore habitats in northern Minnesota is a serious concern. Because lakes are fluid and typically contained systems, a perturbation at one location can have far reaching effects and impact an entire aquatic community. Such disturbances may include shoreline manipulation, erosion, runoff and nutrient enrichment from fertilizers, road salt, and other pollutants, herbicide treatment, use of weed rollers, and invasion of non-native species. Any activity that would increase eutrophication or sedimentation, decrease water clarity, or substantially alter lake substrates would threaten the viability of an Oakes' Pondweed population.

Given the small number of documented populations despite targeted botanical surveys, the increasing pressure on lakeshore habitats, and the significant vulnerability of the known populations to degradation or destruction, a status of Endangered is reasonable and needed.

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Haynes, R. R., and C. B. Hellquist. 2000. *Potamogeton*. Pages 48-70 in *Flora of North America* Editorial Committee, editors. *Flora of North America north of Mexico*. Volume 22. Oxford University Press, New York, New York.

Ogden, E. C. 1943. The broad-leaved species of *Potamogeton* of North America north of Mexico. *Rhodora* 45:57-105.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Potamogeton pulcher* Tuckerman

FAMILY: Potamogetonaceae

COMMON NAME: Spotted Pondweed

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This submerged, aquatic plant is known from only three lakes in Minnesota: Allen Lake in Clearwater County, Colby Lake in Chisago County, and Egg Lake in Cass County. Botanical surveys of more than 1,500 lakes have now been completed by the Minnesota County Biological Survey, and the results indicate this is one of the rarest plants in the state. Where found, the species occurs in water less than 2-meters deep, in substrates of deep silt and fine, organic sediments. Additionally, all three lakes have good water clarity. Any deterioration of water quality in these lakes could lead to the extirpation of the species in Minnesota. Therefore, on the basis of extreme rarity and perceived threats, a status of Endangered is reasonable and needed.

SELECTED REFERENCES:

Haynes, R. R., and C. B. Hellquist. 2000. *Potamogeton*. Pages 48-70 in *Flora of North America* Editorial Committee, editors. *Flora of North America north of Mexico*. Volume 22. Oxford University Press, New York, New York.

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Ogden, E. C. 1943. The broad-leaved species of *Potamogeton* of North America north of Mexico. *Rhodora* 45:57-105.

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SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Potamogeton vaginatus* Turcz.

NEW SCIENTIFIC NAME: *Stuckenia vaginata* (Turcz.) Holub

FAMILY: Potamogetonaceae

COMMON NAME: Sheathed Pondweed

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Despite floristic inventories of more than 1,500 lakes, this submerged aquatic plant has been documented only eight times in northern Minnesota since 1956. Where found, it has been growing in deepwater zones and near shore areas of very large, fairly alkaline lakes. The relatively small number of such lakes in Minnesota is likely a limiting factor for the species. While the species' rarity was suspected when it was listed as Special Concern in 1996, it was hoped that unexplored potential habitat would produce many more records once further surveys were conducted. Unfortunately, that hasn't been the case.

Potential threats to the few known Sheathed Pondweed populations include lakeshore development, declining water quality, invasion of non-native species, herbicide treatment, and artificial water and shoreline manipulation. In addition, the direct traffic and wave action produced by large watercraft, which can cause the plants to be uprooted, is a serious concern. At least two of the known populations are located in precarious spots in the main boat channel and near the public water access site.

Given the small number of documented populations despite targeted botanical surveys, the limited amount of potential habitat for the species in the state, the increasing statewide pressure on lakeshore habitats, and the vulnerability of the known populations to degradation or destruction, a status of Endangered is reasonable and needed.

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Hammer, U. T., and J. M. Heseltine. 1988. Aquatic macrophytes in saline lakes of the Canadian prairies. *Hydrobiologia* 158:101-116.

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Ownbey, G. B., and T. Morley. 1991. *Vascular plants of Minnesota: a checklist and atlas*. University of Minnesota Press, Minneapolis, Minnesota. 307 pp.

Pip, E. 1987. The ecology of *Potamogeton* species in central North America. *Hydrobiologia* 153:203-216.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Potamogeton vaseyi* J.W. Robbins

FAMILY: Potamogetonaceae

COMMON NAME: Vasey's Pondweed

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: This rooted, aquatic plant inhabits small, soft water lakes. When it was designated a Special Concern species in 1984, it had only been documented in northeastern Minnesota 12 times and half of those records predated 1960. Since that time, rare aquatic plant inventories of more than 1,500 lakes have been completed and approximately 100 additional populations have been discovered. Vasey's Pondweed is now known to be more common and widely distributed in Minnesota than was formerly believed. For these reasons, Special Concern status is no longer needed or reasonable.

SELECTED REFERENCES:

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Prenanthes crepidinea* Michx.

FAMILY: Asteraceae

COMMON NAME: Nodding Rattlesnakeroot

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None, and Probably Extirpated from Minnesota

BASIS FOR PROPOSED MINNESOTA STATUS: When this prairie plant was designated a Special Concern species in 1996, only one population had ever been recorded in Minnesota. The collection was from Houston County and dated 1900. Several small fragments of potential habitat still remained to be surveyed at the time of listing, and it was hoped that additional inventory efforts would result in the discovery of remnant populations. Unfortunately, this has not been the case and Nodding Rattlesnakeroot is now considered extinct in Minnesota. For this reason, Special Concern status is no longer needed or reasonable.

SELECTED REFERENCES:

- Bogler, D. J. 2006. *Prenanthes*. Pages 264-271 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 19. Oxford University Press, New York, New York.
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- Ownbey, G. B., and T. Morley. 1991. Vascular plants of Minnesota: a checklist and atlas. University of Minnesota Press, Minneapolis, Minnesota. 307 pp.
- Rosendahl, C. O., and J. W. Moore. 1947. A new variety of *Sedum rosea* from southeastern Minnesota and additional notes on the flora of the region. *Rhodora* 49:197-202.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Prosartes trachycarpa* S. Wats.

FAMILY: Liliaceae

COMMON NAME: Rough-fruited Fairybells

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial herb was first discovered in Minnesota in 1999. A single population containing approximately 60 plants was found scattered across 80-meters of semi-open, forested ridge-top and slope habitat in northern Cook County. Similar habitats in the region have been intensively botanized before and after 1999, but no other populations of Rough-fruited Fairybells have been located. The single population is disjunct hundreds of miles from the main range of the species, which raises the possibility that this is a unique and isolated occurrence. Of primary concern is the fragility of the habitat where the population occurs. The soils are loose and prone to erosion or dislocation; they are held together only by lichens and the roots of small grasses and sedges. As such, the primary threat to the species is competing recreational activities. This is evidenced by a recent proposal to put a hiking trail precariously close to the only known population. A single disturbance or random event could easily cause the extirpation of this species in Minnesota.

Given the documentation of only one population despite intensive surveys, the absence of the species in apparently suitable habitat, and the vulnerability of the only known population to degradation or destruction, a status of Endangered is reasonable and needed.

SELECTED REFERENCES:

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Utech, F. H. 2002. *Prosartes*. Pages 142-145 in *Flora of North America* Editorial Committee, editors. *Flora of North America north of Mexico*. Volume 26. Oxford University Press, New York, New York.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Quercus bicolor* Willd.

FAMILY: Fagaceae

COMMON NAME: Swamp White Oak

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This large tree is restricted to lowland hardwood forests on the floodplain of the Mississippi River. Historically it occurred as far upstream as the Twin Cities area, but it has not been found above Wabasha (Wabasha County) for many years. Most of its habitat was lost early in the 20th Century when a series of eight locks and dams were constructed on the river. The dams turned the Mississippi River from a free-flowing river into a series of interconnected navigation pools. The only original forests that survived intact were located immediately downstream from the dams, where water levels remained more or less natural. Today, Swamp White Oak is only known to occur in a handful of widely separated sites along the river, and there is a concern over whether these populations are regenerating. The remaining habitats are typically flooded in the early spring when snowmelt and rainfall cause the river level to rise. Flooding typically lasts only a few weeks and usually subsides before the growing season begins. The shallow root system of Swamp White Oak is particularly well adapted to survive this type of flooding and the accompanying sedimentation.

Since loss and degradation of habitat is the main cause of the species' decline, recovery will likely depend on improving and increasing appropriate habitat as well as preserving existing habitat. Fortunately, most of the remaining populations of Swamp White Oak are located within the Upper Mississippi River Wildlife and Fish Refuge where threats are considered to be relatively low. Additionally, this presents an opportunity for cooperative management, research, and monitoring between state and federal resource agencies. Some level of recognition is necessary for Swamp White Oak given the very small number and size of remaining populations in Minnesota, the limited amount of potential habitat, and the concerns over natural regeneration. Because the majority of the remaining populations appear to be adequately protected from further land use changes, a status of Special Concern is considered needed and reasonable at this time.

SELECTED REFERENCES:

- Ownbey, G. B., and T. Morley. 1991. Vascular plants of Minnesota: a checklist and atlas. University of Minnesota Press, Minneapolis, Minnesota. 307 pp.
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- Nixon, K. C. 1993. *Quercus*. Pages 445-506 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 3. Oxford University Press, New York, New York.
- Smith, W. R. 2008. Trees and shrubs of Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 703 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Rhynchospora fusca* (L.) Ait. f.

FAMILY: Cyperaceae

COMMON NAME: Sooty-colored Beak Rush

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: When designated a Special Concern species in 1984, this perennial sedge had only been documented in the state 13 times and it was believed to be restricted to water tracks in large patterned peatland complexes. Targeted rare plant surveys over the past two decades have resulted in the discovery of nearly 90 additional populations in a broader range of habitats. The species has now been found in hummocks of *Sphagnum* moss on boggy shores, floating mats at the margins of lakes and bog ponds, boggy pools, and puddles and depressions in fens. Furthermore, it is expected that more populations will be located during botanical surveys of the Border Lakes region. Sooty-colored Beak Rush is now known to be more common and widely distributed in northern Minnesota than was formerly believed. For these reasons, Special Concern status is no longer needed or reasonable.

SELECTED REFERENCES:

- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Rubus fulleri* Bailey

FAMILY: Rosaceae

COMMON NAME: Bristle-berry

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial shrub occurs in shallow wetlands on sandplains in ten counties in central and east-central Minnesota. This is a very fragile habitat type that is susceptible to being drained, filled, invaded by exotic species, or otherwise destroyed. In fact, after more than 100 years of agricultural and urban development in this area, there are very few remaining habitats that are suitable to sustain populations of this species. Bristle-berry is known to be especially sensitive to livestock grazing, competition from invasive species, particularly Reed Canary Grass (*Phalaris arundinacea*), and changes in groundwater levels, and it does not readily colonize grossly disturbed habitats. In addition, active management in the form of brush removal or prescribed burns may be necessary to control encroaching vegetation near several of the approximately 12 known populations.

Given the small number of populations and limited amount of remaining habitat in the state, the historic loss and degradation of sandplain habitats, the current threats posed by land use changes and invasive species, and the potential need for active management, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

Minnesota Department of Natural Resources. 2006. Tomorrow's habitat for the wild and rare: An action plan for Minnesota wildlife, comprehensive wildlife conservation strategy. Division of Ecological Services, Minnesota Department of Natural Resources. 297 pp. + appendices.

Smith, W. R. 2008. Trees and shrubs of Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 703 pp.

Wovcha, D. S., B. C. Delaney, and G. E. Nordquist. 1995. Minnesota's St. Croix River Valley and Anoka Sandplain, a guide to native habitats. University of Minnesota Press, Minneapolis, Minnesota. 234 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Rubus missouricus* Bailey

FAMILY: Rosacea

COMMON NAME: Missouri Dewberry

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial shrub is currently known from only one site in Minnesota, a small, remnant habitat on the Anoka Sandplain. It was discovered in 2003 during a ten-year, statewide survey of *Rubus* species and habitats. Although several hundred *Rubus* populations representing 33 different species were located during the survey, only one population of Missouri Dewberry was discovered. This population was found in a groundwater-sustained sedge meadow on moist sand in nearly full sunlight. All indications tell us that the species is very habitat-sensitive. Disturbances such as changes in drainage patterns, overtopping by trees or larger shrubs, encroachment from non-native plant species, herbicides, and compaction/disturbance of the soil would render the habitat incapable of supporting a viable population of this rare species. This is a serious concern since the only known population is located in an area that is experiencing intense development pressure.

Given the limited amount of potential habitat for the species in the state, the documentation of only one population despite intensive surveys, the historic and present loss of wetland habitats, and the current threats posed by land use changes and invasive species, a status of Endangered is reasonable and needed.

SELECTED REFERENCES:

Minnesota Department of Natural Resources. 2006. Tomorrow's habitat for the wild and rare: An action plan for Minnesota wildlife, comprehensive wildlife conservation strategy. Division of Ecological Services, Minnesota Department of Natural Resources. 297 pp. + appendices.

Smith, W. R. 2008. Trees and shrubs of Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 703 pp.

Wovcha, D. S., B. C. Delaney, and G. E. Nordquist. 1995. Minnesota's St. Croix River Valley and Anoka Sandplain, a guide to native habitats. University of Minnesota Press, Minneapolis, Minnesota. 234 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Rubus multiflorus* Bailey

FAMILY: Rosaceae

COMMON NAME: Kinnickinnick Dewberry

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This low growing shrub is found in high-quality oak savanna remnants on the Anoka Sandplain, and on a few bedrock exposures in prairie habitats elsewhere in central and east-central Minnesota. In the past, these habitats were probably common and Kinnickinnick Dewberry was perhaps correspondingly common. However, the situation has now changed dramatically. More than 99% of the prairie and savanna habitat that was present in the state before settlement has been destroyed or severely degraded and habitat availability is extremely limited. Remaining habitats are typically small, fragmented, and isolated from the ecosystem processes, such as fire, that are needed to maintain favorable conditions. Without fire, the habitats quickly succeed to a closed-canopy forest and lose their characteristic savanna flora, thus making them unsuitable for Kinnickinnick Dewberry. On the basis of the small number of known populations and the limited amount of remaining habitat for the species in the state, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

- Minnesota Department of Natural Resources. 2006. Tomorrow's habitat for the wild and rare: An action plan for Minnesota wildlife, comprehensive wildlife conservation strategy. Division of Ecological Services, Minnesota Department of Natural Resources. 297 pp. + appendices.
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- Widrechner, M. P. 1998. The genus *Rubus* L. in Iowa. *Castanea* 63:415-465.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Rubus quaesitus* Bailey

FAMILY: Rosaceae

COMMON NAME: Prince Edward Island Blackberry

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Little is known about this midsize shrub other than it is apparently rare throughout its range. Authenticated specimens are only known from a few locations in New Brunswick, Wisconsin, and Minnesota. The species was first discovered in Minnesota by Albert Fuller in 1958 in Kanabec County, but attempts to relocate this population have been unsuccessful. The only other known population in Minnesota was discovered in 1998 in a mature forest of Trembling Aspen (*Populus tremuloides*) and Paper Birch (*Betula papyrifera*) in Carlton County. As a measure of its rarity, this population was the only discovery of Prince Edward Island Blackberry among 500 or more Blackberry populations investigated during a ten-year, statewide field survey. Further survey work is needed to clarify this species' distribution and habitat preferences in Minnesota but based on its apparent rarity, Special Concern status is needed and reasonable at this time.

SELECTED REFERENCES:

Smith, W. R. 2008. Trees and shrubs of Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 703 pp.

Widrechner, M. P. 1998. The genus *Rubus* L. in Iowa. *Castanea* 63:415-465.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Rubus semisetosus* Blanch.

FAMILY: Rosaceae

COMMON NAME: Swamp Blackberry

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Most of the approximately 20 known populations of this perennial shrub occur in savanna remnants in Anoka, Isanti, and Sherburne counties, although a few scattered outlying populations have been found as far north as Aitkin County, some of them in tamarack swamps. The savanna populations typically grow in moist sand along the margins of groundwater-fed swales or marshes, but also in surface-dry uplands that are just above the water table. These are usually grass- or sedge-dominated habitats, often with scattered brush and direct sunlight or partial shade. Because of conversion to agricultural uses, and more recently to residential and commercial uses, such diverse, well-structured habitats have become exceedingly rare. Perhaps more importantly, these habitats have been reduced to small fragments that are isolated from the ecosystem processes, such as fire, that are needed to maintain them. Without fire, the habitats quickly succeed to a closed-canopy forest and lose their characteristic savanna flora, thus making them unsuitable for Swamp Blackberry. This species is apparently also sensitive to livestock grazing and does not compete well with invasive species that typically follow human disturbance, such as Reed Canary Grass (*Phalaris arundinacea*).

Given the small number of documented populations despite targeted botanical surveys, the limited amount of remaining habitat for the species in the state, the historic and present loss of savanna and wetland habitats, the potential need for active management, and the current threats posed by land use changes and invasive species, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

Minnesota Department of Natural Resources. 2006. Tomorrow's habitat for the wild and rare: An action plan for Minnesota wildlife, comprehensive wildlife conservation strategy. Division of Ecological Services, Minnesota Department of Natural Resources. 297 pp. + appendices.

Smith, W. R. 2008. Trees and shrubs of Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 703 pp.

Wovcha, D. S., B. C. Delaney, and G. E. Nordquist. 1995. Minnesota's St. Croix River Valley and Anoka Sandplain, a guide to native habitats. University of Minnesota Press, Minneapolis, Minnesota. 234 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Rubus stipulatus* Bailey

FAMILY: Rosaceae

COMMON NAME: Bristle-berry

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial shrub is rare throughout its range, which encompasses only small parts of Minnesota, Wisconsin, and formerly Iowa. Since settlement times, the original savanna ecosystem that sustained this species has been largely supplanted by agricultural fields and more recently by suburban developments. Furthermore, the shallow, groundwater sustained wetlands in which the species is typically associated have survived only to the extent that they could not be drained or filled and were able to resist the invasion of non-native species, particularly Reed Canary Grass (*Phalaris arundinacea*). Such habitat loss was confirmed during a ten-year, statewide survey of *Rubus* species and their habitats. During this study, Bristle-berry was located only twice in Anoka County and once in Rice County; a historic population in Kanabek County is believed to have been destroyed.

Given the limited amount of potential habitat for the species in the state, the documentation of only three extant populations despite intensive surveys, the historic and present loss of wetland habitats, and the current threats posed by land use changes and invasive species, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

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Widrelechner, M. P. 1998. The genus *Rubus* L. in Iowa. *Castanea* 63:415-65.

Wovcha, D. S., B. C. Delaney, and G. E. Nordquist. 1995. Minnesota's St. Croix River Valley and Anoka Sandplain, a guide to native habitats. University of Minnesota Press, Minneapolis, Minnesota. 234 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Rubus vermontanus* Blanch.

FAMILY: Rosaceae

COMMON NAME: Vermont Blackberry

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This midsize shrub was documented approximately 15 times during a ten-year, statewide survey of Blackberry species and their habitats. It occurs in both the shallow wetland and the upland prairie components of savannas, and in open woodlands and brushland habitats, but always in direct sunlight. True savannas are extremely rare these days as most were cleared for agricultural purposes during settlement times. The remaining habitats have been reduced to small fragments that are now isolated from the ecosystem processes, such as fire, that are needed to maintain them. Without fire, the habitats quickly succeed to a closed-canopy forest and lose their characteristic savanna flora, thus making them unsuitable for Vermont Blackberry. Additional threats to the species include livestock grazing, spread of invasive species, herbicide application, and trampling as a result of vehicle traffic. On the basis of the small number of known populations, the limited amount of remaining habitat, and potential threats, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

- Davis, H. A., A. M. Fuller, and T. Davis. 1968. Contributions toward the revision of the *Eubati* of eastern North America. II. *Setosi*. *Castanea* 33:50-76.
- Minnesota Department of Natural Resources. 2006. Tomorrow's habitat for the wild and rare: An action plan for Minnesota wildlife, comprehensive wildlife conservation strategy. Division of Ecological Services, Minnesota Department of Natural Resources. 297 pp. + appendices.
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- Smith, W. R. 2008. Trees and shrubs of Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 703 pp.
- Widrechner, M. P. 1998. The genus *Rubus* L. in Iowa. *Castanea* 63:415-65.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Rudbeckia triloba* L.

NEW SCIENTIFIC NAME: *Rudbeckia triloba* var. *triloba* L.

FAMILY: Asteraceae

COMMON NAME: Three-leaved Coneflower

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Three-leaved Coneflower reaches the northern limit of its natural range in southeastern Minnesota, where it occurs in mesic hardwood forests and floodplain forests. When it was listed as a Special Concern species in 1984, it had only been documented in the state five times, and not since 1960. The lack of current data and systematic surveys prevented it from being assigned a more protective status at that time. Now, after a comprehensive biological inventory of much of the region, only five additional populations have been documented in Houston and Mower counties, and none of the historical records could be relocated. Furthermore, each of the extant populations is small, often consisting of just 10-15 plants.

Within its forested habitats, Three-leaved Coneflower tends to be found where stream beds or other ecotones create canopy gaps and allow more light to reach the forest floor. Since settlement times, large expanses of floodplain forests in southern Minnesota have been lost due to conversion to agriculture, urbanization, and the damming and channelization of rivers. Unfortunately, this trend is continuing and habitat loss and degradation still pose an eminent threat to the species. The invasion of aggressive, non-native species, particularly Common Buckthorn (*Rhamnus cathartica*), Eurasian Honeysuckle shrubs (*Lonicera* spp.), and Wild Garlic Mustard (*Alliaria petiolaris*) is also a serious concern.

Given the limited amount of potential habitat for the species in the state and its limited geographic range, the small number of documented populations despite intensive surveys and the small size of those populations, the historic loss and degradation of floodplain forest habitat, and the current threats posed by competing land use practices and invasive species, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.

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Urbatsch, L. E., and P. B. Cox. 2006. *Rudbeckia*. Pages 44-60 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 21. Oxford University Press, New York, New York.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Ruellia humilis* Nutt.

FAMILY: Acanthaceae

COMMON NAME: Wild Petunia

CURRENT MINNESOTA STATUS: None, and Probably Extirpated from Minnesota

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR MINNESOTA STATUS: This rare plant was originally placed on the state endangered species list in 1984 due to the occurrence of only one population in Minnesota, and subsequently delisted in 1996 when the species was presumed to be extinct in the state. However, in 2005 the population at Afton State Park in Washington County was rediscovered in a dry-mesic grassland habitat on the margins of a woodland. This habitat was most likely a mix of oak woodland and prairie before settlement, but was converted to a pasture at one point in time. After extensive field surveys of remnant dry prairie and oak savanna habitats, the Afton State Park population remains the only known population in the state. While this population is relatively small, it should be able to persist if its habitat can be maintained. However, the habitat is being invaded by several aggressive, non-native plant species including Smooth Brome (*Bromus inermis*), Crown Vetch (*Coronilla varia*), Birds Foot Trefoil (*Lotus corniculatus*), and Common Buckthorn (*Rhamnus cathartica*). Additionally, the encroachment of woody vegetation is resulting in habitat succession to a closed-canopy forest, which will eventually make the habitat unsuitable for Wild Petunia. Fortunately, the population is located in a state park where there is a greater likelihood that active management in the form of prescribed burns, brush removal, and/or invasive species control can be undertaken to protect the long-term viability of the population.

Because the only known Wild Petunia population is located in an area that was formerly a pasture, there is some question as to how it became established. For this reason, a status of Special Concern has been deemed most appropriate at this time. A more protective status may be warranted in the future if thorough searches of native habitats within Afton State Park result in the discovery of additional populations.

SELECTED REFERENCES:

- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
- Fernald, M. L. 1945. *Ruellia* in the eastern United States. *Rhodora* 47:1-90.
- Michigan Natural Features Inventory. 2007. Rare Species Explorer [web application]. Michigan Natural Features Inventory, Lansing, Michigan. <<http://web4.msue.msu.edu/mnfi/explorer>>. Accessed 26 June 2009.
- Minnesota Department of Natural Resources. 2006. Tomorrow's habitat for the wild and rare: An action plan for Minnesota wildlife, comprehensive wildlife conservation strategy. Division of Ecological Services, Minnesota Department of Natural Resources. 297 pp. + appendices.
- Ownbey, G. B., and T. Morley. 1991. Vascular plants of Minnesota: a checklist and atlas. University of Minnesota Press, Minneapolis, Minnesota. 307 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Sagittaria brevirostra* Mackenzie & Bush

FAMILY: Alismataceae

COMMON NAME: Short-beaked Arrowhead

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR MINNESOTA STATUS: Only three small populations of this emergent aquatic plant are known to survive in Minnesota. One is located in a small, spring-fed stream on bottomlands of the lower Minnesota River (Scott County), another is in a quiet backwater of the Mississippi River (Washington County), and the third is in a marshy zone around a prairie lake (Pipestone County). All of these habitats are relatively small, isolated, and fragile. They depend on seasonal fluctuations of water levels and a specific rate of silt deposition, so they can be negatively influenced by a variety of human activities anywhere within their watershed. The critical factor in the conservation of Short-beaked Arrowhead is maintaining the natural hydrological regime that supports its habitat. Dams, flood control structures, and impoundments are all detrimental since they limit or prevent the natural rise and fall of water levels, and they are likely responsible for the species' decline in Minnesota. The accelerating spread of invasive, non-native species also threatens to further degrade the species' habitat.

Given the documentation of only three extant populations despite targeted searches of over 100 potential habitats across southern Minnesota in 2006, the species' unique habitat requirements, and the vulnerability of the few known populations to degradation or destruction, a status of Endangered is reasonable and needed.

SELECTED REFERENCES:

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NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 26 June 2009.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Sagittaria calycina* var. *calycina* Engelm.

FAMILY: Alismataceae

COMMON NAME: Hooded Arrowhead

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR MINNESOTA STATUS: This emergent aquatic plant likely occurs sporadically throughout backwaters of the lower Minnesota River and the Mississippi River south of the Twin Cities, but it is certainly not common. It is known by five historic collections, all of which are presumed destroyed, and seven recent collections. The recent records are the result of a targeted search in 2006 of over 100 potential sites across southern Minnesota. The species has specialized habitat requirements and requires a seasonal cycle of water level fluctuations including flooding and draw-downs. Its high quality wetland habitats and these complex hydrological regimes are easily disrupted by human activities, and it is estimated that at least 90% of its habitat has been degraded or destroyed within historic times. Dams, flood control structures, and impoundments all pose serious threats to the long-term viability of Hooded Arrowhead populations as they all limit or prevent necessary hydrologic cycles. The accelerating spread of invasive, non-native species also threatens to further degrade the species' habitat. On the basis of the small number of known populations, the limited amount of suitable habitat, and the vulnerability of the few known populations to degradation or destruction, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Haynes, R. R., and C. B. Hellquist. 2000. *Sagittaria*. Pages 11-23 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 22. Oxford University Press, New York, New York.
- Michigan Natural Features Inventory. 2007. Rare Species Explorer [web application]. Michigan Natural Features Inventory, Lansing, Michigan. <<http://web4.msue.msu.edu/mnfi/explorer>>. Accessed 29 June 2009.
- Minnesota Department of Natural Resources. 2006. Tomorrow's habitat for the wild and rare: An action plan for Minnesota wildlife, comprehensive wildlife conservation strategy. Division of Ecological Services, Minnesota Department of Natural Resources. 297 pp. + appendices.
- Wisconsin Department of Natural Resources. 2007. Long-lobe Arrowhead (*Sagittaria calycina*) factsheet. <<http://dnr.wi.gov/org/land/er/biodiversity/index.asp?mode=info&Grp=20&SpecCode=PMALI04040>>. Accessed 29 June 2009.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Salix pellita* (Anderss.) Anderss. ex Schneid.

FAMILY: Salicaceae

COMMON NAME: Satiny Willow

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This tall shrub reaches the southwestern periphery of its range in the Arrowhead Region of Minnesota, where it has been found along sandy and rocky shores of large lakes, and stream banks and gravel bars. When it was listed as a Special Concern species in 1996, there were only four known collection records in the state, with the most recent dated 1958. The lack of current data and systematic surveys prevented it from being assigned a more protective status at that time. Now, after years of targeted surveys by the Minnesota County Biological Survey, only eight additional populations have been discovered in the state (Cook and St. Louis counties), and none of the populations discovered before 1958 could be relocated. Furthermore, most of the extant populations are small, consisting of just a handful of plants.

The habitat for Satiny Willow occurs in a narrow band along streams and lakes. As such, any type of shoreline development or disturbance could be damaging to the species. Since all of the known populations are on state, federal, or tribal lands, development is probably not a major concern. However, shoreline stabilization with rip-rap, manipulation of water levels with artificial structures, the invasion of non-native species, and concentrated recreational activity are all actions that could threaten the long-term viability of Satiny Willow populations. Extensive off-road vehicle use has already been documented at one of the river populations.

Given the small number of documented populations despite targeted botanical surveys, the limited amount of potential habitat for the species in the state, the increasing pressure on shoreline habitats, and the vulnerability of the few known populations to degradation or destruction, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
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- Minnesota Department of Natural Resources, Division of Ecological Resources. 2008. Rare species guide: an online encyclopedia of Minnesota's rare native plants and animals [web application]. Minnesota Department of Natural Resources, St. Paul, Minnesota. <www.dnr.state.mn.us/rsg>. Accessed 1 July 2009.
- Monson, P.H. 1988. Endangered, Threatened, and Special Concern Plants. Grand Portage National Monument. Grand Portage, Minnesota. Olga Lakela Herbarium, University of Minnesota, Duluth. Unpublished report submitted to National Park Service. Grand Portage. 15pp.
- Ownbey, G. B., and T. Morley. 1991. Vascular plants of Minnesota: a checklist and atlas. University of Minnesota Press, Minneapolis, Minnesota. 307 pp.
- Smith, W. R. 2008. Trees and shrubs of Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 703 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Salix pseudomonticola* Ball

FAMILY: Salicaceae

COMMON NAME: False Mountain Willow

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This large shrub was not known to occur in Minnesota until 1993 when a series of previously misidentified herbarium specimens collected between 1939 and 1952 along the St. Louis River near Fond du Lac (St. Louis County) were correctly identified. Since then, the species has been found at another location along the St. Louis River in Carlton County and at a handful of locations in extreme northwestern Minnesota. The populations in the northwest appear to be continuous with populations in Canada, but the populations along the St. Louis River seem to be anomalous disjuncts. In the northwest, the species occurs in wet mineral soil and shallow peat in wet brush prairies and shrub swamps. This habitat type is common in that region, and yet False Mountain Willow appears to be rare or at least uncommon. Many of these habitats have become fragmented by agriculture and this in combination with a lack of wildfire may be a limiting factor for the species. Habitats along the St. Louis River are more difficult to characterize but appear to be wet seeps on clay banks or hillsides, in sunny or partially shaded forest openings. Additional survey work is needed to clarify the species' abundance and distribution in the state, but based on its apparent rarity, a status of Special Concern is needed and reasonable at this time.

SELECTED REFERENCES:

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 26 June 2009.

Smith, W. R. 2008. Trees and shrubs of Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 703 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Saxifraga paniculata* P. Mill.

COMMON NAME: Encrusted Saxifrage

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This arctic-alpine species occurs in rock crevices and on small ledges on generally north-facing, shady cliffs in Cook and Lake counties. When it was designated a Threatened species in 1984, only a handful of populations had been documented from a small area in northern Cook County. Since that time, approximately 15 additional populations have been discovered in a broader area including the North Shore of Lake Superior. The species is now known to be more widely distributed than previously thought and Threatened status is no longer necessary. However, Special Concern status is still needed and reasonable given the relative rarity of the species, its restricted range in Minnesota, and the limited amount of suitable cliff habitat in the state.

SELECTED REFERENCES:

Butters, F. K. 1944. The American varieties of *Saxifraga aizoon*. *Rhodora* 46:61-69.

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Penskar, M. R. 2008. Special plant abstract for *Saxifraga paniculata* (encrusted saxifrage). Michigan Natural Features Inventory, Lansing, Michigan. 3 pp.

Voss, E. G. 1985. Michigan Flora. Part II: Dicots. Cranbrook Institute of Science Bulletin 59 and the University of Michigan Herbarium. University of Michigan, Ann Arbor, Michigan. 727 pp.

SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Scirpus clintonii* Gray

NEW SCIENTIFIC NAME: *Trichophorum clintonii* (Gray) S.G. Sm.

FAMILY: Cyperaceae

COMMON NAME: Clinton's Bulrush

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Clinton's Bulrush has a disjunct and widespread distribution in Minnesota, yet it is quite rare. When it was listed as a Special Concern species in 1996, it was known from just ten herbarium records. However, the lack of systematic surveys prevented it from being assigned a more protective status at that time. Now, after years of targeted surveys, only a handful of additional populations have been found. The species' habitat preferences are as curious as its distribution. While they appear to be very specific, they are not easily defined or found on the landscape. All of the habitats have sandy soils and they tend to be small and ecotonal in nature, meaning that they occur as small inclusions in larger habitat mosaics. Such habitats have included sandy ridges within forests; an acid peat meadow; depressional swales near upland/wetland edges; transition zones between wet meadows and prairies, sand prairies and woodland slopes, and mesic prairies and wet prairies; a moist, open field; and shallow swales among dunes in prairies.

The habitats of Clinton's Bulrush require cyclical, naturally occurring disturbance such as ground fire or possibly seasonally fluctuating water levels to sustain them. Because most of the recent collections are from habitat fragments in rapidly developing areas of the Twin Cities Metropolitan Area, there is concern that these fragments may not have retained the ecosystem processes necessary to create ideal habitat conditions and assure the perpetuation of the species. Simply protecting the small patches of habitat where this species is found, while ignoring larger landscape dynamics may not be enough. In the absence of such natural processes, active management in the form of prescribed fire or brush removal may be necessary to control competing vegetation and maintain open habitat conditions. One of the populations in Anoka County was observed to have increased abundance and vigor following a fire in 2000. The spread of invasive species, particularly Reed Canary Grass (*Phalaris arundinacea*), also poses a serious risk to the long-term viability of the remaining populations.

Given the small number of documented populations despite targeted botanical surveys, the species' restrictive/unique habitat requirements, the current threats posed by land use changes and invasive species, and the potential need for active management, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Crins, W. J. 2002. *Trichophorum*. Pages 28-31 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 23. Oxford University Press, New York, New York.
- Minnesota Department of Natural Resources, Division of Fish and Wildlife. 1995. Statement of need and reasonableness in the matter of proposed amendment of Minnesota Rules, Chapter 6134: endangered and threatened species. Minnesota Department of Natural Resources, St. Paul, Minnesota. 336 pp.
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- Ownbey, G.B. and T. Morley. 1991. Vascular plants of Minnesota: A checklist and atlas. University of Minnesota Press. 306pp.

SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Senecio indecorus* Greene

NEW SCIENTIFIC NAME: *Packera indecora* (Greene) A.& D. Lév

FAMILY: Asteraceae

COMMON NAME: Elegant Groundsel

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This boreal species is seemingly rare throughout the Upper Great Lakes region and occurs in northeastern Minnesota only where rugged topography and climate-modifying effects of Lake Superior influence the southerly reaches of the boreal biome. Not surprisingly, its habitat conditions are cool, moist, sandy, and gravelly to rocky. When Elegant Groundsel was designated a Special Concern species in 1996, it had only been documented a handful of times and most of the records were quite old. The lack of current data and systematic surveys prevented it from being assigned a more protective status at that time. Since then, a comprehensive botanical survey of northeastern Minnesota has been initiated by the Minnesota County Biological Survey, and much of the species' potential habitat has been searched. Only one additional population has been found, on a steep, crumbly sandstone slope and the adjacent rocky creek bank in Cut Face Creek Canyon in Cook County. The population consists of 3-4 small patches of plants totaling around 36 individuals.

While such rugged habitats may seem permanent and indestructible, the highly specialized plants that occur in them and their microhabitats are often vulnerable to human activities. Any activities that would result in the sloughing of substrates or increased erosion, such as recreational rock climbing, logging on adjacent upslope habitats, or the routing of recreational trails along cliff tops, could threaten the long-term viability of the species. The invasion of Orange Hawkweed (*Hieracium aurantiacum*), an aggressive non-native species, is also a concern.

Given the documentation of only one recent population despite targeted botanical surveys, the species' restrictive/unique habitat requirements and limited geographic range in the state, and the vulnerability of a single population to degradation or destruction, a status of Endangered is reasonable and needed.

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- Butters, F. K., and E. C. Abbe. 1953. A floristic study of Cook County, northeastern Minnesota. *Rhodora* 55:21-201.
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- Penskar, M. R. 2008. Special plant abstract for *Senecio indecorus* (rayless mountain ragwort). Michigan Natural Features Inventory, Lansing, Michigan. 3 pp.
- Trock, D. K. 2006. *Packera*. Pages 570-602 in *Flora of North America* Editorial Committee, editors. *Flora of North America north of Mexico*. Volume 20. Oxford University Press, New York, New York.
- Voss, E. G. 1996. Michigan Flora. Part III: Dicots Concluded. Cranbrook Institute of Science Bulletin 61 and University of Michigan Herbarium. Ann Arbor, Michigan. 622 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Shepherdia canadensis* (L.) Nutt.

FAMILY: Elaeagnaceae

COMMON NAME: Soapberry

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Soapberry is primarily a shrub of boreal and montaine regions, reaching Minnesota sporadically from the north. It has been documented several times in forests near the North Shore of Lake Superior, but most of the approximately 25 known records are from the northern border region in Cook, Lake, Roseau, and Kittson counties. While essentially a forest species, this shrub does not do well in deep shade, and it seems to thrive only under a thin canopy or along an exposed edge. It is also known to prefer calcareous substrates, which limits its distribution even further especially in the northeast, where substrates tend to be acidic. Extensive searches have found far fewer occurrences of this species than expected. This is true even where apparently suitable habitat exists. It is not known which factors limit its occurrence in Minnesota but it could be that our climate is only marginally suited for this species. Other factors could include soil conditions, availability of pollinators, and seed dispersal agents. On the basis of the small number of known populations and the small size of those populations, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 26 June 2009.

Smith, W. R. 2008. Trees and shrubs of Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 703 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Solidago sciaphila* Steele

FAMILY: Portulacaceae

COMMON NAME: Cliff Goldenrod

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: This distinctive perennial is endemic to the western Great Lakes region, where it typically occurs in crevices of sandstone or dolomite cliffs and outcrops. It may also occur in sandy or rocky soil, particularly on exposed bluffs. When designated a Special Concern species in Minnesota in 1984, Cliff Goldenrod had been documented just 14 times from the southeast corner of the state, and half of the records predated 1947. Since that time, targeted rare plant surveys of the region have been conducted by the Minnesota County Biological Survey and approximately 75 additional populations have been discovered. Given that the species is more abundant than previously thought, Special Concern status is no longer reasonable or needed.

SELECTED REFERENCES:

Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.

Semple, J. C., and R. E. Cook. *Solidago*. Pages 107-166 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 20. Oxford University Press, New York, New York.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Sparganium glomeratum* Laestad. ex Beurling

FAMILY: Sparganiaceae

COMMON NAME: Clustered Bur Reed

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: This aquatic plant was thought to be one of the rarest plants in Minnesota (and North America) when it was designated an Endangered species in 1984. By the time it was reclassified as Special Concern in 1996, the number of known Minnesota populations had increased tenfold. This trend has continued and the number of documented locations is now approaching 150, more than double what was known in 1996. Furthermore, the species has been documented from a broader range of wetland habitats throughout northern Minnesota, and none of the habitats appear to be particularly threatened. Clustered Bur Reed is clearly much more common and widely distributed in Minnesota than was formerly believed. For these reasons, Special Concern status is no longer needed or reasonable.

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Kaul, R. B. 2000. *Sparganium*. Pages 270-277 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 22 Oxford University Press, New York, New York.

Lakela, O. 1941. *Sparganium glomeratum* in Minnesota. Rhodora 43:83-85.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Spiranthes casei* var. *casei* Catling & Cruise

FAMILY: Orchidaceae

COMMON NAME: Case's Ladies' Tresses

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This rare orchid was first discovered in Minnesota in 2000 and has been documented at a total of four locations in a 20-mile long area in Itasca and St. Louis counties. So far it has only been found in drained sediment basins that had previously been used to dispose of taconite tailings. The fact that such habitats did not occur 30 years ago coupled with how rapidly the species was able to colonize the basins, leads us to believe that a stable seed source may occur in a nearby older habitat. This is supported by the occurrence of the species in sandstone bluff and jack-pine barren habitats in neighboring Wisconsin.

Case's Ladies' Tresses is an early successional, disturbance dependent species whose habitat will be overtaken by trees and shrubs if successional changes are able to proceed. The natural forces that periodically reset the successional process to an earlier stage, such as fire, insect infestations and windstorms, are large-scale ecological processes that likely do not function in the artificial tailings basins. As such, the long-term viability of these populations is questionable. The hope is that additional surveys will result in the species being found in a more natural habitat, or at least in a habitat that can be maintained by natural disturbances. Until that time, the small number of occurrences and the vulnerability of those occurrences make a status of Threatened reasonable and needed.

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- Catling, P. M. 1983. Pollination of northeastern North America *Spiranthes* (Orchidaceae). Canadian Journal of Botany 61:1080-1093.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Symphoricarpos orbiculatus* Moench

FAMILY: Caprifoliaceae

COMMON NAME: Coralberry

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: Coralberry is long-lived shrub that has a wide, natural range in the eastern United States, but is frequently cultivated as an ornamental outside of this range. A native population of the species was thought to have been located in Houston County in 1979 prompting the species' listing as Special Concern in 1984. However, 25 years later, no additional populations have been found and the origin of the Houston County population still remains in question. There are no known voucher specimens of Coralberry in any herbaria that were definitively collected from a native Minnesota population. Given the lack of evidence that the species is either native or naturalized in Minnesota, Special Concern status is no longer needed or reasonable.

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Smith, W. R. 2008. Trees and shrubs of Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 703 pp.

Stephens, H. A. 1973. Woody plants of the North Central Plains. The University Press of Kansas, Lawrence, Kansas. 530 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Taenidia integerrima* (L.) Drude

FAMILY: Apiaceae

COMMON NAME: Yellow Pimpernel

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial forb is an uncommon species of southeastern Minnesota, where it occurs in remnant oak savannas and open oak woodlands. Although this habitat type was common at the time of settlement, it has since become quite rare. Botanical surveys of most of the species' remaining habitats have been completed, and Yellow Pimpernel is now known to occur at only 30 sites. All of the populations are local and widely scattered across an 11-county area. There is concern that these remaining habitats may be too isolated and fragmented to have retained the ecosystem processes necessary for maintaining ideal habitat conditions and the perpetuation of the species. Furthermore, several of the populations are threatened by encroaching development and the spread of invasive species. For these reasons, a status of Special Concern is reasonable and needed.

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SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Talinum rugospermum* Holz.

NEW SCIENTIFIC NAME: *Phemeranthus rugospermus* (Holz.) Kiger

FAMILY: Portulacaceae

COMMON NAME: Rough-seeded Fameflower

CURRENT MINNESOTA STATUS: Endangered

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Rough-seeded Fameflower occurs primarily in open, sandy habitats including sandy terraces, fluvial sand dunes associated with rivers, and sand barrens. A secondary habitat is rock outcrops and dry, igneous rock ledges. When it was designated an Endangered species in 1984, it had only been documented from six sites. Since that time, targeted searches have resulted in the discovery of eight additional populations in southeastern Minnesota and four of the six previously known sites have been relocated. Given that the species is slightly more abundant than previously thought, Endangered status is no longer necessary. However, because overall population numbers are low, suitable habitats are quite limited, and several of the populations are threatened by agricultural activities or development pressures, it is reasonable and needed to retain the species in Threatened status.

SELECTED REFERENCES:

- Cochrane, T. S. 1993. Status and distribution of *Talinum rugospermum* Holz. (Portulacaceae). *Natural Areas Journal* 13(1):33-41.
- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
- Kiger, R. W. 2003. *Phemeranthus*. Pages 488-495 in *Flora of North America* Editorial Committee, editors. *Flora of North America north of Mexico*. Volume 4. Oxford University Press, New York, New York.
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- Pavlovic, N. B. 1995. Habitat disturbance, density dependence and the abundance of Fame Flower (*Talinum rugospermum*). Dissertation, University of Illinois at Chicago, Chicago, Illinois. xix + 198 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Thaspium barbinode* (Michx.) Nutt.

FAMILY: Apiaceae

COMMON NAME: Hairy-jointed Meadow-parsnip

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This perennial plant reaches the northwestern limit of its range in southern Minnesota, where it is restricted to edges of dry bluff forests. It appears to have an affinity for calcareous substrates. Based on specimens at the J. F. Bell Museum of Natural History Herbarium, the species has been collected from just eleven sites in Blue Earth, Brown, Jackson, Nicollet, and Winona counties. All but the Winona County collection are from the prairie region of the state, where forests are extremely restricted. Habitat descriptions are scanty, but the species appears to favor the edges of naturally-occurring dry- mesic forest remnants near major rivers.

Only three of the herbarium collections were made in the last 25 years, and all of these are from valleys of the Minnesota and Des Moines rivers. The rather open, dry forests in which the species occurs are frequently grazed, and when not, are highly subject to invasion by Common Buckthorn (*Rhamnus cathartica*). Because Hairy-jointed Meadow-parsnip bears a superficial resemblance to other members of the carrot family, it may have been overlooked in past surveys. Further survey work is needed to clarify the species' current distribution in the state, but Special Concern status is needed and reasonable at this time based on its apparent rarity.

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Kartesz, J. T. 1994. A synonymized checklist of the vascular flora of the United States, Canada, and Greenland. 2 volumes. Second Edition. Timber Press, Portland, Oregon.

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Wisconsin Department of Natural Resources. 2007. Hairy-jointed Meadow-parsnip (*Thaspium barbinode*) factsheet. <<http://dnr.wi.gov/org/land/er/biodiversity/index.asp?mode=info&Grp=20&SpecCode=PDAPI28010>>. Accessed 01 July 2009.

SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Trimorpha acris* var. *asteroides* (Andrz. ex Bess.) Nesom

NEW SCIENTIFIC NAME: *Erigeron acris* var. *kamtschaticus* (DC.) Herder

FAMILY: Asteraceae

COMMON NAME: Bitter Fleabane

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This circumboreal species occurs in northeastern Minnesota only where rugged topography and climate-modifying effects of Lake Superior influence the southerly reaches of the boreal biome. Having only been documented three times before in 1929, 1944, and 1945, Bitter Fleabane was suspected of being quite rare when designated a Special Concern species in 1996. However, a comprehensive field survey of its potential habitat had not yet been conducted. Since that time, targeted botanical inventories in northeastern Minnesota have been initiated by the Minnesota County Biological Survey, and most of the species' potential habitat has been searched. Only two additional populations have been found, confirming that this is one of the rarest plants in the state. Furthermore, none of the three previously recorded populations have been relocated.

The extant populations of Bitter Fleabane occur on the steep, canyon walls of a Lake Superior stream and on a steep, rocky, forested slope roughly two-miles inland from the lake. Both of the populations are very small with approximately eight flowering plants each. One of the populations is within the boundary of a state park, which presumably offers some degree of protection. However, even natural areas in state parks can be threatened by a host of recreational activities and nearby developments. The other population is on county land and currently threatened by rock climbing and trails. The spread and establishment of non-native species is a concern for both populations.

Given the species' restrictive/unique habitat requirements, the limited amount of potential habitat in the state, the documentation of only two recent populations despite targeted botanical surveys, the extremely small size of those populations, and the vulnerability of the two populations to degradation or destruction, a status of Endangered is reasonable and needed.

SELECTED REFERENCES:

- Given, D. R., and J. H. Soper. 1981. The arctic-alpine element of the vascular flora at Lake Superior. National Museum of Canada, Publications in Botany No. 10, Ottawa, Ontario. 70 pp.
- Minnesota Department of Natural Resources, Division of Fish and Wildlife. 1995. Statement of need and reasonableness in the matter of proposed amendment of Minnesota Rules, Chapter 6134: endangered and threatened species. Minnesota Department of Natural Resources, St. Paul, Minnesota. 336 pp.
- Minnesota Department of Natural Resources, Division of Ecological Resources. 2008. Rare species guide: an online encyclopedia of Minnesota's rare native plants and animals [web application]. Minnesota Department of Natural Resources, St. Paul, Minnesota. <www.dnr.state.mn.us/rsg>. Accessed 1 July 2009.
- Nesom, G. L. 2006. *Erigeron*. Pages 256-348 in Flora of North America Editorial Committee, editors. Flora of North America North of Mexico. Volume 20. Oxford University Press, New York, New York.
- Ownbey, G. B., and T. Morley. 1991. Vascular plants of Minnesota: a checklist and atlas. University of Minnesota Press, Minneapolis, Minnesota. 307 pp.
- Voss, E. G. 1996. Michigan Flora. Part III: Dicots Concluded. Cranbrook Institute of Science Bulletin 61 and University of Michigan Herbarium. Ann Arbor, Michigan. 622 pp.

SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Trimorpha lonchophylla* (Hook.) Nesom

NEW SCIENTIFIC NAME: *Erigeron lonchophyllus* Hook.

FAMILY: Asteraceae

COMMON NAME: Short Ray Fleabane

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: When Short Ray Fleabane was designated a Special Concern species in 1996, it was only known from ten locations in Wilkin, Polk, Norman, and Kittson counties in northwestern Minnesota. The species was suspected of having suffered a population decline given the drastic decline of its prairie wetland habitat, however, targeted botanical surveys had not yet been completed and threats to the populations had not been fully assessed. Since that time most, if not all, of the species' potential habitat has been surveyed by the Minnesota County Biological Survey and no additional populations have been discovered. Furthermore, continued habitat loss and degradation from development activities, livestock grazing, herbicide application, and the spread of invasive species have been identified as significant threats to the few remaining populations.

Given the small number of documented populations despite targeted botanical surveys, the limited amount of habitat in the state, the historic and present loss of prairie wetland habitats, and the vulnerability of the known populations to degradation or destruction, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Minnesota Department of Natural Resources, Division of Fish and Wildlife. 1995. Statement of need and reasonableness in the matter of proposed amendment of Minnesota Rules, Chapter 6134: endangered and threatened species. Minnesota Department of Natural Resources, St. Paul, Minnesota. 336 pp.
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- Ownbey, G. B., and T. Morley. 1991. *Vascular plants of Minnesota: a checklist and atlas*. University of Minnesota Press, Minneapolis, Minnesota. 307 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Trisetum spicatum* (L.) Richter

FAMILY: Poaceae

COMMON NAME: Spike Trisetum

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This arctic disjunct is restricted to the North Shore of Lake Superior, where it has been found in crevices of exposed bedrock along the shore and on the upper portions of basalt cliffs. Some potential habitat still remains to be surveyed, but given that the species has only been found at approximately 35 sites since its initial discovery in 1886, it appears to be quite rare. Furthermore, more than half of the documented locations haven't been seen since the 1940s. Only a decade ago it was assumed that rare plants along the bedrock shoreline of Lake Superior were adequately protected by the remoteness and inaccessibility of their habitat. Since then, the region has experienced a tremendous residential, recreational, and commercial boom. This has raised new concerns about the conservation needs of shore plants. Even activities as benign as hiking can become a serious threat if concentrated along fragile shoreline habitats. For these reasons, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

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Rumely, J. H. 2007. *Trisetum*. Pages 744-753 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 24. Oxford University Press, New York, New York.

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SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Tsuga canadensis* (L.) Carr.

NEW SCIENTIFIC NAME: *Tsuga canadensis* var. *canadensis* (L.) Carr.

FAMILY: Pinaceae

COMMON NAME: Eastern Hemlock

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Eastern Hemlock is one of Minnesota's rarest and most imperiled trees. Where found, it is usually scattered in mixed hardwood-conifer forests with Yellow Birch (*Betula alleghaniensis*), Northern White Cedar (*Thuja occidentalis*), White Pine (*Pinus strobus*), or White Spruce (*Picea glauca*), typically on moist, well-drained soils in cool, sheltered valleys and ravines. It has always been relatively rare in Minnesota, which represents the northwestern edge of its range, but has suffered a population decline during the last century and a half. Logging, poor reproduction and recruitment, and significant deer browse have all contributed to the decline. Currently, there are only 19 known sites containing Eastern Hemlock, with a total of perhaps 50 mature trees. The largest population consists of just 12 mature trees. Other sites may have only a single tree, and rarely more than four or five. Furthermore, all but one of the sites exhibit little, if any, reproduction. Without extraordinary management efforts to protect hemlock seedlings from deer, it is unlikely that another generation of trees will be able to establish themselves. Eastern Hemlock has become so rare that it no longer has any significant value to the timber industry in Minnesota.

Given the very small number of populations in Minnesota, the small size of those populations, the species' limited geographic range in the state, and serious concerns over the long term viability of the few remaining populations, a status of Endangered is reasonable and needed.

SELECTED REFERENCES:

- Anderson, R. C. and O. L. Loucks. 1979. White-tail deer (*Odocoileus virginianus*) influence on structure and composition of *Tsuga canadensis* forests. *Journal of Applied Ecology* 16:855-861.
- Calcote, R. R. 1986. Hemlock in Minnesota: 1200 years as a rare species. M.S. Thesis, University of Minnesota, Minneapolis, Minnesota.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Utricularia geminiscapa* Benj.

FAMILY: Lentibulariaceae

COMMON NAME: Hidden-fruit Bladderwort

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This floating aquatic plant reaches the western edge of its range in Minnesota and was first recorded in the state in Lake County in 2004. It has been documented five times since then in a handful of bog pools and poor fens in the northern half of the state. Since the availability of such habitat types does not appear to be a limiting factor, the species may have very specific microhabitat requirements that are not well understood. Some potential habitat still remains to be searched, but it is not expected that many additional populations will be found.

All of the known populations of Hidden-fruit Bladderwort are very small and local in distribution, and they have not successfully proliferated in available habitats. Furthermore, all are located in close proximity to roads and trails, thereby increasing the potential for disturbance from human activities, particularly off-road vehicle use and the introduction of invasive species. Changes in water levels that could result from poorly designed or maintained roads, deterioration of water quality, shifts in pH as a result of surrounding land uses, liming for fisheries management, or intensive leech harvesting could also contribute to the degradation of the species' sensitive bog and fen habitat.

Given the small number and size of populations in Minnesota, the absence of the species in apparently suitable habitat, its seemingly restrictive habitat requirements, and the vulnerability of the known populations to degradation or destruction, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Fassett, N. C. 1957. A manual of aquatic plants. University of Wisconsin Press, Madison, Wisconsin. 405 pp.
- Taylor, P. 1989. The genus *Utricularia*: a taxonomic monograph. Kew Bulletin Additional Series XIV. Royal Botanic Gardens, Kew, London. 724 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Utricularia purpurea* Walt.

FAMILY: Lentibulariaceae

COMMON NAME: Purple-flowered Bladderwort

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This floating, aquatic plant reaches the northwestern edge of its range in Minnesota, and was first recorded from two sites in Cass County in 1992. By the time it was designated a Special Concern species in 1996, four additional occurrences had been found in shallow, bog-lined lakes in Cass, Pine, and Crow Wing counties. At that time, the species' habitat was presumed to be secure from most human disturbances, and there was an assumption that additional populations would be found once more surveys had been conducted. While the latter is true, the results are extremely disappointing. In botanical surveys of more than 1,500 lakes since then, only three additional populations have been located. This brings the total number of known populations in the state to nine. Furthermore, the significant increase in lakeshore development over the past decade now poses a serious risk to the long-term viability of the species. Activities typically associated with lakeshore developments, namely nutrient enrichment, increased sedimentation, herbicide application, and vegetation management, all threaten to degrade the species' aquatic habitat. Because lakes are fluid and typically contained systems, it only takes a perturbation at one location to have far reaching effects and impact an entire aquatic community. Purple-flowered Bladderwort is only found in lakes with very low alkalinity, so any changes in a lake's water chemistry could render the habitat unsuitable.

Given the very small number of documented populations despite targeted botanical surveys, the limited amount of potential habitat for the species in the state, the increasing statewide pressure on lakeshore habitats, and the vulnerability of the few known populations to degradation or destruction, a status of Endangered is reasonable and needed.

SELECTED REFERENCES:

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Taylor, P. 1989. The genus *Utricularia*: a taxonomic monograph. Kew Bulletin Additional Series XIV. Royal Botanic Gardens, Kew, London. 724 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Utricularia resupinata* B.D. Greene ex Bigelow

FAMILY: Lentibulariaceae

COMMON NAME: Lavender Bladderwort

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This carnivorous, aquatic plant reaches the periphery of its range in northeastern Minnesota, where it has been found in the shallow waters of protected bays in large, oligotrophic lakes. When it was designated a Special Concern species in 1996, it was known from just five lakes in the Border Lakes region of Cook and Lake counties. The hope was that unexplored potential habitat would produce more records once further surveys were conducted. Botanical surveys of over 1,500 lakes have now been completed by the Minnesota County Biological Survey, and only ten additional populations have been documented in the state. Just two of the populations are located outside of the Border Lakes region, with one in central St. Louis County and one in northeastern Itasca County.

Lavender Bladderwort typically only occurs where lake bottoms are sandy, gradually sloping, and free of competition from other plant species. In some of the habitats, the plants may become stranded above the water line as the shoreline recedes during the course of the summer. Most of the known populations are within the Boundary Waters Canoe Area Wilderness and as such, they receive a high degree of protection from large-scale human disturbance. However, this particular wilderness area is heavily used by recreationalists, and shallow, sandy bays are a great attraction to visitors. While casual visitation, including canoeing, swimming, and fishing should not harm the species, establishing a campsite in an occupied bay or routing a portage to or from a bay could threaten the long-term viability of a population. There is much greater concern for the two Lavender Bladderwort populations located outside of the wilderness area, as they are subject to the increasing development pressures placed on the state's shoreline habitats. All of the populations would be vulnerable to changes in lake water chemistry or modifications to hydrological regimes.

Given the small number of documented populations despite targeted botanical surveys, the species' unique and potentially restrictive habitat requirements, its limited geographic range in the state, and the inherent vulnerability of a few populations to degradation or destruction, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
- Fassett, N. C. 1957. A manual of aquatic plants. University of Wisconsin Press, Madison, Wisconsin. 405 pp.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Vaccinium uliginosum* L.

FAMILY: Ericaceae

COMMON NAME: Alpine Bilberry

CURRENT MINNESOTA STATUS: Threatened

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: This arctic/subarctic shrub has only been documented three times in Minnesota, all from the North Shore of Lake Superior in Cook County. It was originally discovered near Grand Portage in 1891 and subsequently collected a few kilometers away on Long Island in 1937. In 1982, the Grand Portage site was relocated after a period of 91 years. The island site was revisited in 1980, but the Alpine Bilberry population could not be located. While the species' rarity was apparent when it was designated a Threatened species in 1984, it was hoped that additional intensive searches of shoreline habitats would yield more records. Unfortunately, this has not been the case and the Grand Portage population is the only one currently known to occur in Minnesota. The site is rather isolated and not obviously threatened by human activities. Nevertheless, the low number of plants in such a small area makes it susceptible to extirpation by natural processes such as ice scouring and storm waves, as well as from human factors. On the basis of extreme rarity, a status of Endangered is reasonable and needed.

SELECTED REFERENCES:

- Butters, F. K., and E. C. Abbe. 1953. A floristic study of Cook County, northeastern Minnesota. *Rhodora* 55:21-201.
- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
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- Schori, M. 2004. Conservation assessment for Alpine Bilberry (*Vaccinium uliginosum*) L. United States Forest Service, Eastern Region, Milwaukee, Wisconsin. 45 pp.
- Smith, W. R. 2008. Trees and shrubs of Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 703 pp.
- Voss, E. G. 1996. Michigan Flora. Part III: Dicots Concluded. Cranbrook Institute of Science Bulletin 61 and University of Michigan Herbarium. Ann Arbor, Michigan. 622 pp.
- Young, S. B. 1970. On the taxonomy and distribution of *Vaccinium uliginosum*. *Rhodora* 72:439-57.

SPECIES STATUS SHEET

OLD SCIENTIFIC NAME: *Vitis aestivalis* Michx.

NEW SCIENTIFIC NAME: *Vitis aestivalis* var. *bicolor* Deam

FAMILY: Vitaceae

COMMON NAME: Silverleaf Grape

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This climbing vine reaches the northwestern limit of its range in southeastern Minnesota. It appears to be restricted to hardwood forests in Houston, Wabasha, and Winona counties, where the terrain is defined by deep valleys and tall bluffs. Silverleaf Grape prefers oak forests, especially the margins of oak forests where there is more sunlight, but it also occurs in brushy habitats and in pioneering stands of young forest trees. While its rarity was apparent when it was designated a Special Concern species in 1996, the degree of its rarity had not yet been realized. In more than a decade of botanical surveys since its initial listing, only one additional population has been found. This brings the total number of historical and recent populations to eleven. Furthermore, at least one of the populations is known to have been partially destroyed, presumably in a misguided effort to manage the forest for the benefit of individual canopy trees rather than the forest community as a whole. Under certain conditions in highly disturbed forests, Silverleaf Grape can grow rampantly, clambering over shrubs and tree saplings. However, the potential damage caused to a host should not be overemphasized; this vine is a rare and benign member of the natural forest community to which it is well adapted.

Given the limited amount of potential habitat for the species in the state and its limited geographic range, the small number of documented populations despite years of botanical surveys, and the vulnerability of known populations to degradation or destruction, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Comeaux, B. L., W. B. Nesbitt, and P. R. Fantz. 1987. Taxonomy of the native grapes of North Carolina. *Castanea* 52:197-215.
- Minnesota Department of Natural Resources, Division of Fish and Wildlife. 1995. Statement of need and reasonableness in the matter of proposed amendment of Minnesota Rules, Chapter 6134: endangered and threatened species. Minnesota Department of Natural Resources, St. Paul, Minnesota. 336 pp.
- Minnesota Department of Natural Resources, Division of Ecological Resources. 2008. Rare species guide: an online encyclopedia of Minnesota's rare native plants and animals [web application]. Minnesota Department of Natural Resources, St. Paul, Minnesota. <www.dnr.state.mn.us/rsg/>. Accessed 1 July 2009.
- Moore, M. O. 1991. Classification and systematics of eastern North American *Vitis* L. (Vitaceae) north of Mexico. *Sida* 14:339-367.
- Ownbey, G. B., and T. Morley. 1991. Vascular plants of Minnesota: a checklist and atlas. University of Minnesota Press, Minneapolis, Minnesota. 307 pp.
- Smith, W. R. 2008. Trees and shrubs of Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 703 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Woodsia alpina* (Bolton) S.F. Gray

FAMILY: Dryopteridaceae

COMMON NAME: Alpine Woodsia

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: This small fern is found in crevices and on small ledges of moist, partially shaded cliffs. In Minnesota, it is restricted to only 32 locations in Lake and Cook counties. While its rarity was suspected when it was designated a Special Concern species in 1996, a comprehensive survey of potential habitat had not yet been conducted. Since that time, targeted botanical inventories in northeastern Minnesota have been initiated by the Minnesota County Biological Survey, and much of the species' potential habitat has been searched. The discovery of so few populations confirms that this is indeed a very rare plant in the state.

Almost all of the sites harboring this rare fern are along the shore of Lake Superior where development pressures are great and increasing every year. Of particular concern are threats related to trail and road construction, recreational rock climbing, and timber management. These threats are especially problematic because most of the Alpine Woodsia locations contain only a few plants, and extirpations could occur as a result of even small disturbances. Given the species' restrictive/unique habitat requirements, the limited amount of potential habitat in the state, the small number of documented populations despite targeted botanical surveys, the small size of those populations, and the vulnerability of the populations to degradation or destruction, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Brown, D. F. M. 1964. A monographic study of the fern genus *Woodsia*. Nova Hedwigia 16:1-154.
- Butters, F. K., and E. C. Abbe. 1953. A floristic study of Cook County, northeastern Minnesota. Rhodora 55:21-201.
- Gerdes, L. B. 2001. A contribution to the flora of the Rove Slate Bedrock Complex Landtype Association, northern Cook County, Minnesota, USA. Thesis, Michigan Technological University, Houghton, Michigan. 79 pp.
- Lakela, O. 1965. A flora of northeastern Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 541 pp.
- Minnesota Department of Natural Resources, Division of Fish and Wildlife. 1995. Statement of need and reasonableness in the matter of proposed amendment of Minnesota Rules, Chapter 6134: endangered and threatened species. Minnesota Department of Natural Resources, St. Paul, Minnesota. 336 pp.
- Minnesota Department of Natural Resources, Division of Ecological Resources. 2008. Rare species guide: an online encyclopedia of Minnesota's rare native plants and animals [web application]. Minnesota Department of Natural Resources, St. Paul, Minnesota. <www.dnr.state.mn.us/rsg>. Accessed 1 July 2009.
- Ownbey, G. B., and T. Morley. 1991. Vascular plants of Minnesota: a checklist and atlas. University of Minnesota Press, Minneapolis, Minnesota. 307 pp.
- Windham, M. D. 1993. *Woodsia*. Pages 270-280 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 2. Oxford University Press, New York, New York.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Woodsia oregana* ssp. *cathcartiana* (B.L. Robins.) Windham

FAMILY: Dryopteridaceae

COMMON NAME: Oregon Woodsia

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: This small fern occurs in crevices of bedrock exposures (both granite and sedimentary) and on associated talus. It has been reported from approximately 35 sites although targeted surveys have not been completed. A few of the locations are from steep, cliff faces in northeastern Minnesota and from bluffs in southeastern Minnesota. However, the bulk of the occurrences are from rock outcrop communities in the Upper Minnesota River valley and Pipestone and Rock counties. Rock quarrying, cattle grazing, and herbicide application currently threaten this rare community type and its associated flora. Mining in particular has been a growing issue over the past decade, fueled by federal highway construction standards now requiring crushed bedrock instead of gravel. Until further survey work can be completed for this species and threats to the populations are adequately assessed, a status of Special Concern is needed and reasonable.

SELECTED REFERENCES:

Harris, F. 2009. Rock pools on the prairie. *Minnesota Conservation Volunteer* 72(423):30-39.

Minnesota County Biological Survey. 2007. Native plant communities and rare species of the Minnesota River valley counties. Minnesota Department of Natural Resources, Division of Ecological Resources, St. Paul, Minnesota. 153 pp.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 7 May 2009.

Windham, M. D. 1993. *Woodsia*. Pages 270-280 in *Flora of North America* Editorial Committee, editors. *Flora of North America north of Mexico*. Volume 2. Oxford University Press, New York, New York.

LICHENS

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Amygdalaria panaeola*

FAMILY: Porpidiaceae

COMMON NAME: Powdery Almond Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Powdery Almond Lichen is distributed across parts of the east coast of Canada, the Adirondack Mountains, Ontario, Alaska, Washington, and Isle Royale in Lake Superior. This crustose lichen occurs on non-calcareous rocks and boulder fields, often near lakes or streams. In Minnesota, this lichen has only been found at a single locality in Cook County. While it was first reported in the 1930's, no further collections of this species were recorded in the state until 2002, and surveys have failed to locate additional occurrences. The main threats to the Powdery Almond Lichen in Minnesota are habitat loss and degradation due to shoreline development and foot traffic. Because of its highly restricted range at a single known locality in Minnesota and the potential threats to its habitat, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

- Brodo, I., and H. Hertel. 1987. The lichen genus *Amygdalaria* (Porpidiaceae) in North America. *Herzogia* 7: 493-521.
- Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. *Lichens of North America*. Yale University Press, New Haven and London. 795 pp.
- Fink, B. 1935. *The Lichen Flora of the United States*. University of Michigan Press, Ann Arbor. 426 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Arctoparmelia centrifuga*

FAMILY: Parmeliaceae

COMMON NAME: Concentric Ring Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Concentric Ring Lichen is a foliose lichen that is found primarily in arctic regions, and it reaches its southernmost North American distribution in northern Minnesota. It occurs on sunny non-calcareous rocks and talus slopes in humid localities, especially along Lake Superior. The Concentric Ring Lichen was first reported in Minnesota in the 1930's, and no further collections of this species were recorded until 2002. To date, only four localities of this species are known in the state in Cook and Lake Counties despite extensive surveys of suitable shoreline habitat over the past 30 years. The main threats to Concentric Ring Lichen populations in Minnesota are habitat loss and degradation due to shoreline development and foot traffic. Because of its restricted range, the few known localities despite extensive survey effort, and the potential threats to its habitat, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.

Fink, B. 1935. The Lichen Flora of the United States. University of Michigan Press, Ann Arbor. 426 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Arctoparmelia subcentrifuga*

FAMILY: Parmeliaceae

COMMON NAME: A Species of Ring Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: *Arctoparmelia subcentrifuga* is a rare, foliose lichen that has a northern distribution, and it reaches its southernmost North American range in northern Minnesota. It occurs on sunny non-calcareous rocks and talus slopes in humid localities, especially along lakes. In Minnesota, this species is only known from two locations in Cook County despite extensive searches of suitable shoreline habitat over the past 30 years as well as recent, targeted survey efforts for lichens in the northeastern part of the state. The main threats to *Arctoparmelia subcentrifuga* populations in Minnesota are habitat loss and degradation due to shoreline development and foot traffic. Because of its restricted range, the few known localities despite extensive survey effort, and the potential threats to its habitat, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

Hale, M. 1986. *Arctoparmelia*, a new genus in the Parmeliaceae (Ascomycota). *Mycotaxon* 25: 251-254.

Vitikainen, O., and T. Dudoreva. 2003. *Arctoparmelia subcentrifuga* new to Europe. *Graphis Scripta* 14: 3-4.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Arthrorhaphis citrinella*

FAMILY: Arthrorhaphidaceae

COMMON NAME: Golden-dot Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Golden-dot Lichen is a bright-yellow, crustose lichen that occurs on soil over acidic rocks and in rock cracks in boreal and alpine habitats. Its North American distribution includes Maine, Colorado, and Montana, but this species also has a disjunct occurrence in northern Minnesota where it has only been documented at a single locality in Cook County. Extensive surveys have failed to find additional occurrences of this species. This lichen is highly susceptible to disturbance of the soils where it occurs, and although the one known locality is somewhat removed from land development, there is no legal protection for the site. Therefore, given the documentation of only a single, isolated occurrence of Golden-dot Lichen in the state and its vulnerability to disturbance, Threatened status is reasonable and needed.

SELECTED REFERENCES:

Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.

Hansen, E. and W. Obermayer. 1999. Notes on *Arthrorhaphis* and its lichenicolous fungi in Greenland. Bryologist 102: 104-107.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Bryoria fuscescens*

FAMILY: Alectoriaceae

COMMON NAME: Pale-footed Horsehair Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Pale-footed Horsehair Lichen is a brown, shrubby, hanging fruticose lichen that grows on coniferous trees and occasionally on birch. It occurs throughout the boreal zone in North America and parts of the United States including the Pacific Northwest, but is rare south of the Great Lakes in the central United States. In Minnesota, the Pale-footed Horsehair Lichen has only been documented at a few locations in Cass, Cook, and Lake counties although extensive surveys have been conducted. It is vulnerable to frequent logging of coniferous forests, as these activities may not provide the species the time necessary for colonization and dispersal. Due to its limited range and the low number of known occurrences in the state, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

Brodo, I. and D. Hawksworth. 1977. *Alectoria* and allied genera in North America. Opera Botanica 42: 1-164.

Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Buellia nigra*

FAMILY: Physciaceae

COMMON NAME: Black Disc Lichen

CURRENT MINNESOTA STATUS: Endangered

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Black Disc Lichen is a crustose lichen whose worldwide distribution is limited to Minnesota and a single locality in South Dakota. Its preferred substrate is non-calcareous rock in exposed sunny areas of prairie habitat, sometimes near the edge of hardwood forests. The Black Disc Lichen was originally collected in 1900 from Otter Tail County, where it occurred on moraines with granite boulders and limy soil. A second location in Winona County was discovered in 1978. Based on its very limited range in the state and concerns about habitat loss at the only recent collection site in Winona County, the Black Disc Lichen was designated an Endangered Species in 1984.

A 1997-1999 botanical inventory initiated by the Minnesota DNR's County Biological Survey resulted in a better understanding of the Black Disc Lichen's distribution and ecology in Minnesota. Since 1997, this species has been documented on outcrops at 18 sites in southcentral and western Minnesota, including along the Minnesota River valley. To date, the Black Disc Lichen is now known from a total of 20 localities in 14 counties in the state. This lichen is small and easily overlooked, and while usually rare, it has been found in abundance in some locations. Ecological changes due to agricultural activities in nearby fields may pose a potential threat to the Black Disc Lichen. Because this species is now known to be more widely distributed in Minnesota than was formerly believed, Endangered status is no longer necessary. However, it is reasonable and needed to retain the species in Special Concern status given its global center of abundance in Minnesota and its vulnerability to potential land use changes.

SELECTED REFERENCES:

- Coffin, B., and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. University of Minnesota Press, Minneapolis, Minnesota. 473 pp.
- Fink, B. 1902. Contributions to a knowledge of the lichens of Minnesota VI. Lichens of northwestern Minnesota. Minnesota Botanical Studies 2:657-709.
- Fink, B. 1935. The Lichen Flora of the United States. University of Michigan Press, Ann Arbor. 426 pp.
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- Sheard, J. W. 1969. Four previously misinterpreted *Buellia* species from North America. The Bryologist 72:220-24.
- Wetmore, C. M. 1981 (revised 2005). *Keys to the Lichens of Minnesota*. Department of Plant Biology, University of Minnesota, St. Paul, Minnesota. 92 pp.
- Wheeler, G. A. 1999. New localities for *Buellia nigra* in Minnesota and the first report of this crustose lichen from South Dakota. The Michigan Botanist 38(4):51-56.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Caloplaca stellata*

FAMILY: Teloschistaceae

COMMON NAME: A Species of Firedot Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: *Caloplaca stellata* is an orange crustose lichen that occurs on shady non-calcareous rock cliffs. It has a scattered distribution west of the Rocky Mountains in North America and rare occurrences in South Dakota and Minnesota. Despite extensive surveys to locate other populations of *Caloplaca stellata* in the state, it has only been documented at three localities in Cook and Wabasha counties. Alteration of the surrounding vegetation can destroy the critical habitat for this species. Given its rarity, disjunct distribution in the state, and vulnerability to habitat alteration, Special Concern status is needed and reasonable.

SELECTED REFERENCES:

USGS. 2008. NP Lichen: A database of lichens in the U.S. National Parks. Version 4.5. U.S. Geological Survey, Ashland, WI. < <http://www.ies.wisc.edu/nplichen>>. Accessed 30 September 2009.

Wetmore, C. and Kärnefelt. 1998. The lobate and subfruticose species of *Caloplaca* in North and Central America. *Bryologist* 101: 230-255.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Heterodermia obscurata*

FAMILY: Physciaceae

COMMON NAME: Orange-tinted Fringe Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Orange-tinted Fringe Lichen is distributed in the southern United States from Florida to Arizona and reaches its northernmost North American distribution in Minnesota. This foliose lichen typically occurs in partial shade on tree bark in moist habitats such as cedar swamps, and in Minnesota is known only from a single locality in Cass County despite survey efforts to locate additional occurrences in the state. The Orange-tinted Fringe Lichen is vulnerable to disturbance of its habitat due to logging, road or building construction. Because of the single known locality in Minnesota and potential threats to its habitat, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.

Wetmore, C. 1988. Lichens and air quality in Sleeping Bear Dunes National Lakeshore. Michigan Botanist 27: 111-118.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Lecanora epanora*

FAMILY: Lecanoraceae

COMMON NAME: A Species of Rim-lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: *Lecanora epanora* is a crustose lichen that grows on siliceous rocks in shady habitat. Its North American distribution is restricted to British Columbia and a single locality in Cook County, Minnesota. Extensive surveys have been conducted to locate additional occurrences of this species in the state, but none have been found to date. Although the one known locality is somewhat removed from land development, there is no legal protection for the site. Given the documentation of only a single, isolated location in the state and concerns about its long-term viability, Threatened status is reasonable and needed.

SELECTED REFERENCES:

Brodo, I. W. Noble, T. Ahti, and S. Clayden. 1987. Lichens new to North America from the flora of British Columbia, Canada. Mycotaxon 28: 99-110.

Esslinger, T.L. and R.S. Egan. 1995. A sixth checklist of the lichen-forming, lichenicolous, and allied fungi of the continental United States and Canada. The Bryologist 98(4):467-549.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Lobaria quercizans*

FAMILY: Lobariaceae

COMMON NAME: Smooth Lungwort

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: Smooth Lungwort is a foliose lichen that is primarily restricted to the northeastern United States, the Appalachian Mountains, and the Great Lakes region, and it occurs at the northwestern limit of its continental range in Minnesota. This lichen grows on the bark of older deciduous trees such as yellow birch, northern white cedar, and sugar maple, but has also been found growing on ash trees and on rocks. Smooth Lungwort appears to favor old-growth forests with mixed vertical structure, and is often found in partial shade near wet openings where moss is usually present. Historically, this species was known from ten localities in the northeastern part of the state and was listed as a Threatened species in Minnesota in 1984. However, it was subsequently reclassified to Special Concern status in 1996 after it was discovered at a number of new locations during surveys of old-forest areas.

Since 1996, additional surveys have discovered Smooth Lungwort at 19 sites in Cook, Lake, and St. Louis counties, and there are now 41 records of this lichen in five counties in Minnesota. Because this species is now known to be quite common in old, uncut hardwood forests in the northern part of the state, the only serious threat to the survival of this lichen in Minnesota would be wide-scale clearcutting of these old-growth trees. For these reasons, Special Concern status is no longer needed or reasonable.

SELECTED REFERENCES:

- Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.
- Coffin, B. and L. Pfannmuller, editors. 1988. Minnesota's endangered flora and fauna. Univ. of Minnesota Press. Minneapolis.
- Fink, B. 1935. The Lichen Flora of the United States. University of Michigan Press, Ann Arbor. 426 pp.
- Jordan, W.P. 1973. The genus *Lobaria* in North America north of Mexico. The Bryologist 76:225-51.
- Minnesota Department of Natural Resources, Division of Ecological Resources. 2008. Rare species guide: an online encyclopedia of Minnesota's rare native plants and animals [Web Application]. Minnesota Dept. of Natural Resources, St. Paul, Minnesota. < <http://www.dnr.state.mn.us/rsg> >. Accessed 02 July 2009.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Melanelia subolivacea*

FAMILY: Parmeliaceae

COMMON NAME: Brown-eyed Camouflage Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Brown-eyed Camouflage Lichen is primarily found west of the Great Plains of the United States, but also has a disjunct distribution in northern forests in the Great Lakes area. This brown foliose lichen occurs on both hardwood and conifer trees and is known from four localities in Minnesota: three in St. Louis County and one in Clearwater County. Extensive surveys have been conducted to locate additional populations in the state, but none have been found. The Brown-eyed Camouflage Lichen is vulnerable to disturbance of its habitat due to logging, road or building construction. Because of its rarity in Minnesota and potential threats to its habitat, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.

Esslinger, T. 1977. A chemosystematic revision of the brown *Parmeliae*. Journal of the Hattori Botanical Laboratory 42: 1-211.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Menegazzia terebrata*

FAMILY: Parmeliaceae

COMMON NAME: Port-hole Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Port-hole Lichen is distributed along the west coast of the United States and is also found in New England, the Appalachian Mountains, and the Great Lakes region. Minnesota lies at the northwestern edge of this species' continental range, where it occurs on bark of older conifers, particularly white cedar trees, in bog/swamp habitat in the northeastern part of the state. Despite widespread surveys in northern Minnesota, the Port-hole Lichen has only been documented at ten locations in Cook, Lake, and St. Louis counties, and most of these occurrences consist of single individuals. Extensive disturbance of old growth cedar bogs, particularly from logging and road construction, is the main threat to the continued persistence of this species in Minnesota. Therefore, based on the limited number and small size of Port-hole Lichen populations in the state and their vulnerability to habitat disturbance, a status of Special Concern is needed and reasonable.

SELECTED REFERENCES:

- Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.
- Fink, B. 1935. The Lichen Flora of the United States. University of Michigan Press, Ann Arbor. 426 pp.
- U.S. Forest Service. 2002. Conservation assessment for port-hole lichen (*Menegazzia terebrata*) Hoffm. Massal. USDA Forest Service, Eastern Region, March 2002. 15 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Ochrolechia androgyna*

COMMON NAME: Powdery Saucer Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Powdery Saucer Lichen has a circumpolar arctic distribution with its southernmost range limits in the upper Great Lakes area of the United States. This whitish crustose lichen typically occurs on conifer bark, but has also been found on rock in coniferous forests. Despite extensive survey effort, the Powdery Saucer Lichen is only known from four localities in Cook and St. Louis counties in Minnesota, and most of these occurrences consist of single individuals. The main threat to this species' continued existence in the state is widespread habitat disturbance. Based on the limited number and small size of Powdery Saucer Lichen populations in Minnesota and their vulnerability to disturbance, a status of Special Concern is needed and reasonable.

SELECTED REFERENCES:

- Brodo, I. 1991. Studies in the lichen genus *Ochrolechia*. 2. Corticolous species of North America. Canadian Journal of Botany 69: 733-772.
- Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Peltula bolanderi*

FAMILY: Peltulaceae

COMMON NAME: Bolander's Peltula Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Bolander's Peltula Lichen is primarily found in the southwestern United States with disjunct occurrences in North Dakota, South Dakota, and a single locality in Lake of the Woods County, Minnesota. While this species typically occurs on non-calcareous rocks in dry habitats, the Lake of the Woods population was found on steep rocks near a river. Shoreline development along the river threatens the long-term viability of this population, and no additional occurrences of the lichen have been found in the state despite extensive surveys of suitable habitat. Given the documentation of only a single, isolated population and the threats to its habitat, it is needed and reasonable to classify the Bolander's Peltula Lichen as a Threatened species in Minnesota.

SELECTED REFERENCES:

Büdel, B and T. Nash. 2002. *Peltula* in Nash, T, B. Ryan, C. Greies, and F. Bungartx. 2001. Lichen Flora of the Greater Sonoran Desert Region 1: 331-340.

Wetmore, C. 1970. The lichen family Heppiaceae in North America. Ann. Missouri Botanical Garden 57: 158-209.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Platismatia glauca*

FAMILY: Parmeliaceae

COMMON NAME: Ragbag Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Ragbag Lichen is a gray foliose lichen that has a boreal distribution, and it reaches its southernmost North American distribution in extreme northeastern Minnesota. This species occurs on coniferous tree bark and decayed logs in humid northern habitats along Lake Superior, and only two occurrences are known in Minnesota from the Susie Islands off of Cook County despite extensive survey effort. Construction of buildings can disturb the moist shorelines where the Ragbag Lichen occurs, and because most populations consist of single individuals, this disturbance can result in local extirpation of the lichen. Based on the restricted range and limited number of Ragbag Lichen occurrences in the state and their vulnerability to disturbance, a status of Special Concern is needed and reasonable.

SELECTED REFERENCES:

Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.

Esslinger, T.L. and R.S. Egan. 1995. A sixth checklist of the lichen-forming, lichenicolous, and allied fungi of the continental United States and Canada. The Bryologist 98(4):467-549.

Williams, C. and S. Sillett. 2007. Epiphyte communities on redwood (*Sequoia sempervirens*) in northwestern California. Bryologist 110: 420-452.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Protopannaria pezizoides*

FAMILY: Pannariaceae

COMMON NAME: Brown-gray Moss-shingle Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Brown-gray Moss-shingle Lichen is a boreal species of lichen that reaches its southernmost North American distribution in northeastern Minnesota. This species occurs on soil and moss in moist habitats, and in Minnesota it is only known from a single old growth white cedar bog in Lake County despite extensive survey efforts to locate additional records. The Brown-gray Moss-shingle Lichen is sensitive to habitat disturbance that would reduce moisture levels and threatened its continued survival. Therefore, given the documentation of only a single, isolated occurrence of this species in Minnesota, its low abundance, and concerns about its long-term viability, Threatened status is reasonable and needed.

SELECTED REFERENCES:

Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.

Esslinger, T.L. and R.S. Egan. 1995. A sixth checklist of the lichen-forming, lichenicolous, and allied fungi of the continental United States and Canada. The Bryologist 98(4):467-549.

Jorgensen, P. M. 2000. Survey of the lichen family Pannariaceae on the American Continent, north of Mexico. The Bryologist 103(4): 670-704.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Ramalina roesleri*

FAMILY: Ramalinaceae

COMMON NAME: Frayed Ramalina Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Frayed Ramalina Lichen has a discontinuous boreal distribution that includes a rare, isolated occurrence at the southern edge of its continental range in extreme northeastern Minnesota. This distinctive yellow-green fruticose lichen was found growing on bark of an old white cedar near the shore of Lake Superior in Cook County, and although extensive surveys have been conducted to locate additional occurrences in the state, none have been found. While this one known locality is somewhat removed from land development pressures, given the documentation of only a single, isolated occurrence of the Frayed Ramalina Lichen in Minnesota and its low abundance at this locality, Threatened status is needed and reasonable.

SELECTED REFERENCES:

Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.

Williams, C. and S. Sillett. 2007. Epiphyte communities on redwood (*Sequoia sempervirens*) in northwestern California. Bryologist 110: 420-452.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Ramalina thrausta*

FAMILY: Ramalinaceae

COMMON NAME: Angel's Hair Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Angel's Hair Lichen is an uncommon boreal species whose North American distribution includes southern Canada, Michigan, Isle Royale, Minnesota, and parts of the western United States. This yellow-green fruticose lichen occurs on trees, especially conifers, in very humid environments in northern localities. Despite extensive surveys of suitable habitat, this species is only known in Minnesota from three locations in Cook County. The Angel's Hair Lichen requires undisturbed, humid habitats and is sensitive to air pollution. Because of its restricted range, habitat requirements, and few known localities in the state, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

Bowler, P. 1977. *Ramalina thrausta* in North America. Bryologist 80: 529-532.

Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Stereocaulon pileatum*

FAMILY: Stereocaulaceae

COMMON NAME: Pixie Foam Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The distribution of the Pixie Foam Lichen in North America includes New England, the southern Appalachian Mountains, and disjunct occurrences in the upper Great Lakes in Michigan and Minnesota. This small, gray fruticose lichen is found on non-calcareous rocks, often near water. Despite extensive surveys of suitable habitat, this species is only known in Minnesota from five localities in Cook and Lake counties. The main threat to the Pixie Foam Lichen is habitat destruction due to foot traffic or the building of roadways. Because of its restricted range and few known localities in the state, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.

Dey, J. 1978. Fruticose and foliose lichens of the high-mountain areas of the southern Appalachians. Bryologist 81: 1-93.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Thelocarpon epibolum*

FAMILY: Acarosporaceae

COMMON NAME: A Species of Thelocarpon Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: *Thelocarpon epibolum* has a circumpolar distribution and occurs in coastal southern Canada and parts of the northern United States including Isle Royale, Michigan, and Minnesota. This species is parasitic on other lichens and occurs in moist, shady habitats. Despite surveys to locate additional occurrences in the state, *Thelocarpon epibolum* is only known from a single locality in Koochiching County. This species is vulnerable to any type of disturbance that would result in damage to the host lichens in its habitat. Given its rarity, unique life history, and restricted range in the state, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

Ahti, T. 1973. Notes on the lichens of Newfoundland. 2. *Thelocarpon epibolum*. Ann. Bot. Fenn. 10: 66-67.

Eversman, S, C. Wetmore, K. Glew, and J. Bennett. 2002. Patterns of diversity in Yellowstone National Park. Bryologist 105: 27-42.

Harris, R.C. 1977. Lichens of the Straits Counties, Michigan. Published by the author, University of Michigan Herbarium, Ann Arbor. 150 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Usnea longissima*

FAMILY: Parmeliaceae

COMMON NAME: Methuselah's Beard Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Methuselah's Beard Lichen is a boreal species that occurs on the west coast of North America and is also distributed from New England west to Michigan, Wisconsin, and Minnesota along Lake Superior. This draping fruticose lichen is found in moist forests and bogs where it grows on the tops of old growth trees in full sunlight, usually near water. Historically, the Methuselah's Beard Lichen was known from six localities in Cook, Lake and St. Louis counties. However, recent surveys confirm the rarity of this lichen in Minnesota, with only 11 localities documented in these same historical counties despite extensive search effort and usually only small pieces of the thallus found. This lichen is very sensitive to air quality and also has a poor ability to disperse, thereby requiring continuous tracts of favorable habitat. Logging of old-growth conifer forests, especially near streams and lakes, interrupts this lichen's ability to disperse and may have serious negative impacts on long-term population viability. Given its restricted range, limited abundance, and sensitivity to environmental disturbance, it is needed and reasonable to designate the Methuselah's Beard Lichen as a species of Special Concern in Minnesota.

SELECTED REFERENCES:

- Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.
- Esseen, P.-A., L. Ericson, H. Lindstrom, and O. Zackrisson. 1981. Occurrence and ecology of *Usnea longissima* in central Sweden. Lichenologist 13: 177-190.
- McCune, B., C. Derr, P. Muir, A. Shirazi, S. Sillett, and W. Daly. 1996. Lichen pendants for transplant and growth experiments. Lichenologist 28: 161-169.
- Wetmore, C. 2002. R9 species conservation assessment for *Usnea longissima* Ach. in the Upper Great Lakes national forests. Report submitted to USDA Forest Service. 14 pp.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Usnea mutabilis*

FAMILY: Parmeliaceae

COMMON NAME: Bloody Beard Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: The Bloody Beard Lichen is distributed in the eastern half of the United States and occurs at the northwestern edge of its continental range in Minnesota. This fruticose lichen is found on deciduous and coniferous trees and is only known in the state from two localities: one historical location near Minneapolis in Hennepin County, and a recently-documented location in Washington County. Extensive survey efforts over the past several decades have failed to locate additional occurrences of this species. Based on historical information reported by Fink (using the name *Usnea barbata*), the range of this species appears to have decreased over the past one hundred years. Air quality and land development pose the greatest threats to the survival of this species in Minnesota. Given the recent documentation of only a single known locality of the Bloody Beard Lichen and its restriction to the Twin Cities metropolitan area, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.
- Fink, B. 1897. Contributions to a knowledge of the lichens of Minnesota – II. Lichens of Minneapolis and vicinity. Minnesota Botanical Studies 1: 703-725.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Usnea rubicunda*

FAMILY: Parmeliaceae

COMMON NAME: Red Beard Lichen

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: The Red Beard Lichen is found in the eastern United States, portions of the west coast, and also has a disjunct distribution in southern Minnesota. This fruticose lichen occurs on trees in humid habitats, and despite extensive survey efforts, it has only been documented at three localities in the state: one historical location in Hennepin-Ramsey County and two recent locations in Pine and Washington counties. Air quality and land development pose the greatest threats to the survival of this species in Minnesota. Given its rarity, restricted range, and proximity to populated areas of the state that are subject to intense land development pressures, it is needed and reasonable to classify the Red Beard Lichen as a species of Special Concern.

SELECTED REFERENCES:

Brodo, I. M., S. A. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press, New Haven and London. 795 pp.

Fink, B. 1897. Contributions to a knowledge of the lichens of Minnesota – II. Lichens of Minneapolis and vicinity. Minnesota Botanical Studies 1: 703-725.

MOSSES AND LIVERWORTS

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Aphanorrhegma serratum* (Wilson & Hooker) Sullivant

COMMON NAME: Lidded Earth Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Lidded Earth Moss is an endemic to eastern North America within the temperate bioclimatic zone. It has been recorded regionally from Ontario, Nebraska, Iowa, and Wisconsin. In Minnesota, only a single small population in Chisago County has been found. The species occurs along river banks and areas prone to flooding. Because only one population has been documented, there is too little information available to detect a statewide population trend at this time. The species may occur more widely in Minnesota, but until a targeted survey is completed, it is not possible to fully define its distribution in the state or the potential threats to its survival. However, because of its apparent rarity, a status of Special Concern is needed and reasonable.

SELECTED REFERENCES:

Flora of North America Editorial Committee, editors. 2007. Flora of North America north of Mexico. Volume 27, Bryophyta. Oxford University Press, New York, New York. 713 pp.

Janssens, J. A. 2005. Proposed candidates of endangered, threatened, and special concern species of bryophytes for Minnesota, update June 2005. Report to the Minnesota Department of Natural Resources, County Biological Survey. 18 pp.

Janssens, J. A. 2009. MS Access[®] Database on Minnesota Bryophytes. Lambda-Max Ecological Research, Minneapolis, Minnesota.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 10 June 2009.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Atrichum crispum* (James) Sullivant

COMMON NAME: Wave-leaved Crane's-bill Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Wave-leaved Crane's-bill Moss is disjunct in the boreal bioclimatic zone, occurring in Europe and eastern North America. It has been recorded regionally from Ontario, Iowa, Wisconsin, and the Upper Peninsula of Michigan. In Minnesota, just three populations have been located in Lake and Rice counties. The species grows as a colonist on wet soils in woods and hummocky seepage fens. Because only a few populations have been documented, there is too little information available to detect a statewide population trend at this time. Further survey work is needed to clarify the species' abundance and distribution in Minnesota, but based on its apparent rarity, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

- Flora of North America Editorial Committee, editors. 2007. Flora of North America north of Mexico. Volume 27, Bryophyta. Oxford University Press, New York, New York. 713 pp.
- Janssens, J. A. 2001. Bryophyte survey of the Cannon River Wilderness Area County Park calcareous fen site, Rice County, Minnesota. Report to the Minnesota Department of Natural Resources, Division of Waters. 5 pp.
- Janssens, J. A. 2001. Bryophyte survey of the Pheasants Forever calcareous fen site, Dodge County, Minnesota. Report to the Minnesota Department of Natural Resources, Division of Waters. 5 pp.
- Janssens, J. A. 2001. Bryophyte survey of the Stewartville calcareous fen site, Olmsted County, Minnesota. Report to the Minnesota Department of Natural Resources, Division of Waters. 5 pp.
- Janssens, J. A. 2001. Bryophyte survey of the Sucker Creek calcareous fen site, Meeker County, Minnesota. Report to the Minnesota Department of Natural Resources, Division of Waters. 5 pp.
- Janssens, J. A. 2002. Bryophyte survey of the Perched Valley calcareous fen, Goodhue County, Minnesota. Report to the Minnesota Department of Natural Resources, Division of Waters. 4 pp.
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- Janssens, J. A. 2009. MS Access® Database on Minnesota Bryophytes. Lambda-Max Ecological Research, Minneapolis, Minnesota.
- NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 10 June 2009.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Atrichum tenellum* (Röhling) Bruch & Schimper

COMMON NAME: Little Saw Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Little Saw Moss has a nearly continuous distribution in the temperate regions of the Northern Hemisphere. It has been recorded regionally from Ontario, Manitoba, and Wisconsin. In Minnesota, a single population has been found in the blufflands of Fillmore County. As a colonist, the species inhabits wet soils in open hardwood forests. But because it has few distinguishing characters, it might be easily overlooked or seldom collected. With only one recorded population in Minnesota, there is too little information available to detect a statewide population trend at this time. Further inventory work is needed to clarify the species' abundance and distribution in the state and the potential threats to its survival. Until this information becomes available, a status of Special Concern is needed and reasonable based on the species' apparent rarity.

SELECTED REFERENCES:

Flora of North America Editorial Committee, editors. 2007. Flora of North America north of Mexico. Volume 27, Bryophyta. Oxford University Press, New York, New York. 713 pp.

Janssens, J. A. 2005. Proposed candidates of endangered, threatened, and special concern species of bryophytes for Minnesota, update June 2005. Report to the Minnesota Department of Natural Resources, County Biological Survey. 18 pp.

Janssens, J. A. 2009. MS Access[®] Database on Minnesota Bryophytes. Lambda-Max Ecological Research, Minneapolis, Minnesota.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 10 June 2009.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Aulacomnium androgynum* (Hedwig) Schwägrichen

COMMON NAME: Bud-headed Thread Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Bud-headed Thread Moss has a disjunct global distribution in the temperate bioclimatic zone, including western North America, scattered portions of eastern North America, and eastern Asia, Europe, and Patagonia. It has been recorded regionally from Ontario, Wisconsin, and the Upper Peninsula of Michigan. In Minnesota, three populations have been found in Cook County from the North Shore Highlands subsection and the Susie Islands. Generally, Bud-headed Thread Moss frequents sedge meadows, treed fens, and conifer forests as a colonist. In Europe, it is often found on charred stumps in disturbed conifer forests. Because so few populations have been documented in Minnesota, there is too little information available to detect a statewide population trend at this time. Further survey work is needed to clarify the species' abundance and distribution, but based on its apparent rarity, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

- Crum, H. A., and L. E. Anderson. 1981. Mosses of eastern North America. 2 volumes. Columbia University Press, New York, New York.
- Janssens, J. A. 1999. The bryophytes of the Susie Islands, Lake Superior, Cook County, Minnesota, based on surveys by J. A. Janssens and R. M. Schuster. Report submitted to the Minnesota Department of Natural Resources, County Biological Survey. 28 pp.
- Janssens, J. A. 2005. Proposed candidates of endangered, threatened, and special concern species of bryophytes for Minnesota, update June 2005. Report to the Minnesota Department of Natural Resources, County Biological Survey. 18 pp.
- Janssens, J. A. 2009. MS Access[®] Database on Minnesota Bryophytes. Lambda-Max Ecological Research, Minneapolis, Minnesota.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Aulacomnium heterostichum* (Hedwig) Bruch & Schimper

COMMON NAME: Differential Branched Crease Capsule Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Differential Branched Crease Capsule Moss is a disjunct Arcto-Tertiary species in the temperate bioclimatic zone, presently occurring in eastern North America and Japan. It has been recorded regionally from Ontario, Iowa, and Wisconsin. In Minnesota, only a single population has been found in the blufflands of Winona County. The moss is a non-aggressive perennial stayer found on soil or rocks in open, deciduous woods and along creeks. Because only one population has been documented in Minnesota, there is too little information available to detect a statewide population trend at this time. Further inventory work is needed to clarify the species' abundance and distribution in the state, and the potential threats to its survival. Until this information becomes available, a status of Special Concern is needed and reasonable based on the species' apparent rarity.

SELECTED REFERENCES:

- Crum, H. A., and L. E. Anderson. 1981. Mosses of eastern North America. 2 volumes. Columbia University Press, New York, New York.
- Janssens, J. A., D. G. Horton, and J. F. Basinger. 1979. *Aulacomnium heterostichoides* sp. nov., an Eocene moss from south central British Columbia. Canadian Journal of Botany 57:2150-2161.
- Janssens, J. A. 2005. Proposed candidates of endangered, threatened, and special concern species of bryophytes for Minnesota, update June 2005. Report to the Minnesota Department of Natural Resources, County Biological Survey. 18 pp.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Bryoxiphium norvegicum* (Bridel) Mitten

COMMON NAME: Sword Moss

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Sword Moss has a scattered northern hemisphere distribution without zonal affinity. In continental North America, it is considered a glacial relict that survived in the driftless area during the last glaciation. It has been recorded regionally from Iowa and Wisconsin, and a single Minnesota population was observed in the bluffs of Winona County from 1893-1905. Based on the herbarium label description of the Minnesota specimen and on general information from specimens collected elsewhere, the species usually occurs as a colonist in caves and other shaded, moist recesses such as cliffs and gorges. Unfortunately, the Minnesota population is believed to have been destroyed and no additional populations have been discovered during routine ecological surveys in suitable habitat.

Most of the known Sword Moss populations in the United States are experiencing limited to no spore production, which severely limits the species' dispersal ability and exacerbates the problems of already small, isolated populations. Other threats to the species include physical damage from walking or climbing on exposed habitats, impoundments, erosion, heat, and drying. Furthermore, Sword Moss is a prime candidate for extinction by climate change throughout its entire range since the loss of moist, shaded habitat conditions would decimate the species. Given its relatively recent discovery in Iowa, there is hope that a remnant Sword Moss population will be relocated in Minnesota. A dedicated survey of potential habitat is warranted during non-drought years. On the basis of the species' extreme rarity, its restrictive habitat requirements and documented habitat loss, and perceived global threats, a status of Endangered is needed and reasonable.

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- Allen, B. H. 1979. *Bryoxiphium norvegicum* in Colorado. *The Bryologist* 82:490.
- Hill, S. R. 2002. Conservation Assessment for Sword Moss (*Bryoxiphium norvegicum*) (Brid.) Mitt. United States Forest Service, Eastern Region, Milwaukee, Wisconsin. 25 pp.
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- Pursell, R. A. 2007. *Bryoxiphium*. Pages 329-330 in Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 27. Oxford University Press, New York, New York.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Bryum cyclophyllum* (Schwägrichen) Bruch & Schimper

COMMON NAME: Egg-leaf True Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Egg-leaf True Moss has a nearly continuous northern hemisphere distribution of boreal affinity. It occurs as a colonist on wet soils subject to inundation. The species has been recorded regionally from Ontario and Wisconsin. In Minnesota, a single population has been found on Susie Island in Cook County. With only one recorded population, there is too little information available at this time to detect a statewide population trend. Further inventory work is needed to clarify the species' abundance and distribution in the state. However, until this information becomes available, a status of Special Concern is needed and reasonable based on the species' apparent rarity.

SELECTED REFERENCES:

- Crum, H. A., and L. E. Anderson. 1981. Mosses of eastern North America. 2 volumes. Columbia University Press, New York, New York.
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- NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. <<http://www.natureserve.org/explorer>>. Accessed 10 June 2009.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Buxbaumia aphylla* Hedwig

COMMON NAME: Bug-on-a-stick Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Bug-on-a-stick Moss has a nearly continuous world distribution of temperate affinity. It has been recorded regionally from Ontario, Iowa, Wisconsin, and the Upper Peninsula of Michigan. In Minnesota, only a single population has been found in the bluffs of Winona County. The species occurs as a pioneering colonist on disturbed soils or old logs in hardwood forests at the edge of creeks. Because only one population has ever been documented in Minnesota, there is too little information available to detect a statewide population trend at this time. Further survey work is needed to better define the species' distribution and specific habitat needs in Minnesota. However, based on its apparent rarity, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

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Janssens, J. A. 2005. Proposed candidates of endangered, threatened, and special concern species of bryophytes for Minnesota, update June 2005. Report to the Minnesota Department of Natural Resources, County Biological Survey. 18 pp.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Cirriphyllum piliferum* (Hedwig) Grout

COMMON NAME: Hair-pointed Feather Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Hair-pointed Feather Moss has a nearly continuous northern hemisphere distribution of temperate affinity. The species grows as a non-aggressive perennial stayer on soil and decayed wood in moist, shady places within mesohabitats such as algific slopes and spring fens. It has been recorded regionally from Ontario and the Upper Peninsula of Michigan. In Minnesota, only two populations have been found in Fillmore and Washington counties. Despite extensive surveys of suitable habitat of algific slopes in the region and spring fens throughout the state, no additional populations have been encountered. While there is too little information available to detect a statewide population trend at this time, climate change and the resulting disappearance of these specialized mesohabitats will stress survival of the existing populations in the state. On the basis of the species' extreme rarity and perceived threats to its habitat, a status of Threatened is needed and reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Cryptocolea imbricata* Schuster

COMMON NAME: Hidden-perianth Liverwort

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Hidden-perianth Liverwort is endemic to northeastern North America and Greenland within the montane bioclimatic zone. It has been recorded regionally from Isle Royal in the Upper Peninsula of Michigan. In Minnesota, the species was originally described in 1951 based on specimens from the Porcupine and Susie Islands in Cook County. Hidden-perianth Liverwort occurs as a colonist on moist soil as indicated by the Minnesota type location. A search for the original population has not yet been possible as the site is not easily accessible. However, no additional populations were found on nearby islands during surveys of suitable habitat. Because Hidden-perianth Liverwort is part of the "Tundra Strip" flora and requires a specific arctic-montane habitat, its populations may be susceptible to local extinction due to climate change. The species' biogeography is unique and its habitat is susceptible to drying conditions and trampling. The long-term viability of Hidden-perianth Liverwort depends on the maintenance of cool, moist, habitat conditions.

Given the species' extreme rarity and limited geographic range in the state, its restrictive habitat requirements, the vulnerability of populations to degradation or destruction, and concerns over a rangewide decline, a status of Threatened is reasonable and needed.

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- Janssens, J. A. 1999. The bryophytes of the Susie Islands, Lake Superior, Cook County, Minnesota, based on surveys by J. A. Janssens and R. M. Schuster. Report submitted to the Minnesota Department of Natural Resources, County Biological Survey. 28 pp.
- Janssens, J. A. 2005. Proposed candidates of endangered, threatened, and special concern species of bryophytes for Minnesota, update June 2005. Report to the Minnesota Department of Natural Resources, County Biological Survey. 18 pp.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Cynodontium schisti* (Weber & Mohr) Lindberg

COMMON NAME: Mowed Mosquito Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Mowed Mosquito Moss has a nearly continuous northern hemisphere distribution at high latitudes, extending southward into mountains and coastal regions. It has been recorded regionally from Wisconsin, Ontario and the Upper Peninsula of Michigan. In Minnesota, a single population has been found in Cook County, on Little Brick Island in Lake Superior. Mowed Mosquito Moss grows as a colonist in shaded crevices of cliffs and boulders. Despite extensive surveys of the three other Susie islands as well as suitable mesohabitats on the mainland along the North Shore of Lake Superior, no additional populations have been found. Because Mowed Mosquito Moss is part of the "Tundra Strip" flora and requires a specific arctic-montane habitat, its populations may be susceptible to local extinction due to climate change. The species' biogeography is unique and its habitat is susceptible to drying conditions and trampling. The long-term viability of Mowed Mosquito Moss depends on the maintenance of cool, moist, habitat conditions.

Given the species' extreme rarity and limited geographic range in the state, its restrictive habitat requirements, the vulnerability of populations to degradation or destruction, and concerns over a rangewide decline, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Flora of North America Editorial Committee, editors. 2007. Flora of North America north of Mexico. Volume 27, Bryophyta. Oxford University Press, New York, New York. 713 pp.
- Janssens, J. A. 1997. Bryophyte floristics at Sugarloaf Cove, Cook County, Minnesota. Report submitted to the University of Minnesota, Sugarloaf Interpretive Center Association, Duluth, Minnesota.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Cyrto-hypnum pygmaeum* (Schimper) Buck

COMMON NAME: Pygmy Plume Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Pygmy Plume Moss is an endemic to eastern North America within the temperate bioclimatic zone. It has been recorded regionally from Ontario, Iowa, Wisconsin, and the Upper Peninsula of Michigan. In Minnesota, only two populations have been found in the bluffs of Houston and Wabasha counties. Pygmy Plume Moss is a non-aggressive perennial stayer that forms smooth mats in mesic forests, on cliffs, and in rocky creek-bed habitat. Because only a few populations have been documented in Minnesota, there is too little information available to detect a statewide population trend at this time. Further inventory work is needed to clarify the species' abundance and distribution in the state, and the potential threats to its survival. Given its specific local microhabitat preferences in the driftless region, climate change may eventually stress survival of the existing populations in the state. On the basis of the species' apparent rarity and restrictive habitat requirements, a status of Special Concern is needed and reasonable.

SELECTED REFERENCES:

- Crum, H. A., and L. E. Anderson. 1981. Mosses of eastern North America. 2 volumes. Columbia University Press, New York, New York.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Encalypta procera* Bruch

COMMON NAME: Tall Extinguisher Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Tall Extinguisher Moss has a nearly continuous world distribution of boreal affinity. It has been recorded regionally from Ontario, Manitoba, North Dakota, South Dakota, Iowa, Wisconsin, and the Upper Peninsula of Michigan. In Minnesota, two populations have recently been discovered in Cook and Lake counties, and the species has also been recorded historically from the southeastern part of the state. Tall Extinguisher Moss grows as a colonist on calcareous rock or soil in moist crevices, on talus, and on cliff ledges. Because only a few populations have been documented in Minnesota, there is too little information available to detect a statewide population trend at this time. Trampling has been identified as a potential threat to one of the known populations where a bike-path overpass is proposed be built near the species' ravine habitat. Further inventory work is needed to clarify the species' distribution in the state and to adequately assess threats to its survival. Until this information becomes available, a status of Special Concern is needed and reasonable based on the species' apparent rarity.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Frullania selwyniana* Pearson

COMMON NAME: Selwyn's Ear-leaf Liverwort

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Selwyn's Ear-leaf Liverwort is a rare endemic to eastern North America within the boreal bioclimatic zone. It has been recorded regionally from Ontario, Wisconsin, and the Upper Peninsula of Michigan. In Minnesota, the species has been recorded in Cook, Lake, and St. Louis counties. Selwyn's Ear-leaf Liverwort is restricted to humid paludified cedar and cedar/ash swamps, growing only on White Cedar (*Thuja occidentalis*) bark of large-diameter, older trees. A targeted survey of the Superior National Forest in 2008 turned up many new locations, but only within this particular microhabitat. Because many of the old-growth cedar forests in Minnesota are senescing and cedar swamps in general are threatened by poor regeneration, habitat availability is likely a limiting factor for this species. Given the species' narrow geographic range in the state, its specialized and restrictive habitat requirements, and the limited amount of available habitat, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

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- Janssens, J. A. 2009. MS Access[®] Database on Minnesota Bryophytes. Lambda-Max Ecological Research, Minneapolis, Minnesota.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Heterocladium dimorphum* (Bridel) Bruch & Schimper

COMMON NAME: Spaced-out Tangle Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Spaced-out Tangle Moss has a disjunct distribution in the northern hemisphere in the boreal bioclimatic zone, ranging across parts of North America, northern and central Europe, and the Caucasus region. It has been recorded regionally from Ontario and the Upper Peninsula of Michigan. In Minnesota, only a single population has been recorded from Cook County. The species grows on boulders and crevices in cliffs and along moist streambanks as a non-aggressive perennial stayer. Because only one population has been documented in Minnesota, there is too little information available to detect a statewide population trend at this time. However, the known population is located in an area that is highly vulnerable to destruction by trampling from rock scrambling and climbing. Additional survey work is needed to clarify the species' abundance and distribution in the state, but until this information becomes available, a status of Special Concern is needed and reasonable based on the species' apparent rarity.

SELECTED REFERENCES:

- Crum, H. A., and L. E. Anderson. 1981. Mosses of eastern North America. 2 volumes. Columbia University Press, New York, New York.
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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Hyophila involuta* (Hooker) Jaeger

COMMON NAME: Rolled-leaf Wet-ground Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Rolled-leaf Wet-ground Moss has a nearly continuous world distribution without zonal affinity. It has been recorded regionally from Ontario, Iowa, and Wisconsin. In Minnesota, only a single population has been found in the blufflands of Houston County. Rolled-leaf Wet-ground Moss is a short-lived shuttle species that grows on wet rocks, often in streams. Because only one population has been documented in Minnesota, there is too little information available at this time to detect a statewide population trend. While further survey work is needed to clarify the species' abundance and distribution in the state, its specific microhabitat suggests that climate change might eventually stress survival of any existing populations in the state. Therefore, based on its apparent rarity and restrictive habitat requirements, a status of Special Concern is needed and reasonable.

SELECTED REFERENCES:

Flora of North America Editorial Committee, editors. 2007. Flora of North America north of Mexico. Volume 27, Bryophyta. Oxford University Press, New York, New York. 713 pp.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Jaffuelobryum wrightii* (Sullivant) Thériot

COMMON NAME: Wright's Blunt Leaved True Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Wright's Blunt Leaved True Moss is endemic to eastern North America within the temperate bioclimatic zone. It has been recorded regionally from Ontario, South Dakota, Nebraska, Iowa, and Wisconsin. In Minnesota, only a single population in Le Sueur County has been found. Wright's Blunt Leaved True Moss grows in dry saxicolous habitat as a colonist. Because only one population has been documented in Minnesota, there is too little information available at this time to detect a statewide population trend. Further inventory work is needed to clarify the species' distribution in the state and potential threats to its survival. Until this information becomes available, a status of Special Concern is needed and reasonable based on the species' apparent rarity.

SELECTED REFERENCES:

Flora of North America Editorial Committee, editors. 2007. Flora of North America north of Mexico. Volume 27, Bryophyta. Oxford University Press, New York, New York. 713 pp.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Lescuraea saxicola* (Schimper in Bruch & Schimper) Milde

COMMON NAME: Lustrous Bow Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Lustrous Bow Moss has a scattered northern hemisphere distribution of montane affinity. There are no regional records from states or provinces adjacent to Minnesota. In the state, several small patches were discovered at a single site in Cook County in 2001. Here the species occurs as a colonist on exposed rocks in a riverine black ash swamp along the narrow deep canyon of the Brule River. Because the patches belong to the only documented population in Minnesota, there is too little information available to detect a statewide population trend at this time. However, similar mesohabitats have been extensively searched in the region and no additional populations have been found. Lustrous Bow Moss' specific arctic-montane habitat and its dependence on the maintenance of cool, moist conditions will likely make the species susceptible to local and global extinction from climate change.

Given the species' extreme rarity and limited geographic range in the state, its restrictive habitat requirements, the vulnerability of populations to degradation or destruction, and concerns over a potential rangewide decline, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

Crum, H. A., and L. E. Anderson. 1981. Mosses of eastern North America. 2 volumes. Columbia University Press, New York, New York.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Meesia uliginosa* Hedwig

COMMON NAME: Swan Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Swan Moss has a nearly continuous northern hemisphere distribution of subarctic and boreal affinity. It has been recorded regionally from Ontario, Manitoba, Wisconsin, and the Upper Peninsula of Michigan. In Minnesota, a single population was found in a large patterned peatland in Koochiching County in 1984. Swan Moss is an excellent, but rare, indicator of calcareous fens and swamps. Because only one population has been documented in Minnesota, there is too little information available to detect a statewide population trend at this time. However, the species' short life cycle is a limiting factor, which makes any population vulnerable to local extinction. Further survey work is needed to clarify the species' distribution in Minnesota and potential threats to its survival, but based on its apparent rarity, a status of Special Concern is reasonable and needed.

SELECTED REFERENCES:

Crum, H. A., and L. E. Anderson. 1981. Mosses of eastern North America. 2 volumes. Columbia University Press, New York, New York.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Pogonatum urnigerum* (Hedwig) Beauvois

COMMON NAME: Urn-bearing Hair Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Urn-bearing Hair Moss has a nearly continuous world distribution of subarctic and boreal affinity, where it occurs as a colonist along roadbanks and in cliff crevices. It has been recorded regionally from Ontario and Wisconsin. In Minnesota, several small patches were discovered at a single site in Cook County in 1995. Because only one population has been documented in Minnesota, there is too little information available to detect a statewide population trend at this time. However, the known population is located in an area that is vulnerable to destruction by trampling from rock scrambling and climbing. Additional survey work is needed to clarify the species' distribution and specific habitat needs in the state, but until this information becomes available, a status of Special Concern is needed and reasonable based on the species' apparent rarity.

SELECTED REFERENCES:

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Sphagnum compactum* Lamarck & de Candolle

COMMON NAME: Cushion Peat Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Cushion Peat Moss has a nearly continuous world distribution without zonal affinity. It has been recorded regionally from Ontario, Manitoba, Iowa, Wisconsin, and the Upper Peninsula of Michigan. In Minnesota, a single population was found in St. Louis County in 1996. This carpet-forming species occurs along the dry margins of open bogs, and also pioneers farther north on sand, rock, and bare peat. An intensive search of the original locality has not been able to relocate the species, and it is thought that this particular small population may have been extirpated by chance collecting during a previous ecological survey. Furthermore, years of additional surveys throughout the state in suitable mesohabitats have not resulted in the discovery of any additional records. Given the species' extreme rarity and limited geographic range in the state, its restrictive habitat requirements, and the vulnerability of populations to degradation or destruction, a status of Threatened is reasonable and needed.

SELECTED REFERENCES:

- Flora of North America Editorial Committee, editors. 2007. Flora of North America north of Mexico. Volume 27, Bryophyta. Oxford University Press, New York, New York. 713 pp.
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- Reich, P. B., P. Bakken, D. Carlson, L. Frelich, K. Friedman, and D. F. Grigal. 2001. Influence of logging, fire, and forest type on biodiversity and productivity in southern boreal forests. *Ecology* 82:2731-2748.

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Sphagnum lescurii* Sullivant

COMMON NAME: Red Twisted Peat Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Red Twisted Peat Moss has a disjunct northern hemisphere world distribution of temperate affinity including eastern North America and Europe. It has been recorded regionally from Ontario, Wisconsin, Iowa, and the Upper Peninsula of Michigan. In Minnesota, a single population was discovered in Lake County in 2003. Red Twisted Peat Moss occurs in somewhat minerotrophic conditions along pond margins and in transitional fens. Despite numerous research projects and surveys in suitable mesohabitats throughout the state, no additional locations have been found. Individual transitional fen habitats are quite vulnerable as they occupy only a short phase in the peatland successional chronosequence, and consequently, local extinctions of Red Twisted Peat Moss are likely. On the basis of extreme rarity, documented habitat loss, and perceived threats, a status of Threatened is needed and reasonable.

SELECTED REFERENCES:

Flora of North America Editorial Committee, editors. 2007. Flora of North America north of Mexico. Volume 27, Bryophyta. Oxford University Press, New York, New York. 713 pp.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Splachnum rubrum* Hedwig

COMMON NAME: Red Parasol Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Endangered

BASIS FOR PROPOSED MINNESOTA STATUS: Red Parasol Moss is an exceedingly rare and disjunctly scattered species in the boreal bioclimatic zone including northern Europe, North America, and Asia. It has been recorded regionally from Ontario and Isle Royale in Michigan. In Minnesota, three populations have been located in Cook County, two in 1984 and one in 2004. This short-lived shuttle species grows exclusively on old Moose (*Alces alces*) dung and thus only occurs throughout the range of moose. The substantial decline of Minnesota's northwestern Moose population over the past decade and the predicted decline of the northeastern Moose population are cause for concern. Furthermore, the short life-history of Red Parasol Moss makes any population quite vulnerable to local extinction. Populations with mature sporophytes are also extremely obvious and run a definite risk of being extirpated by avid collectors. On the basis of extreme rarity, limited state and regional distribution, highly specialized microhabitat and life-history, and obvious and perceived threats, a status of Endangered is needed and reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Thelia hirtella* (Hedwig) Sullivant

COMMON NAME: Nipple Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Nipple Moss is an endemic to eastern North America within the temperate bioclimatic zone. It has been recorded regionally from Ontario, Nebraska, Iowa, and Wisconsin. In Minnesota, two populations were discovered in St. Louis County in 1976. Nipple Moss grows on bark near the base of hardwood trees as a colonist. Because only a few populations have been documented in Minnesota, there is too little information available at this time to detect a statewide population trend. Further inventory work is needed to clarify the species' distribution in the state and potential threats to its survival. Until this information becomes available, a status of Special Concern is needed and reasonable based on the species' apparent rarity.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Tomenthypnum falcifolium* (Renauld ex Nichols) Tuomikoski

COMMON NAME: Curved-leaved Golden Moss

CURRENT MINNESOTA STATUS: Special Concern

PROPOSED MINNESOTA STATUS: None

BASIS FOR PROPOSED MINNESOTA STATUS: Curved-leaved Golden Moss is a North American and Asiatic species in the boreal and subarctic bioclimatic zones. It has been recorded regionally from Ontario, Manitoba, Wisconsin, and the Upper Peninsula of Michigan. When it was listed as a Special Concern species in 1984, it had only been documented from a handful of sites in five counties. Since that time, additional surveys have resulted in the discovery of many new populations. Approximately 40 populations have now been found in Beltrami, Cass, Clearwater, Cook, Itasca, Koochiching, Lake, Marshall, Roseau, and St. Louis counties. Curved-leaved Golden Moss characteristically occurs among *Sphagnum* hummocks in slightly minerotrophic poor fens. It turns out to be as common or even more common as its congener *Tomentypnum* Moss (*Tomentypnum nitens*), which is a rich-fen and extreme rich-fen species. Curved-leaved Golden Moss was fairly recently described as a new species but because it is now routinely found during poor-fen surveys, Special Concern status is no longer warranted.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Tortella inclinata* (Hedwig f.) Limpricht

COMMON NAME: Shortleaf Chalk Moss

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: Shortleaf Chalk Moss is a widespread species in the temperate bioclimatic zone of both hemispheres. It has been recorded regionally from Ontario, Iowa, Wisconsin, and the Upper Peninsula of Michigan. In Minnesota, a single population was discovered in Cook County in 1975. Shortleaf Chalk Moss grows as a pioneering colonist in calcareous habitats, on stabilized dune, and in sand and gravel. Because only one population has ever been documented in Minnesota, there is too little information available to detect a statewide population trend at this time. Further survey work is needed to better define the species' distribution and specific habitat needs in Minnesota, but based on its apparent rarity, a status of Special Concern is reasonable and needed.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Trichocolea tomentella* (Ehrhart) Dumortier

COMMON NAME: Down Liverwort

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Threatened

BASIS FOR PROPOSED MINNESOTA STATUS: Down Liverwort is disjunct to oceanic and suboceanic regions in the northern hemisphere within the temperate bioclimatic zone. It has been recorded regionally from Ontario, Wisconsin, and the Upper Peninsula of Michigan. In Minnesota, three populations have been documented in Cass, Lake, and Itasca counties in 1992, 2001, and 2007, respectively. This weft-forming perennial species is found in black ash/conifer and cedar swamps. The general senescence of old-growth cedar forests in Minnesota and their poor regeneration as a result of deer browsing is a serious concern which threatens the long-term viability of the species' customary mesohabitat. A dedicated search of potential habitats was conducted in 2008 across all districts of the Superior National Forest, but no new Down Liverwort populations were discovered. On the basis of extreme rarity, documented habitat loss, and perceived threats, a status of Threatened is needed and reasonable.

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FUNGI

SPECIES STATUS SHEET

SCIENTIFIC NAME: *Boletus subcaerulescens*

COMMON NAME: A Species of Porcini Mushroom

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: *Boletus subcaerulescens* is reported as occasional to locally common from eastern Canada, south to western New York and Michigan, but the species' geographic range limits have not been determined. Within Minnesota, this mushroom species has been reported from only two sites: along Amity Creek in Lester Park, Duluth, southern St. Louis County and in a red pine plantation near the Willow River, General Andrews State Forest, Pine County. It is a mycorrhizal forest species that fruits on the ground in association with northern conifers and hardwoods, and was first reported in association with *Pinus banksiana*, but more recently with *Pinus sylvestris*, spruce, birch and aspen.

In Minnesota, *Boletus subcaerulescens* is associated with *Pinus resinosa* or near *Picea glauca*, *Abies balsamea*, *Pinus strobus*, and *Betula* sp. In our area, it is reported to fruit from mid July until early October. This species is easily mistaken for *Boletus edulis* but is distinguishable by cap and stipe colors, and tubes that bruise blue. *Boletus subcaerulescens* has not been observed beyond the two known locations in Minnesota during recent surveys for porcini mushrooms, but additional surveys are needed. Given its limited known distribution, the assignment of Special Concern status is needed and reasonable.

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SPECIES STATUS SHEET

SCIENTIFIC NAME: *Sarcosoma globosum*

COMMON NAME: A Species of Cup Fungus

CURRENT MINNESOTA STATUS: None

PROPOSED MINNESOTA STATUS: Special Concern

BASIS FOR PROPOSED MINNESOTA STATUS: *Sarcosoma globosum* is a large distinctive species of fungus that forms a dark brown gelatinous cup. In Minnesota, it is known from only Johnson Lake, Superior National Forest, St. Louis County, where it was found fruiting in shaded, moist pine needle duff in depauperate herbaceous layer, under *Betula papyrifera*, *Populus tremuloides*, and *Abies balsamea*, with *Pinus strobus* nearby. This species of fungus fruits in the spring, and was recorded in late May in Minnesota. Members of the Sarcosomataceae are likely saprobic. *Sarcosoma globosum* is reported in the literature as distributed from the Great Lakes region east to New England and adjacent Canada with occasional reports from Idaho, Oregon and California. It is considered rare in both North America and Europe, where the European Council for Conservation of Fungi has proposed it for listing under the Bern Convention. Although additional surveys are warranted, its single known Minnesota location indicates that the assignment of Special Concern status is needed and reasonable.

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