Introduction: How to Use the *MinnAqua Leader's Guide*

Goals and Intent

The *Fishing: Get in the Habitat! MinnAqua Leader's Guide* was created in an effort to meet the Minnesota Department of Natural Resources goal of providing environmental and natural resources stewardship education to Minnesota citizens. The *MinnAqua Leader's Guide* is for instructors who work with children in grades 3-5 in both formal and nonformal education settings as a source of lessons, activities, ideas, and information.

Although the lessons target grades 3-5, most lessons include a K-2 option as well as ideas for extensions that further develop the concepts introduced in the lessons. Instructors working with groups of older students will find many of the lessons in the *MinnAqua Leader's Guide* suitable or adaptable to their needs, too.

The *MinnAqua Leader's Guide* addresses three key education and outreach goals of the Minnesota DNR, including: building an effective, coordinated, Minnesota DNR natural resources stewardship education effort with consistent messages and measurable outcomes; expanding Minnesota DNR working relationships with preK-12 audiences and providers; and collaborating with other natural resource agencies and organizations to provide natural resources stewardship education. The MinnAqua Program addressed these goals by consulting national and state standards, highly qualified instructors, and organizations to guide the development of the *MinnAqua Leader's Guide,* as well as by including leading Minnesota education and natural resources experts, stakeholder groups, and intended users in a formative evaluation process.

The MinnAqua Program's mission is to **"provide lifelong educational programming that will increase people's knowledge and understanding about aquatic ecosystems, management, and resource issues; help acquire skills related to aquatic recreation, careers, and teaching; and foster a better stewardship of the state's natural resources."**

The MinnAqua Program's goals for the *MinnAqua Leader's Guide* are that instructors will use it to:

- teach about Minnesota fish, aquatic resources, and resource management
- lead students outdoors and initiate self-sustaining programs such as volunteer monitoring, shoreline restoration, and other service-learning projects
- connect students to their local aquatic resources through the recreational activity of angling
- and promote lasting stewardship of Minnesota's aquatic resources.

The *MinnAqua Leader's Guide* lessons and activities are Minnesota-focused, engaging, and provide an angling and aquatic education context for learning. By enlisting the Recreational Boating and Fishing

Foundation's Best Practices for Boating, Fishing, and Aquatic Resources Stewardship Education, the *MinnAqua Leader's Guide* is designed to be an effective teaching resource with learner-centered lessons and activities for a variety of educational settings, including:

- traditional grade 3-5 classrooms
- home-schools
- charter schools
- non-traditional schools
- retail outreach
- youth groups
- 4-H
- Cub Scouts
- Girl Scouts
- park and recreation centers
- environmental learning centers
- community centers
- museum programs
- sporting groups
- after-school programs
- day care centers
- state agencies
- watershed districts
- nature centers
- camps
- resorts
- fisheries resource management instructors
- environmental and outdoor recreation instructors
- all other groups that wish to teach youth in grades 3-5 about Minnesota fisheries and water resources, angling skills, and aquatic stewardship

By aligning the lessons with the Minnesota Academic Standards, the MinnAqua Program has ensured that teachers in the formal setting won't be adding something "extra" to their already-full curriculum plates by using the *MinnAqua Leader's Guide* lessons in their classrooms. Instead, they'll enhance and enrich their curricula by engaging their students in a relevant, real-world, place-based, hands-on, minds-on, interdisciplinary, systems-based environmental—and fun—context to effectively achieve their academic goals, while helping students become environmentally-literate citizens.

The *MinnAqua Leader's Guide* underwent an extensive formative evaluation process that included nonformal and formal instructors, who pilot-tested lessons with their students and youth groups. The review process included input from outreach partners and stakeholders, as well as experts in instructional design, Minnesota fisheries biology, academic standards and environmental education guidelines, and accessibility for people with physical disabilities.

The CD ROM and ring binder format of the *MinnAqua Leader's Guide* is intended to provide flexibility and ease of use of copy pages, images, and background materials to enhance utility and ease of implementation in a variety of settings. This publication has been designed for printing, allowing instructors to print the pages back-to-back—just choose the "print front to back" option in your print dialogue box. Pages can then be punched, placed in a three-ring binder, and removed and used as needed.

Components and Organization of the MinnAqua Leader's Guide

Chapters
The *MinnAqua Leader's Guide* contains 39 lessons in six chapters:

- **Chapter 1: Aquatic Habitats**
- **Chapter 2: Minnesota Fish**
- **Chapter 3: Water Stewardship**
- **Chapter 4: Fish Management**
- **Chapter 5: Fishing Equipment & Skills**
- **Chapter 6: Safety & the Fishing Trip**

Each chapter has a number of interdisciplinary lessons that contribute to a better understanding of Minnesota's aquatic systems and basic fishing skills.

Lessons
Each of the lessons can stand alone or be combined and constructed into a variety of thematic units—or you can choose specific lessons to incorporate into your current curriculum or activities and outreach efforts. Each lesson is a complete freestanding package. Each lesson contains extensive background information on biology, and the necessary copy pages to provide the instructor with the confidence

and the resources to teach the lesson. Many of the lessons are quite comprehensive, and the instructor may choose to do one portion, several parts of a lesson, or adapt a lesson to meet specific academic or programming needs.

The *MinnAqua Leader's Guide* lessons were developed with these overarching guidelines:

- to ensure concepts, environmental issues, and problems are addressed with accuracy and fairness
- to feature content specific to Minnesota culture, natural resources, and fisheries management

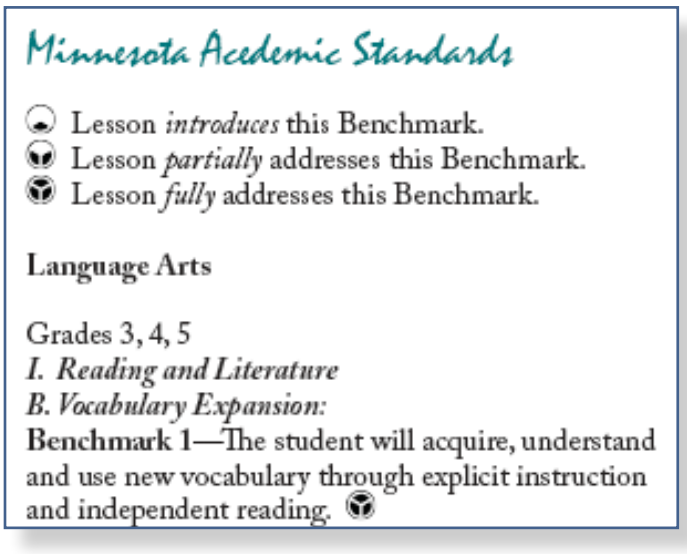
Lesson features include:

- extensive background and biology information for each lesson
- well-defined steps and procedures for lesson implementation
- alignment with the Minnesota Academic Standards
- alignment with the Environmental Literacy Scope and Sequence
- clear and measurable student learning objectives met by doing the Activity section of the lesson and measured by the assessment options
- authentic assessment ideas, including a student checklist and a scoring rubric
- developmentally-appropriate activities and concepts that build on students' prior knowledge
- accommodation of multiple learning styles in lesson activities
- a K-2 option that provides ideas on how to adapt lessons to best support the emerging and developing abilities of these students
- extensions that enable students to delve deeper, further develop concepts, or exercise different learning style strengths
- making connections to students' everyday lives
- outdoor as well as indoor setting activities
- self-directed, student-centered learning opportunities
- incorporation of individual and group activities
- interdisciplinary, hands-on, and inquiry-based activities
- lessons that can stand alone or can be used as part of a unit
- a plan for incorporating service-learning opportunities and ideas

The Lesson Format

The lesson format provides instructors with easy access to the information needed to successfully carry out an activity.

(Some of the teaching tips appearing in this section have been adapted from *The ABCs of Environmental Education*, U. S. Environmental Protection Agency, June 2006.)


Minnesota Academic Standards

◒ Lesson *introduces* this Benchmark.
◒ Lesson *partially* addresses this Benchmark.
◒ Lesson *fully* addresses this Benchmark.

Language Arts

Grades 3, 4, 5
I. Reading and Literature
B. Vocabulary Expansion:
Benchmark 1—The student will acquire, understand and use new vocabulary through explicit instruction and independent reading. ◒

◒ The Benchmark is mentioned or touched on, but not addressed in depth.

◒ Some—but not all—of the Benchmark is addressed. A portion of a Benchmark may be addressed in a rigorous way, but another part of the Benchmark may not be covered completely. (For example, the concept may be addressed in the activity but all of the vocabulary words stated in the Benchmark aren't used).

◒ All parts of the Benchmark are addressed. The activity is taught in such a way that students will have a complete understanding of the concepts and terms stated in the Benchmark.

Each lesson lists the Minnesota Academic Standards to the Benchmark level for grades 3-5 for Science, Social Studies, Language Arts, and Mathematics that are addressed by the Activity section of the lesson. This is a timesaving resource for instructors and program planners for school groups, and it demonstrates and supports the value of the *MinnAqua Leader's Guide* lessons and activities in formal education settings. See the ***Appendix:***

Minnesota Academic Standards Correlations for a comprehensive matrix of all of the standards listed down to the benchmarks cross referenced with the lessons that introduce, partially address or fully address each benchmark.

Academic standards are *not* identified based on the assessment options in the lesson. They're addressed by the *content of the lesson.*

The listed Benchmarks will enable you to quickly determine if the lesson addresses required academic standards.

Programs that can demonstrate that their activities and lessons address required academic standards are appropriate for school groups and attractive to teachers and school administrators.

"The *Environmental Literacy Scope and Sequence* is a tool for instructors that provides a systems approach to environmental education in Minnesota for preK through adult learners. It describes key concepts about the interaction of natural and social systems and a sequence in which they are to be taught."

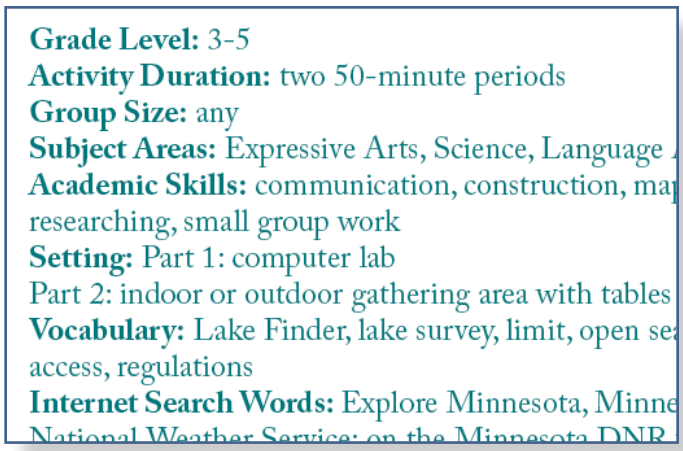
—Minnesota Office of Environmental Assistance, 2005

Environmental Literacy Scope and Sequence

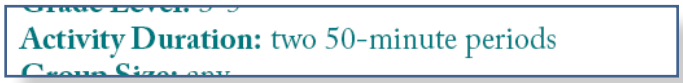
These preK-2 and grades 3-5 Benchmarks define the broad systems-based environmental ideas students should understand by the end of each of these two grade level groupings.

It's important to note that each Benchmark progressively builds on the previous benchmark to bring the student knowledge to a higher level of understanding. Students construct knowledge based on their prior level of understanding, not necessarily according to standards set for their actual grade level.

Review the Benchmarks to determine if your students have the appropriate environmental systems background for the concepts expressed in the lesson. If your students lack the systems Benchmarks knowledge noted for grades 3-5, begin with an experience, lesson or activity to introduce or reinforce the Benchmarks from the preK-2 level. After mastering these Benchmarks, your students will be able to more effectively make connections to new knowledge, and understand and incorporate the grade 3-5 level Benchmarks into their knowledge base.



The lessons are designed for grades 3-5, but they can be adapted for use with younger or older students, too. It is most helpful to know your audience for the lesson. Where are the students academically? Developmentally?



Check the lesson's time requirement and read the lesson to develop a sense of how long it will take to complete the lesson. The lessons are generally planned for 45- to 55-minute sessions—not including time needed for the initial purchase, obtaining, or creation of activity materials. In ***Appendix: Planning Aids*** there is a document called *Activity Timeline Matrix,* which lists the time needed for each part of each lesson on one page.

Some activities can be used with groups of any size. Others work best with a minimum or maximum number of participants. Check Group Size to determine whether an activity is appropriate for your group.

Subject Areas: Expressive Arts, Science, Language A

The academic subject areas addressed in the *MinnAqua Leader's Guide* lessons include Expressive Arts (art, theater, dance), Health and Safety, Language Arts, Math, Physical Education, Science, and Social Studies (including History, Geography, and Economics). Most lessons are interdisciplinary and can be used to meet learning objectives in a variety of academic subject areas. In ***Appendix: Planning Aids*** there is an *Academic Subjects Matrix* that lists all of the academic subjects suggested in each of the lessons and checks off which lessons introduce each subject. In ***Appendix: Planning Aids*** there is an *Academic Subjects Matrix* that lists all of the academic subjects suggested in each of the lessons and checks off which lessons introduce each subject.

Academic Skills: communication, construction, map

The *MinnAqua Leader's Guide* lists the academic skills introduced or practiced in the lesson to assist the instructor with lesson planning or the targeting of particular skills. Academic skills include: analysis, communication, observation, graphing, identification, inference, classification, mapping, measuring, modeling, construction, prediction, reading, and recording data.

For a complete grid correlating academic skills to each lesson in the *MinnAqua Leader's Guide* go to ***Appendix: Planning Aids*** and select the document called *Academic Skills Matrix.*

Setting: Part 1: computer lab
Part 2: indoor or outdoor gathering area with tables

Lessons can be conducted in the various suggested settings, which include a gym or large, open area, gathering area with tables, gathering area, water's edge, or computer lab. Check Settings recommendations to determine if the lesson will work in your setting. The settings for each lesson are also documented in the *Location and Settings Matrix* found in the ***Appendix: Planning Aids.***

Vocabulary: Lake Finder, lake survey, limit, open sea

This section includes key words introduced and defined for the instructor's benefit in the Instructor's Background Information section. (They're also listed alphabetically in a ***Appendix: Additional Information & Resources,*** *Glossary.)*

Internet Search Words: Explore Minnesota, Minnes

These words and terms, typed into an Internet search engine, lead to additional information related to the lesson content.

Summary

This brief overview includes the lesson's main points and activities.

Student Objectives

Objectives are specific, measurable learning outcomes. The lessons contain multiple objectives. The stated objectives usually begin with a capability verb ranging from basic comprehension (such as "to understand") to higher-order thinking levels (such as "to synthesize" or "to evaluate").

The student learning objectives describe what students will do to acquire further knowledge and skills, as well as what students will be able to do as a result of participating in the lesson. The lesson objectives also describe the conditions under which students' performance will be accomplished. These objectives are measurable. From the objectives, the instructor can determine criterion for judging satisfactory attainment of the objectives.

The Assessment Options section at the end of each lesson helps the instructor measure whether students have met lesson objectives.

Materials

All materials needed for activities are listed in the margins of the first few pages of each lesson and are intended to be readily available or easily acquired.

You can devise substitutions for some materials. Remember that, if asked, local or statewide sports groups and retail discount stores may be willing to donate materials and supplies for educational efforts. Comprehensive lists of the materials needed for each lesson organized by chapter, material type, and lessons is available in Appendix: Materials, Materials Master Matrix, Craft Materials Matrix and Basic Fishing Equipment Matrix.

This icon accompanies notes that deal with safety precautions identified in this section.

Instructor's Background Information

Comprehensive background information and biology information is provided for each lesson. *Don't let the length of this section deter you.* This section equips any instructor or youth leader with all of the information, understanding, and confidence to present and competently teach the lesson regardless of previous knowledge of the topic. You're bound to learn something new about Minnesota fish, aquatic habitats, and fishing—even if you're an avid angler! This comprehensive background information can also be especially useful in training new education program staff.

This icon accompanies notes that deal with supporting information.

This icon accompanies notes containing fun fish facts. A complete list of fish fun facts and water fun facts can be found in A***ppendix: Additional Information & Resources,*** *Minnesota Water Facts* and *Minnesota Fun Fish Facts.*

Procedure

These are the items that the instructor must prepare ahead of time in order to present the activities in the lesson.

Activity

Activity sections in each lesson include Warm-up, Lesson, and Wrap-up sections containing all sequential steps and instructions necessary to carry out the lesson. The Activity addresses the learning objectives and lesson concepts. Questions that will prompt student learning are suggested throughout this section.

This icon accompanies notes that deal with safety precautions identified in this section.

Warm-up

The Warm-up provides an activity to set the stage and introduces the main lesson topics.

Lesson

The Lesson is the heart of what you'll be teaching. It includes an easy to follow step-by-step process for teaching the lesson.

You may choose to adapt the lesson to suit your curriculum and programming needs. The MinnAqua Program has strived to create comprehensive and rich learning experiences for your students with each lesson, but time limitations may impact your ability to run an activity in its entirety. Most lessons can be easily altered or condensed to suit your needs. Be sure to assess participants' learning after any adaptation to the lesson—this will provide feedback on whether your adapted lesson still enables students to achieve your learning objectives.

The lessons are designed to encourage instructors to be creative and flexible while teaching to maintain student interest and curiosity, and to address various

learning style preferences of individual students (such as visual learners, auditory learners, and tactile learners).

Wrap-up

This section provides an opportunity to enable students to summarize, review, debrief, and reflect on the content covered in the lesson. This is an important step in the learning process, providing students with a chance to better absorb and make lasting connections to new concepts. The Wrap-up is an important component that enhances learning retention.

Assessment Options

Each lesson contains authentic assessment ideas, including a Checklist and a Scoring Rubric based on the lesson objectives. For each lesson, read the Assessment Options and use those that best suit your student evaluation needs. Assessment activities allow students to demonstrate that they've successfully achieved and understood the lesson objectives. The Assessment Options relate directly to the learning objectives for each lesson and provide multiple ways to measure objectives and accommodate various learning styles. They present students with real-world (authentic) challenges that require them to use higher-order thinking skills and apply a range of knowledge.

Planning a Fishing Trip Checklist

Possible Points	Points Earned Student	Points Earned Instructor	
4	_____	_____	Use the Internet to Finder feature on t

The Checklist provides criteria that address the learning objectives. The instructor can use the Checklist to assess student learning—or the student can use it as a self-assessment to measure the degree to which they've met the lesson objectives. The Checklist can also be given to students prior to the lesson as a guide to successful completion of the lesson (formative evaluation).

Planning a Fishing Trip Scoring Rubric

Fishing Trip, Poster, Brochure, or Skit Criteria	4 Excellent
Fishing trip components and lake map	Uses a lake map with location of where to fish for a particular species, species information, lake accesses, seasons/limits information, type of bait to use (what the fish species eats), weather information, safety considerations, lodging sites, guide services, bait shops, and other recreational activities for th area, to help plan a fishing trip, fishing trip planning skit, poster, brochure.
Research	Can use the Internet to locate th

This section corresponds to one of the lesson's Assessment Options and addresses the lesson objectives. It clearly states what students need to do to achieve a range of scores for various criteria. You may choose to give the Scoring Rubric to your students prior to the lesson to let them know what they're expected to do and learn as they participate in the activities.You may also choose to use it as a guide to create a rubric that addresses a different Assessment Option.

Diving Deeper

Extensions

This section contains suggested follow-ups that provide students with an advanced or enriched opportunity and further explore a topic or concept covered in the lesson. Extensions build on the lesson's original objectives. Extension activities also provide ideas for additional ways to address a variety of learning style preferences or student skills, or to adapt the lesson to an audience that may be more academically or culturally diverse.

For the Small Fry

K-2 Option

Included for most lessons, the K-2 Option provides ideas on how to adapt the lesson to best support the emerging and developing abilities of these students.

Appendices

The *MinnAqua Leaders Guide* contains detailed Appendices to assist you in planning your curriculum, unit, or programming needs.

Appendix: Additional Information & Resources

Glossary

The Glossary is an alphabetized list of specialized terms and their meanings as they're highlighted and used within the context of the *MinnAqua Leader's Guide* lessons.

Conceptual Framework

Service-learning

This section includes a brief description of service-learning, a list of service-learning resources, and service-learning project ideas related to the content of Chapters 3-6. These project ideas are meant to give students opportunities to take action, get involved, and apply the skills and knowledge acquired from *MinnAqua Leader's Guide* lessons to identify and address problems in their local environments and communities. A service-learning project can be done as a capstone to any unit or strand developed from the *MinnAqua Leader's Guide* to empower students and develop their stewardship and citizenship skills.

Student Reading List

Arranged and related to the *MinnAqua Leader's Guide* chapters, content, and concepts, this list contains books with age-appropriate reading levels.

Minnesota Water Facts

Minnesota, the "Land of 10,000 Lakes," also has many tens of thousands of miles of rivers and streams. Pique your students' curiosity and enjoy these interesting facts about Minnesota lakes, rivers, and streams.

Minnesota Fun Fish Facts

Minnesota is home to 160 interesting fish species. Impress your friends and relatives and enhance learning with these fun facts about fish and fishing!

Appendix: MN Academic Standards Correlations

MN Academic Standards Correlations

This matrix correlates the *MinnAqua Leader's Guide* lessons with Minnesota Academic Standards to the Benchmark level for Science, Social Studies, Language Arts, and Math for grades 3-5.

Appendix: Correlations

Correlations matrices cross-reference all lessons to provide quick curriculum and program planning information at a glance.

4-H Correlations Matrix

The 4-H Correlations matrix illustrates how lessons can help meet various 4-H sportsfishing project area requirements. It also illustrates how activities from the *MinnAqua Leader's Guide* and 4-H activities complement one other, and how lessons and service-

learning ideas provide useful ideas for fair projects or supplements to other 4-H activities.

Cub Scout Correlations Matrix

This matrix illustrates how lessons and service-learning projects can help meet requirements for various Cub Scouting badges. In addition to meeting various badge requirements, incorporating the lessons into Cub Scout activities can provide opportunities for creating family scouting events related to angling.

Girl Scout Correlations Matrix

This matrix illustrates how lessons and service learning projects can help meet requirements for various Junior Girl Scouting badges. In addition to meeting various badge requirements, incorporating the lessons into Junior Girl Scout activities can provide opportunities for creating family scouting events related to angling.

Appendix: Planning Aids

Alphabetical List of Lessons

Academic Subjects Matrix

Academic Skills Matrix

Seasons Matrix

Topics Matrix

Unit Matrix

The *MinnAqua Leader's Guide* is a versatile and interdisciplinary instructor's resource. You may find the suggested units or strands in this matrix useful, or you may want to create a different themed unit or strand to suit your particular curriculum or programming needs. See the Topics Matrix Appendix—it will help you create a unit or lesson strand not listed above. Individual lessons can also stand on their own merit, or you can choose one or several to supplement or enhance your current lessons and programs.

Locations and Settings Matrix

Activity Timeline Matrix

Addressing Physical Disabilities

This section addresses accessibility and includes a set of planning documents to aid instructors in adapting teaching methods and the lessons for individuals with physical disabilities. The documents include:

- an overview
- a needs assessment for identifying an individual's physical abilities and limitations
- a lesson analysis record for analyzing a lesson based on its physical activity requirements
- an adaptation guide to help instructors consider accommodations that may be necessary to enable individuals to participate

Appendix: Materials

Materials Master Matrix

This matrix is a master list of the materials required for all lessons. It groups these items as craft materials, fishing materials, scientific materials, and miscellaneous materials.

Craft Materials Matrix

Basic Fishing Equipment Matrix

The Benefits of Using the MinnAqua Leader's Guide

The *MinnAqua Leader's Guide* incorporates a broad range of environmental education strategies, best practices, and guidelines to increase the outreach and effectiveness of the education efforts of the Minnesota DNR. It incorporates Environmental Education strategies that address social connections to Minnesota aquatic environmental issues and problems. Through innovative and research-based approaches to education in both formal and non-formal settings, educators can reach students in energizing and transforming ways. The *MinnAqua Leader's Guide* provides educators with an engaging and fun context for learning. Aquatic ecology and angling is a context for learning that can be used in a variety of educational settings. It presents an innovative strategy to actively involve students in their learning, enhance critical thinking and problem solving skills, and teach individuals to weigh various perspectives on environmental issues to make informed and responsible decisions.

The educators who pilot-tested these lessons found that the *MinnAqua Leader's Guide* connects participants to local aquatic environments and to learning and increases overall academic performance and achievement. Students enjoy the lessons—and instructors enjoy teaching and facilitating them. Students already familiar with fishing are able to share their skills and knowledge with classmates. Some students who might not otherwise actively participate in class have a chance to shine. You might just find that some parents and local experts will be more than happy to share their knowledge of fishing skills with your students.

Because the lessons make connections to Minnesota students' daily lives and are place-based, the lessons are easy to understand, build on prior knowledge, and can easily accommodate a variety of learning styles and abilities.

The lessons and activities in the *MinnAqua Leader's Guide* focus on local environment and community, which makes them very useful for building partnerships and mentoring opportunities related to angling.

The MinnAqua Program's Hope

Using the *MinnAqua Leader's Guide* will make the "what" and "how" of your teaching more deliberate, relevant, and empowering, enabling students to: acquire awareness and direct experience with aquatic and natural resources in their communities; gain knowledge and skills needed to enjoy the lifelong activity of fishing (Minnesota's pasttime); become empowered, engaged citizens capable of informed and responsible environmental choices and decisions; develop the ability to identify, address, solve, and prevent ever-growing environmental problems and challenges; and be inspired to live in their communities in a sustainable manner. Working together, we can ensure a lasting legacy of aquatic and fisheries resources for future generations of Minnesotans.

The MinnAqua Program intends that the *MinnAqua Leader's Guide* will enhance learning opportunities for students, provide them with authentic experiences in local surroundings, enable a deeper understanding of their role in the environment, and—ultimately—guide them toward a path of stewardship.