

# Cuyuna Country State Recreation Area Management Plan Amendment



Minnesota Department of Natural Resources  
Division of Parks and Recreation

July 2005

**Department of Natural Resources Approval  
of Management Plan Amendment for Cuyuna Country State Recreation Area**

Minnesota Statutes 86A §09, Subdivision 1, requires that a master plan be prepared for units of Minnesota's outdoor recreation system, including state parks and state recreation areas. The Laws of Minnesota for 1993 established Cuyuna Country State Recreation Area as part of Minnesota's Outdoor Recreation System (MS 85.013, Subd. 20a).

The Minnesota Department of Natural Resources worked in partnership with Minnesota citizens and an interdisciplinary resource team to develop a management plan amendment for Cuyuna Country State Recreation Area.

The management plan amendment was approved by the Division of Parks and Recreation management team, and has been approved through the DNR Regional Interdisciplinary Review Service (RIRS) process during April 2005.

  
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Gene Merriam, Commissioner  
Minnesota Department of Natural Resources

  
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Date

# Cuyuna Country State Recreation Area Management Plan Amendment



## State of Minnesota Department of Natural Resources Division of Parks and Recreation

This management plan has been prepared as required by 2004 Minnesota Laws Chapter 86A.09, Subdivision 1.

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# PURPOSE

This Management Plan Amendment has been prepared as required by 2004 Minnesota Statutes Chapter 86A.09, Subdivision 1. The following documents amends the Cuyuna Country State Recreation Area Management plan, adopted by the Department of Natural Resources in 1995.

Cuyuna Country State Recreation Area (SRA) provides a range of recreational opportunities in a historically and geologically significant area. The recreation area is situated in Crow Wing County and is characterized by a chain of natural and mine pit lakes surrounded by second growth forest.

As one of only six state recreation areas managed by the DNR Division of Parks and Recreation and one of its newest properties, land and recreation are important questions for the future of Cuyuna Country State Recreation Area. Citizens at the management plan amendment open house were supportive of the boundary modifications. Boundary changes need to be approved by the Minnesota State Legislature. The DNR will only support a boundary change with the written consent of the landowners.

To meet visitor demands, the state recreation area will be operating the newly acquired Portsmouth Campground. Other major recommendations include working with various organizations to construct the Cuyuna Lakes State Trail that will eventually connect Brainerd and Aitkin. A connection will need to be made with the campground area.

During the planning process, the Minnesota Department of Transportation (Mn/DOT) was conducting reviews of the Cuyuna Lakes State Trail alignment through the recreation area. In a letter to the State Historic Preservation Office, Mn/DOT identified a new area, encompassing most of the recreation area and beyond, as being eligible for nomination as a historic landscape district.

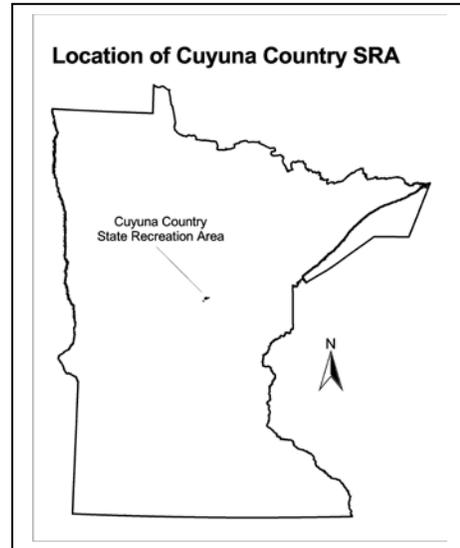
Cuyuna Country State Recreation Area has an experienced, knowledgeable and dedicated management team that is committed to efficiently and innovatively managing the resources, working with neighbors and neighboring communities, and serving recreational users.

The following amendment presents background information for the recommended campground and trail development, and boundary changes. At the end of each section there are recommended actions. This plan provides the basic management direction for the recreation area and is not intended to provide specific management or development details. It will be necessary for the DNR to seek legislation for the boundary changes, funding to complete land acquisition, and trail and facility development.

# DESCRIPTION

In 1981, the Iron Range Resource and Rehabilitation Board (IRRRB) requested that an advisory committee be formed to improve the appearance and the recreational use of the Cuyuna Range abandoned mining area. The Cuyuna Range Mineland Reclamation Committee was formed and completed many projects including: public water accesses, campgrounds, channels, overlooks, annual clean-up events, and trout stocking.

The committee realized that the mineland area was a very unique resource and should be preserved. They then formed the Cuyuna Range Mineland Recreation Area Joint Powers Board (or Mineland Joint Powers Board) in 1988. The purpose of this board was to formulate plans for the area to protect it from uncontrolled and unplanned development through the adoption of zoning ordinances, formation of a plan for continued recreational use of the area, donation, purchase or lease of critical lands in the public interest, and sound management of the public lands. By this time, the mining companies no longer owned most of the area. In meetings held with state park personnel, it was recommended that the area be dedicated as a state recreation area rather than a state park because it could accommodate more intensive recreational use and attract visitors from beyond the local area. Senator Don Samuelson and Representative Kris Hasskamp organized the required legislative action.



Cuyuna Country State Recreation Area (CCSRA) was established in 1993 by the state legislature (Laws of Minnesota for 1993, Chap. 172, Sec. 34). The recreation area is approximately 5,000 acres (including 1,600 surface water acres), with 25 miles of shoreline, 15 mine pit lakes, and six natural lakes. The legislature mandated that an advisory committee work with the DNR to develop a management plan. The Cuyuna Country State Recreation Area Advisory Board provided the direction for the first management plan that was completed in 1995.

This Plan Amendment document supplements the campground, trail, and boundary sections of the management plan for Cuyuna Country State Recreation Area completed in 1995. The campground section needed to be updated due to the acquisition of the private Portsmouth Campground. The boundary chapter was updated because there have been several changes in the statutory boundary during the past three legislative sessions; with the most recent boundary change was during the 2004 session. Several more changes are proposed for the future.

# NATURAL AND CULTURAL RESOURCES

There are no archaeological sites or significant vegetation or wildlife documented in the Portsmouth campground or in the proposed boundary expansion areas. There is a historic district, an identified historic landscape district, and unique geology at Cuyuna Country SRA.

## **Ironton Sintering Plant National Register Historic District**

A short distance south of the campground is the 20-acre Ironton Sintering Plant Complex, which is listed on the National Register of Historic Places (also known as the Cuyuna Sintering Plant). A small portion of this site comes into the campground area and along the beach; none of the structures are in the park/campground. (See attached map). The public water access is immediately south of the Sintering Plant Historic District.

The Sintering Plant is on the west bank of the lake formed by the pit of the former Portsmouth Mine. The site was owned by the City of Crosby at the time of register designation. The Sintering Plant buildings are now privately owned. Several structures are being used as a warehouse or business and the remaining structures are in fair to poor condition. The sintering structure and trestle are ruins. In all there are eight structures on the Sintering Plant Site, including the trestle. The Ironton Sintering Plant was the second major beneficiation plant built in the United States and represents a process that was unique to the Cuyuna Range in Minnesota. With this process the lower grade ore could meet user specifications. The unique processing plant exemplifies the mining industry's capacity for great technological innovation.

## **Cuyuna Iron Range Historic Mining Landscape District**

In April 2003, a historic mining landscape district was identified as eligible for listing on the National Register of Historic Places. This area has not been nominated yet, but it has been identified and considered eligible by the Minnesota Department of Transportation (Mn/DOT) historical archaeologist pursuant to their FHWA-delegated responsibilities for compliance with Section 106 of the National Historic Preservation Act, as amended (36 CRF800). Because FHWA (Federal Highway Administration) funding is being sought for the bike trail project, Mn/DOT is responsible for inspecting and making a determination on potential cultural resource impacts.

The State Historic Preservation Office (SHPO) has received the Mn/DOT letter regarding the Cuyuna Lakes Trail and concurs with their conclusion that the bike trail project will have no adverse effect on the historical qualities of the area. The potential area that is considered eligible for the Cuyuna Iron Range Mining Landscape Historic District is a large, irregular shaped area encompassing most of the Cuyuna Country State Recreation Area (it does not include the cities).

The concentration of open-pit mines, railroad lines and spurs, and tailing piles within the vicinity of the towns of Cuyuna, Trommald, Riverton, Ironton, and Crosby is eligible for listing on the National Register as an historic mining landscape. During World War I, the Cuyuna Range supplied 90 percent of the nation's manganese. By 1920, there were 29 mines on the Cuyuna Range, producing over two million tons per year. The area reached its peak in production in 1953. Taconite processing began at Silver Bay in 1956. As a result, ore production at the Cuyuna and Vermilion ranges began to decline and Cuyuna mines closed in 1978.

The DNR was not involved in this identification process; it was done by Mn/DOT as part of their review for the proposed Cuyuna Lakes State Trail. Because of the way the National Register legislation is structured, being determined eligible for the National Register of Historic Places is the same as being formally listed for the purposes of federal project review.

The DNR has not formally reviewed the proposed nomination. The DNR has concerns about the possible listing of the mining district on the National Register of Historic Places and its effect on the ability to lease state owned mineral rights in the Cuyuna County State Recreation Area. The state owns and/or administers valuable mineral rights and stockpiles in this area, and any such listing may preclude future revenue generation to the various trust funds from mining or stockpile sales. Also, private mineral and stockpile interests likely exist in this area, and the value of these interests may be affected by any such listing. The State Historic Preservation Office (SHPO) is a function of the federal government and is not subject to state statutes. Private owners may comment on nominations of their properties to the National Register but to this point public ownership has never been able to effect such nominations. Public organizations are able to comment on potential nominations to the National Register during the state review board hearings, a part of the review process where the formal nomination is discussed and voted on as to its historic or cultural quality before being forwarded to the National Register for final review and acceptance or rejection.

## **Other Cultural Resources**

There are several large mining artifacts located in the campground. Park staff members do not know at this time if they were moved to the area or what their significance is historically.

There may also be some mining artifacts in the 30-acre section of land that is underwater. According to local scuba divers, approximately 20-30 feet from the campground shore, there are 3 concrete structures/ large culverts (approximately 100 feet) that run parallel to the shore. These were connected with the railroad operations.

Also underwater, to the south of the campground bay (outside the boundary) is a big scuba diving attraction. The area has many ceramic insulators and other items left from the mining operations. Although this area is outside of the boundary, interpretive signing should encourage preservation of these submerged artifacts.

The 1995 Management Plan noted the presence of an American Indian cemetery site on the northwest corner of Portage Lake. This is near the proposed boundary expansion area on the southwest section of Portage Lake and may merit further review before any development occurs.

## **Geology and Mining**

According to the Laws of Minnesota for 1993, establishing the Cuyuna Country State Recreation Area (Ch 172 Sec. 34 Subd.1 85.013 Subd.5c. Subd.3): "The commissioner shall recognize the possibility that mining may be conducted in the future within the Cuyuna Country State Recreation Area and that the use of portions of the surface estate and control of the flowage of water may be necessary for future mining operations."

The 1995 plan addressed the future mining potential of the Cuyuna Country State Recreation Area with regard to construction rock, natural iron ore and manganese and the potential for exploration and mining of non-ferrous metallic minerals.

The map of future mining potential in the 1995 plan shows areas of potential for manganese ore and base and precious metal deposits around the northeast section of Portsmouth Mine. The campground is located on the northwest corner of the lake and is unlikely to have significant future mining potential.

The DNR updated its 1995 future mining potential map in 2004 and provided an expanded discussion of the geology and mineral resources for the entire recreation area. The new geology/mining information

can be found in the appendix of this document (it was not included in the public review draft). Mining potential maps are updated on a continual basis and are available from the DNR..

### **Natural and Cultural Resource Recommendations:**

- Park staff will consult with the State Historic Preservation Office (SHPO) on trail and facility development to avoid adverse impacts to the historic district.
- The Cuyuna Lakes State Trail will pass through this historic district and state trail staff will also need to consult with SHPO.
- As recommended in the 1995 management plan, all proposed development areas should be surveyed for the presence of cultural resources. Historic and cultural resources should be preserved, documented and interpreted. If significant cultural resources are discovered during the surveys, facility siting, public use, and possible archaeological mitigation will need to be reviewed to avoid or minimize impacts.
- Develop interpretive displays and materials based on the interpretive themes outlined in the original management plan.
- The state trail plans will meet the Secretary of the Interior's standards for treatment of Historic Properties and guidelines for the treatment of Cultural Landscapes. If the area is accepted as a National Register site, park trails will likely need to meet these guidelines as well.

# **RECREATIONAL USE & VISITOR SERVICES**

## **Camping**

Camping is a popular recreation activity in the state recreation area. Although the 1995 Management Plan recommends two campgrounds and several primitive camping “pod” areas, no camping facilities have been developed to date. Currently, campers drive their vehicles into any location they feel is suitable and set up camp. No facilities are provided. CCSRA area has very few large, relatively flat areas that can accommodate a typical campground. Including Portsmouth Campground in the state recreation area will help meet this need for a designated campground and associated facilities.

The Portsmouth Campground, previously owned by a private operator, has 29 campsites that are developed (11 sewer, water, electric; 9 electric; 8 no hook-ups; 3 with phone hook-ups; and 1 group camp). Development of thirty more sites was begun but remain unfinished (about 75% complete). There is a sanitation building and a small playground. Yawkey Campground was operated by the City of Crosby but was donated for inclusion in the state recreation area, but has been closed because of vandalism.

## **Swimming & Scuba Diving**

One of the most popular activities in the mine lakes is scuba diving. The dive season is generally from April through November. Ice diving also occurs during the winter months. There may be 250-300 divers in the area per weekend during the summer.

There is currently no available parking in the campground that will support day-use scuba diving and general swimming. One option may be to allow parking in the Portsmouth public access and have scuba divers walk over to the beach on the snowmobile trail. Scuba divers will likely prefer to swim over. However, there may be security concerns with leaving unattended vehicles in a remote parking lot.

The campground beach has not been available for day-use scuba diving and swimming in the past. With miles of undeveloped shoreline in the CCSRA, day-users have plenty of swimming and diving options. Due to the volume of use, a parking lot and support facilities for scuba divers should be provided.

## **Hiking, Biking & Snowmobiling**

The Cuyuna Lakes State Trail is currently being developed. The main trail will go along the south shore of Portsmouth Lake with a spur trail connecting to the Portsmouth Campground.

With the development of the new trail, an increased number of day-users in the campground is anticipated. The DNR Division of Parks and Recreation will need to monitor potential conflicts and security issues. Trail alignment, signing, and enforcement will be key issues.

## **Boating & Fishing**

Boating and fishing for trout are especially popular in the Portsmouth section of the state recreation area. Portsmouth Mine has one designated public access. DNR owns the entire Portsmouth Mine lakeshore; although in some places it is just a narrow strip of land. The fact that the lake is completely within the state recreational area allows the DNR Division of Parks and Recreation to impose speed limits that reduce the interest in using personal watercraft on this body of water.

## Recreation Management Objectives from 1995 Management Plan

The following list identifies acceptable recreation uses for the state recreation area as outlined in the 1995 Cuyuna Country State Recreation Area Management Plan:

- Provide appropriate and compatible recreation uses through designated roads, trails, and other recreational development.
- Provide safe and enjoyable recreation experiences managed through appropriate rules and regulations.
- Preserve the scenic beauty and non-commercial atmosphere of the area.
- Provide the highest level of access practicable for persons with disabilities.
- Provide a broad selection of outdoor recreation opportunities in a pleasing natural setting, which may be used by large numbers of people.
- Offer and market a package of opportunities which includes:
  - Scuba diving
  - Canoeing
  - Horse back riding
  - Mountain biking
  - Fishing and boating
  - Mining history interpretation
  - Snowmobiling
  - Cross-country skiing
  - Camping
  - Picnicking and hiking

## Recreational Use and Visitor Services Recommendations

### *Short Term Recommendations*

- Operate the Portsmouth campground facility using existing campsites, buildings, utilities, and design (minor changes only).
- Provide minimal staffing and needed improvements that will facilitate a self-registration operation (kiosk/ground safe).
- Evaluate the use of the beach for day use swimming and scuba diving.
- Evaluate the feasibility of having a paved bike trail run to or through the campground connecting with the Cuyuna Lakes State Trail and the trail around Portsmouth Lake.
- Explore the feasibility of offering additional sewer and water hookups at some existing sites.
- Expand camping season by adding vault toilets.
- Provide a buffer screen for the sewage ponds to the north and the industrial site to the south.

### *Long Term Recommendations*

- Redesign the existing campground configuration to meet DNR Division of Parks and Recreation and Americans with Disabilities Act (ADA) standards and provide a quality experience with special focus on the needs of the scuba divers.
- Evaluate the design and layout of the unfinished camping loop prior to further development.

# STATE RECREATION AREA BOUNDARY

Cuyuna Country State Recreation Area statutory boundary includes approximately 4,922 acres. Within the statutory boundary, 2,682 acres are owned by the State of Minnesota, 1,385 acres are privately owned, 763 acres are have shared ownership (undivided interests) between the state and various private owners, and 92 acres are trust fund lands.

State park and state recreation area boundaries are established by the Minnesota State Legislature. All boundaries are legally described in Minnesota Statutes. Statutory boundaries serve to identify lands appropriate for inclusion in the park. The DNR is authorized to negotiate acquisition of lands within the statutory boundary. The state only acquires land for state parks and state recreation areas from willing sellers. Inclusion in a park statutory boundary does not limit what private landowners can do with their property.

This management plan amendment recommends boundary changes, which must be approved by the Minnesota State Legislature. When an addition to a park statutory boundary is considered, the DNR will contact private landowners that would be within the proposed boundary and ask for their documented support. Without the support of the landowner, the DNR will not request a statutory boundary change from the Minnesota State Legislature.

## Recent Statutory Boundary Adjustments

The 1995 Cuyuna Country State Recreation Area management plan recommended the addition of 120 acres on the west end of Portsmouth Mine. This area includes the Portsmouth Campground and has several other owners. The 80 acres campground area includes 30 acres that are underwater. This boundary change was authorized during the 2002 legislative session. At the same time the Minnesota State Legislature approved the addition of 6 acres of abandoned railroad right-of-way, which was conveyed to the state in 1998 by the Soo Line Railroad. This area will be part of a future recreational trail connecting local communities to the Cuyuna Country State Recreation Area.

Also during the 2002 legislative session, 62 acres were deleted on the northern edge of the recreation boundary. The landowner had requested his land be excluded from the boundary. The Cuyuna Country State Recreation Area Advisory Committee, City of Trommald, and Crow Wing County supported these boundary changes.

The most recent boundary change went before the Minnesota State Legislature during the 2004 legislative session. The change involved 14 acres of land, water, and a boat access that the City of Crosby donated to the DNR in October 2002. The land is now within the CCSRA boundary.

## Proposed Boundary Modifications

The plan amendment proposes seven modifications to the Cuyuna Country State Recreation Area statutory boundary. The proposed boundary modifications are shown on page 14.

1) **ADDITION**

Approximately 20 acres - T46 R30 S24, E1/2 x SE x SE

Current ownership - State of MN DNR (Located in Oak Lawn Township)

This parcel includes the western edge of the Sagamore Pit Lake. The acquisition of this parcel will result in securing 100% of the shoreline of the Sagamore Pit Lake. This will allow the DNR to establish surface water regulations as needed. This land is currently trust fund land. The DNR recommends that before a statutory boundary change is requested, the trust will be exchanged or transferred to other state lands.

2) **DELETION**

Approximately 12 acres - T46 R29 S19, NW x NW

Current ownership - State of MN DNR Parks (Located in City of Riverton)

A local road cuts through this parcel creating an unusable remnant of little recreational value. Managing this parcel as part of the state recreation area is not desirable because it is not contiguous.

3) **ADDITION**

Approximately 36 acres - T46 R29 S8, Government Lot 5

Current ownership - Crow Wing County and several undivided owners (Located in Irondale Township)

This parcel includes 1/4 mile of shoreline on Portage Lake. This addition would help protect the Portage Lake experience. These 36-acres contain a beautiful stretch of undeveloped shoreline. The boundary would go up to the township road.

4) **ADDITION**

Approximately 4 acres - T46 R29 S11, SE x NW

Current ownership - Crow Wing County (Located in City of Crosby)

This narrow strip, on the north shore of Armour No. 2 Mine, is an inholding that is crossed by an old mining road that is currently used as a trail. These four-acres are needed for the development of the Cuyuna Lakes State Trail.

5) **ADDITION**

Approximately 20 acres - T46 R29 S10 NE x SE

Current ownership - Crow Wing County (Located in City of Ironton)

This parcel is north of Ironton and south of Pennington Mine. The first 1/4 mile of the main entrance road currently passes through this 20-acre parcel. Ownership is needed in order to control the development and maintenance of the roads and trails in this area. The ability to manage signing is also important.

6) **ADDITION**

Approximately 13.9 acres - T 46 R29 Parts of Sections 2 & 11

Current Ownership - DNR (Located in City of Crosby)

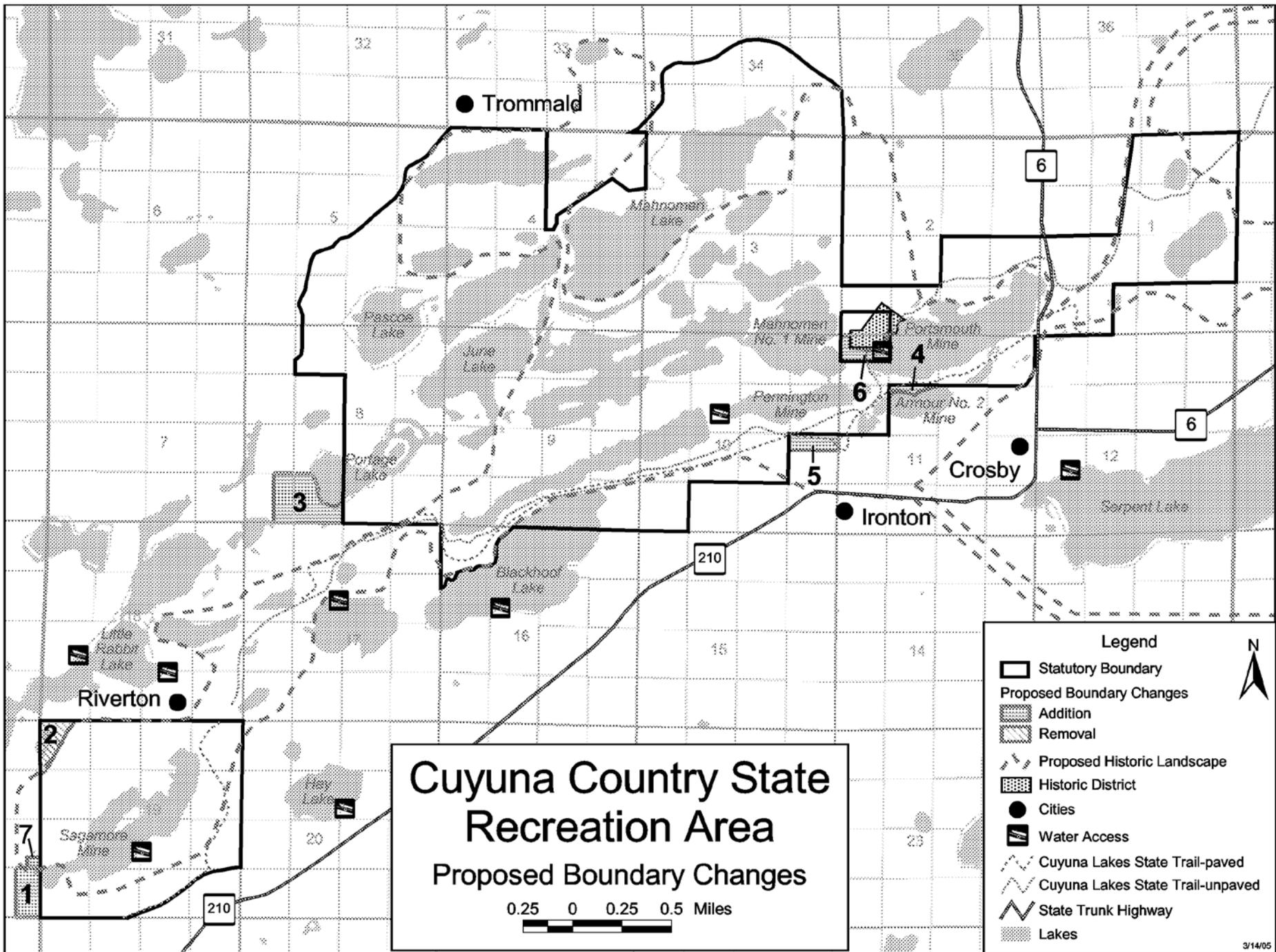
This parcel was transferred from the City of Crosby to the DNR. Once a boundary change is authorized it can be transferred to State Parks. The existing management plan already recommends the addition of the Portsmouth Public Access. The 13.9-acre parcel is included in the 120 acres on the west side of the Portsmouth. Part of this is in the Ironton Sintering Plant Historic District. Current Ownership = DNR (Located in City of Crosby)

7) **ADDITION**

Approximately 2.4 acres - T46 R30 S24, SE x NE1/4 x SE1/4, 350' x 300'

Current ownership - 7/8 tax forfeited and 1/8 privately owned.

This parcel is located next to the northwest shoreline of the Sagamore Pit Lake and is critical for the development of trails on the north side of the lake. The land is also important as an egress and ingress point..



# **MANAGEMENT PLAN TEXT REVISIONS**

This amendment supplements the Introduction, Natural and Cultural Resources, Recreation Resources, and Proposed Boundary Chapters in the 1995 Management Plan. This plan amendment does not require that any language be deleted from the original plan.

# PUBLIC REVIEW

The plan amendment process has a series of steps:

1. Review the proposed change at the park and regional level. Determine which stakeholders potentially have a major concern and how those concerns should be addressed. If the major concerns are within the DNR Division of Parks and Recreation, the issue should be resolved within the Division with input from the public. The proposed change is then reviewed with the DNR Division of Parks and Recreation Central Office Management Team.
2. If the proposed change involves other DNR Divisions, the issue should be resolved by staff and approved by the affected Division Directors. This may require one or two area/regional integrated resource management team meetings. The proposed change will be reviewed through the DNR Regional Interdisciplinary Review Service (RIRS) process.
3. If the proposed change issue involves other state agencies, the issue should be resolved by staff and approved by the DNR Division of Parks and Recreation Central Office Management Team - with input from the public - and reviewed by RIRS.
4. If the proposed change is potentially controversial among elected boards, park user groups, adjacent landowners, or the public, an open house will be held that is advertised in the local and regional area.
5. All plan amendments should be coordinated, documented, and distributed by the DNR Division of Parks and Recreation Planning Staff.

All of the steps were followed for this amendment. A public open house was held on April 29, 2003. Discussion and correspondences were held with the State Historic Preservation Office, Department of Transportation, DNR Trails and Waterways, and the DNR Division of Lands and Minerals. The Department of Natural Resources Statewide Interdisciplinary Review System provided comments on the draft amendment in July 2003. The Regional Management Team reviewed the plan amendment in April 2004. The amendment was approved through the DNR Regional Interdisciplinary Review Service (RIRS) process during April 2005.

# APPENDIX – Geology and Minerals Summary

The DNR Division of Lands and Minerals staff provided the following information concerning the geology and mineral resources present at Cuyuna Country State Recreation Area.

## Geology

Generally, the entire Cuyuna region is poorly drained, causing the water table to remain close to the level of the Mississippi River. As a result of this high water table, the Cuyuna Mine pits filled with water when mining and pumping activities ceased in the 1960s and '70s.

The Cuyuna Range bedrock is part of an early Proterozoic geologic terrain, composed of layers of sedimentary and volcanic rock units. The Range is primarily divided into three districts -- the Emily District, the North Range and the South Range. The Cuyuna Country State Recreation Area is located in the North Range, the most heavily mined of the three ranges. The rocks of the North Range were once correlated with those of the Precambrian Mesabi Range (1.9 billion years old), but now are believed to be part of the younger Animikie Basin (approximately 1.7 billion years old).

## Description of the Cuyuna Range

The Cuyuna Range trends northeast to southwest for about 65 miles, varying in width from one to twelve miles. The surface overburden topography is predominantly morainic. There are large areas where the land includes numerous small hills interspersed with swampy areas and lakes. Other areas of the Range are covered with extensive outwash plains. Prior to mining, the surface of the Cuyuna Range was flat to gently undulating. The relief of the Cuyuna Range before mining was about 200 feet. From the west, a low elevation of 1150 feet at the Mississippi River rises to an elevation of 1350 feet at the eastern edge of the Range.

The iron-bearing bedrock on the Cuyuna Range has been heavily folded; some meta-sedimentary beds are tipped nearly vertical which is in sharp contrast to the Mesabi Range where the bedded deposits dip at angles varying from 3° to 12°. The bedrock of the Cuyuna Range can be classified into three general categories: "1) iron-bearing sedimentary cherts and slates interbedded with metamorphosed igneous rocks; 2) intrusive igneous rock; and 3) younger sediments that lie horizontally on the eroded surfaces of the older rocks (Schwartz, 1973)." Cuyuna ore at the southern end of the North Range is soft and earthy, made up of red and brown iron oxides. The ore from the northern part of the Range can be dark gray to almost black. These types of ore usually contain higher amounts of manganese.

Binghamite is a rare rock that is found in the Cuyuna Range that is sometimes used as a gem. The lapidary industry uses binghamite in many types of jewelry. It is a metamorphic rock with a yellowish to reddish color composed of quartz with dense parallel inclusions of goethite. It exhibits a lustrous three-dimensional translucency that is referred to as chatoyancy. Silkstone is a more common type of rock, similar to binghamite, also found in the Cuyuna Range, where the goethite inclusions are not parallel.

## Future Mining Potential in Cuyuna Country State Recreation Area

There are currently four resources existing in the Cuyuna Country State Recreation Area that may lead to future mining within the recreation boundary: construction stone, landscape stone, natural iron ore (nonmagnetic), and manganese ore. Construction stone and landscape stone is the most likely resource to be mined in the near future, but the remaining manganese ore deposits have the highest potential for

long-term mining. There is also potential for exploration and mining of non-ferrous metallic minerals such as copper, zinc, and gold.

For the dual purpose of the conservation of stone resources and land, existing brown field sites of disturbed land from past mining should be utilized to the maximum extent possible in order to delay the need to disturb new land for mining. Therefore, the stockpile materials and existing mines in this area should be available for future mining.

#### *Construction Stone*

The State of Minnesota owns millions of tons of stockpiled material within the state recreation area. These state-owned stockpiles contain school and tax-forfeit trust fund minerals. These stockpiles, and many other stockpiles which exist throughout the state recreation area, may be marketable for various construction stone purposes and for landscape stone. Further, there may be a need to quarry new stone for these purposes.

#### *Iron Ore Mining Potential*

The majority of iron ore processing facilities in the United States switched from processing natural ore to processing taconite in the 1960's. The Cuyuna Range contains manganese-rich natural iron ore, which differs from the magnetic taconite ores on the Mesabi Range. However, within the state recreation area, "lean iron ore stockpiles" and unmined, in-place resources may contain enough natural iron ore to make removal profitable using new technologies. Minnesota has recently been benefiting from dramatic increases in world demand for steel. The increased demand is largely due to increasingly high levels of Chinese steel production and consumption. Increasing the quantity of iron unit consumption has led to significant increases in the value of iron units of all types. Such increased value could lead to the development of alternative sources of iron, such as from sources in the Cuyuna Range.

#### *Manganese Mining Potential*

Manganese is a critical defense-related element used as a hardening agent in the steel-making process. For every ton of steel produced, six to nine pounds of manganese is required. The United States began importing large amounts of manganese in the early 1960's and currently imports all manganese used in its steel production. The Cuyuna Range was a critical supplier of manganese in W.W.I and W.W.II when foreign supplies were threatened, and at times drastically reduced by wartime activities. The Cuyuna Range has the largest and highest grade reserves of the four identified areas of manganese within the borders of the United States.

The Cuyuna Range contains a large but low-grade resource of manganese. There have been many attempts to estimate the potential deposits of manganese remaining. Beltrame, et al performed the most recent estimation in 1981. They estimated that the Range contains a minimum of 170 million metric tons of manganiferous rock with an average grade of 10.46 weight percent manganese. However, there are many inferred resources on the Cuyuna Range that have not been fully explored. The glacial drift covering the Cuyuna area is generally less than 100 feet thick; however, in some areas the glacial drift thickness reaches 200 feet thick.

In the foreseeable future, the two most likely scenarios for re-starting mining on the Cuyuna Range would be a metallurgical breakthrough or a U.S. crisis. In the event of a national emergency, at least part, if not all, of the reserves of the manganese-bearing ore on the Cuyuna Range may need to be put back into production. Ores of the Emily District north of Cuyuna (near Emily, Minnesota) have a much higher percentage of manganese than that which is found on the North Range (where the state recreation area is located). Within the immediate boundary of the state recreation area, there are large amounts of low-grade manganese-bearing ore ranging from 3-5% manganese. High-grade ore usually contains above 12% manganese. Large stockpiles exist within the state recreation area which may contain low-grade ore. This material was considered waste at the time of mining during the 1940's, '50's and '60's. However with technological advances, these stockpiles may become valuable, especially in the event of a U.S. crisis. Moreover, the former LTV minesite on the Mesabi Range may reopen as a plant for producing iron nuggets (pig iron). The addition of iron/manganese

concentrates from the Cuyuna Range would be a significant “value-added” step for Mesabi pig iron production.

The Cuyuna Range could be put back into production. Many railroad beds exist throughout the region, leading directly to large ports along Lake Superior and mining operations on the Mesabi Range. Opening of any new mining activity would require permitting and environmental reviews. The state, local taxing authorities, and school districts could receive significant royalty income as a result of reopening old mines and starting new operations. The State of Minnesota is the largest mineral owner on the North Range.

Within the State Recreation Area, the Louise, Hopkins, and Sagamore mine areas have the best chance to be put back into production. Portions of these areas include manganese ore greater than 10%. Immediately to the north of the State Recreation Area, the Pontiac, Merritt, Gloria-Zeno, Milford and Colonization properties show the greatest potential for mineable manganese resources. These areas have the highest concentrations of mineable manganese ore on the North Range.