



Guide to Fisheries Education Resources for Grades K–12



Youth Education Committee
American Fisheries Society

GUIDE TO FISHERIES EDUCATION RESOURCES FOR GRADES K-12

Alan Crook and Michaela Zint
and the
Youth Education Committee
Education Section, American Fisheries Society

Sponsored by the National Fish and Wildlife Foundation, the Future Fisherman Foundation, and the following American Fisheries Society groups: the Minnesota Chapter and affiliated Minnesota organizations; the Dakota, Missouri, New York, and Virginia Tech Chapters; the Education and Fisheries Management Sections; and the Southern and Western Divisions.

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ACKNOWLEDGMENTS

The creation of this guide was inspired by, and closely follows, the format provided by Andrews' (1995) directory of water curricula, *Educating Young People about Water: A Guide to Goals and Resources with an Emphasis on Nonformal and School Enrichment Settings*, which is available through the ERIC Clearinghouse for Science, Mathematics and Environmental Education (Columbus, Ohio). The Youth Education Committee is also grateful for the comments and suggestions provided by the following reviewers: Don Bonneau (Iowa Department of Natural Resources), Karen Bick and Mike Bira (U.S. Environmental Protection Agency—Region 6), Susan Blanton (Batelle), Valerie Chase (National Aquarium in Baltimore), Leanne Hennessee (Montana State University), Chuck Hopkins (John Dearness Environmental Society), Dale Johns (Hanford High School), Lonnie Nelson (Aquatic Resources Education Association), Frank Panek (U.S. Fish and Wildlife Service), Bora Simmons (Northern Illinois University), Lundie Spence (North Carolina Sea Grant), Gail Wintczak (Kennewick School District), and Al Zale (American Fisheries Society Education Section).

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INTRODUCTION

Fisheries professionals and others with an interest in fish, fishing, and fisheries management issues view youth education as an important step in developing a more informed, responsible citizenry. It is hoped that such a citizenry can help solve the problems caused by past actions and contribute to building sustainable fisheries. Interest in creating an informed, responsible citizenry has resulted in the development of a variety of educational materials and programs for youth that can be used in school (formal education) and nonschool (nonformal education) settings. Nowhere, however, have these materials been inventoried and reviewed to determine to what extent existing instructional resources meet fisheries education goals and needs. The purpose of this guide is to (1) provide a framework for fisheries education (page 2), (2) describe existing fisheries education materials (pages 7–21), and (3) summarize the fisheries education content covered by these instructional resources. For more information on why and how this guide was developed, please refer to pages 2–4.

WHO SHOULD USE THIS GUIDE?

This guide is designed for individuals who are interested in developing, implementing, and evaluating youth education programs concerned with fish, fishing, or fisheries management issues. Users might include coordinators of youth education programs, developers of educational materials and programs, and those who are interested in aquatic resources education in general. The guide is designed to help individuals select instructional resources that will meet aquatic resource education needs and to identify gaps in coverage among fisheries education materials for youth.

HOW TO USE THIS GUIDE

The Fisheries Education Materials Summary Chart (page 39) provides an overview of the materials reviewed. To learn more about specific materials, you can refer to the annotated Guide to Reviewed Materials on page 7. The materials in the summary chart and in the annotated guide are listed alphabetically by title.

Although this publication provides a great deal of information about fisheries education materials, users will need to make their own judgment about which materials are most appropriate for a particular audience and setting. For example, users may need to select materials to meet teaching objectives that are based on school, district, state, or national standards. In addition, users may want to adapt the materials to make them more suitable for their region or the age of their learners. Finally, users should focus on teaching youth “how to think” rather than “what to think” about fisheries issues. In other words, fisheries professionals and educators should encourage students to take informed actions based on scientific understanding of fisheries and not on advocacy without such background.

Additional information on how to select and use environmental education materials in general and on how to promote environmental literacy is available from:

North American Association for
Environmental Education
P.O. Box 400
Troy, OH 45373, USA
513/676-2514

HELP US IMPROVE THIS GUIDE

We reviewed many instructional resources with fisheries education content to develop this guide. However, we may have missed valuable materials and would like your help in identifying such resources. If you have instructional materials that are not reviewed in this guide and that cover content listed in the Fisheries Education Framework (page 33–35), we would like to know about it. Please send a copy of the material or ordering information to:

Alan Crook
RR #6
Lindsay, Ontario K9V 4R6
CANADA

Please make sure to mark your package “educational review materials, no commercial value”

We would also like to hear from you if you have any corrections, updates, or format change suggestions for future editions. Please send these to:

Michaela Zint
School of Natural Resources and Environment
University of Michigan
Dana Building, 430 East University
Ann Arbor, MI 48109-1115
USA

Thank you for your help.

MORE ABOUT THIS GUIDE

The American Fisheries Society (AFS) is the world's oldest and largest organization dedicated to strengthening the fisheries profession, advancing fisheries science, and conserving fisheries resources. The AFS has been involved in selecting K–12 fisheries education activities in the past and has a strategic plan that calls for public education. As a response, the Youth Education Committee (Committee) under the Education Section of the AFS was formed in 1994 to “advise the AFS on the status and direction of youth aquatic resource education as related to the fishery resources in the United States and Canada” and “to engage in activities leading to the development of recommendations to the AFS so that it may make effective contributions to formal and nonformal aquatic resource (both freshwater and marine) education.” To meet this charge, Committee members were selected to represent formal and nonformal education interests as well as state agency, provincial ministry, university, and private industry interests.¹

Because educators and fisheries professionals wanted information on fisheries education materials for youth and AFS was interested in developing and supporting such materials, the Committee decided that its first project should be to conduct a fisheries education needs assessment. The specific objectives of the needs assessment were to:

1. develop a Fisheries Education Framework for youth based on key fisheries issues and concepts identified by AFS leaders;
2. identify, collect, and select instructional materials with fisheries-related content;
3. review selected instructional materials based on the Fisheries Education Framework;
4. describe the strengths and limitations of existing fisheries education materials to help direct the improvement of existing, or the development of new, instructional resources; and

5. produce a guide describing relevant materials and summarizing results in a format convenient for those interested in fisheries education.

Development of a Fisheries Education Framework

The Committee began by defining three goals for fisheries education. These fisheries education goals were inspired by the goals of environmental education, which stress awareness, knowledge, skills, attitude, and action.

Fisheries Education Goals

Goal 1. Help youth acquire a basic awareness and understanding of the total ecosystem in which fishes live; the commercial, sport, and subsistence fisheries supported by that ecosystem; the issues involved in managing these fisheries; and the effects people can and do have on the resource.

Goal 2. Help youth acquire positive attitudes and values toward fishes, fishing, fisheries, and the aquatic ecosystem in general, ensuring their protection, rehabilitation, and responsible management.

Goal 3. Help youth acquire the social and technical skills to make decisions and solve problems associated with the management of fisheries and the motivation to personally act on those problems. Provide youth with opportunities for personal action and evaluation of those actions.

These three goals were then used to select fisheries issues and concepts from the 1994 document prepared by AFS entitled *Vision for North American Fisheries in the 21st Century*. A questionnaire that included the fisheries issues and concepts was sent to 89 AFS leaders (73% responded). These fisheries leaders approved the issues and concepts identified by the Committee and added several concepts that they considered important. The resulting Fisheries Education Framework contains 8 key issues and 55 related concepts to include in fisheries education materials (page 33–35).

¹ For more information on AFS involvement in youth education, please refer to Zint, M., and S. Dann. 1995. Educating youth about fish, fishing, and fisheries management issues. *Fisheries* 20(2):28-30.

Fisheries Education Issues

1. Maintain and recover fisheries habitat.
2. Identify and reduce sources of pollution affecting fisheries habitat.
3. Maintain and rebuild biodiversity within commercial, sport, and subsistence fisheries.
4. Build sustainable commercial, sport, and subsistence fisheries.
5. Manage for sustainable commercial, sport, and subsistence fisheries.
6. Promote resource stewardship.
7. Promote responsible recreational fishing.
8. Develop an awareness of fisheries science as a profession and help prepare youth for careers in this profession.²

Identification, collection, and selection of fisheries education materials

The AFS Youth Education Committee also worked to identify and collect fisheries instructional materials for youth. The Committee identified more than 20 materials from its members' libraries, placed requests for materials in related newsletters, and reviewed bibliographies of relevant materials. In addition, the Committee requested more than 80 instructional materials directly from their sources, of which 46 were received. To determine which of the materials would be reviewed for this guide, the Committee applied five criteria:

1. Material must cover one or more fisheries education issues or related concepts.
2. Material must be designed or adapted for youth.
3. Material must be interactive (i.e., require thought or action), not simply reference or support material.
4. Material must be at least 10 pages long, not a brochure or single activity.
5. Videos must have support material that meet these same criteria.

The final 54 materials that were selected based on the Committee's criteria represent resources from local, state, regional, and national agencies, ministries, organizations, and groups in Canada and the United States. The Guide to

Reviewed Materials on page 7 provides a brief description of each item. In addition, the section on page 23 includes materials that were received after the winter 1997 review deadline as well as materials that did not meet the review criteria but that may provide unique supporting resources.

Review of fisheries education materials

The materials that met the selection criteria for this guide were reviewed by Committee member Alan Crook, who has a strong background in both environmental education and fisheries issues. Ideally, the review of each material would have involved several individuals striving for agreement. Because of the Committee's limited time and financial resources, such an in-depth review was not feasible. Instead, the Committee members compared assessments of a sample of materials to provide Crook with a benchmark from which he proceeded.

Materials were evaluated and scored based on how well each item addressed the concepts listed in the Fisheries Education Framework. Scores were then combined and weighted based on the number of concepts per issue to assign an overall percentage of coverage to each of the eight fisheries education issues. Based on the distribution of scores, which ranged from 0% to 71%, a scale was developed to summarize the extent to which the eight issues are covered by each material in this guide.

0%	No 	= no coverage
1–12%		= limited coverage relative to all issues and materials
13–24%	 	= fair coverage relative to all issues and materials
25–36%	  	= moderately good coverage relative to all issues and materials
37%–above	   	= good coverage relative to all issues and materials

Because many of the reviewed instructional materials incorporated fish, fishing, or fisheries issues but did not have these topics as their focus, each material's main emphasis was also classified.

² For additional information about the needs assessment that resulted in this guide, please refer to Zint, M., and A. Crook. 1998. A needs assessment of fisheries education materials for youth. *Fisheries* 23(10).

Main emphasis

Fisheries	General recreation	Biology
Habitat	Careers	Ecology
Management regulations	Environmental issues	Animals
Recreational fishing	Water science	Plants

Finally, a variety of other characteristics of the selected materials were identified, including their appropriateness for different grade levels and subject areas.

A summary chart provides an overview of the strengths and limitations of the materials reviewed for this guide. Because the summary chart is intended to help users find the materials that can best meet their needs, it shows (1) appropriateness for different grade levels and subject areas, (2) main emphasis, (3) coverage of eight key fisheries education issues, (4) relevant fisheries education goals, and (5) a variety of other program characteristics (pages 39–51).

Production of the fisheries education guide

The production of this guide to fisheries education materials was inspired by a 1995 publication by E. Andrews describing water education curricula, *Educating Young People about Water: A Guide to Goals and Resources with an Emphasis on Nonformal and School Enrichment Settings*, which is available through the ERIC Clearinghouse for Science, Mathematics and Environmental Education (Columbus, Ohio). This guide closely follows the format used by Andrews to provide educators and fisheries professionals with a user-friendly description of available fisheries education materials.

LIMITATIONS OF THIS GUIDE

Users of this guide should be aware of the following limitations of this needs assessment:

- The Fisheries Education Framework the Committee developed and used to review the fisheries education materials described in this guide includes the issues and concepts important to AFS but may not address those viewed as significant by others.
- The Committee is confident that the guide includes many excellent fisheries education materials, but additional valuable instructional resources are likely to exist.

- The Committee fully supports Crook's assessment of the fisheries education materials in the guide but acknowledges that the use of multiple reviewers may have yielded different results in some cases.

GAPS AND NEEDS

By the time this guide was prepared, three of the reviewed materials were no longer available and were therefore excluded. Based on the remaining materials, we conclude that most concepts under Pollution and Fishing receive good coverage. Most concepts under Habitat and Managing Fisheries receive reasonable coverage. Coverage of Building Sustainable Fisheries is mixed in that only some of the concepts are addressed reasonably well. In contrast, Biodiversity concepts receive limited coverage. The remaining issues, Stewardship and Careers, are covered somewhat better but not as well as the rest.

The following areas need development:

- Alternative species for commercial, sport, and subsistence fisheries: are they keys to sustainability?
- Aquaculture: advantages and limits
- Commercial, sport, and subsistence fisheries conflicts
- Fisheries and biodiversity
- Fisheries and critical habitats
- Fisheries and watersheds
- Fisheries careers
- Global trends and fisheries issues
- Harvest: effects of gear selection, techniques and effort, and bycatch (for commercial, sport, and subsistence fisheries)
- Introduced species: boon and bane
- Sharing the resource: fisheries and interspecific competition
- Stocking: advantages and limits
- Subsistence fishing and aboriginal rights

More specific information on gaps in coverage can be found in the article by Zint and Crook (1998). It should also be noted that very few of the materials address fisheries education issues and concepts in a marine context or provide multicultural perspectives. Finally, many materials purport to cover a broad range of grades (e.g., 4–12), but the Committee feels that the bulk of the reviewed materials are generally appropriate for grades 4–8. Dedicated fisheries education resources are generally lacking for grades 9–12 and are extremely limited for K–3.

RECOMMENDATIONS

On the basis of this needs assessment and the development of this guide, the Committee makes seven recommendations.

1. This guide should be widely disseminated to help educators and fisheries professionals select instructional resources that can best meet the needs of their specific audience. To make users aware of the guide, its availability should be announced on the World Wide Web and in newsletters of professional fisheries and education groups.
2. This guide should be updated in 1–2 years and at 3- to 4-year intervals thereafter. Users of the guide are encouraged to identify fisheries education materials and programs for future editions and send this information to the guide's authors. Information on additional resources should be collected through the World Wide Web and more formal means including interviews, focus groups, or mail questionnaires targeted at K–12 teachers, aquatic resource educators (including marine educators), fisheries professionals, and others.
3. Most reviewed materials are current but not “leading edge.” This has not gone unnoticed by curriculum developers, many of whom are currently revising their resources. Those individuals should refer to the Fisheries Education Framework and the areas in need of development (page 4) for important issues and concepts to include and should look to technical experts to provide insight into these areas.
4. New materials should be developed to fill the content gaps identified as a result of this needs assessment and to provide marine contexts, include multicultural perspectives, and target grade levels K–3 and 9–12, for which few resources are available at this time. Development of such new materials should involve fisheries professionals and formal and nonformal educators teaching appropriate grade levels and a variety of subject areas.
5. Content gaps other than those identified by this needs assessment are likely to exist. Those already identified by reviewers of this guide may include the history of fisheries management, the value of fish as food, and the impact of cumulative or synergistic effects on fisheries. Needs in these areas are among those that cannot be confirmed because related concepts were not included in the Fisheries Education Framework and, hence, were not reviewed in the materials.
6. There is a need to support existing fisheries education materials and efforts. Many organizations indicated that they are unable to obtain funding to revise and improve popular resources or to publish additional copies. Aid is needed to update, improve, reprint, promote, and disseminate existing materials.
7. Finally, many individuals and groups have an interest in fisheries education for youth but have not developed beneficial partnerships. Potential partners include but are not limited to fisheries professionals, formal and nonformal educators and curriculum developers, university faculty and extension personnel, state and federal natural resource agencies and education departments, industry groups, nongovernment organizations, and foundations. Affiliated professional groups lend themselves to developing and strengthening linkages between these parties and thus should play important roles in improving fisheries education materials for youth.

GUIDE TO REVIEWED MATERIALS

This section provides an annotated bibliography of each item reviewed for this guide in alphabetical order by title. Review this list for general information about each material, but refer to the summary chart in the back for an overview of the key fisheries education issues covered. For a brief description of how these materials were identified, selected, and reviewed, please refer to page 3.

Many of the reviewed materials are being revised, and contact information and prices are subject to change. Also, prices listed here are in U.S. dollars for single copies only. Most organizations offer bulk discounts for larger orders.

Aquatic Project WILD (1992)

Cost: Aquatic Project WILD can be obtained only through participation in a workshop, and cost varies depending on the state or province

Project WILD
707 Conservation Lane, Suite 305
Gaithersburg, MD 20878 USA
301/527-8900
<http://eelink.umich.edu/wild/>

Project WILD is a popular, interdisciplinary, supplementary conservation and environmental education program for educators of K–12 age youth. *Aquatic Project WILD* follows exactly the same pattern, focusing on aquatic (both freshwater and marine) rather than terrestrial themes and topics. Each lesson is self-contained, providing all necessary information from objectives to evaluation. Background information is provided for some les-

sons, whereas other, more process-oriented approaches leave content up to student-driven research. Recommendations for exercises that extend the learning experience in the activities are detailed and provide key learning opportunities, often in the areas of local application or student involvement in issues. *Aquatic Project WILD* looks at aquatic ecosystems from a broad environmental and ecological perspective but has some content related to fishing and fisheries.

Aquatic Resources Education Curriculum (1996)

Cost: \$25 plus \$4 shipping and handling

Future Fisherman Foundation
1033 North Fairfax Street, Suite 200
Alexandria, VA 22314 USA
703/519-9691 to obtain order form
847/364-1222 to order via credit card or purchase order

This manual integrates the “how to’s” of fishing instruction with the “why’s” of aquatic resource education and is best used with grades 7–12. It encourages personal responsibility and action related to both fishing and the resource in general. *Aquatic Resources Education Curriculum* is designed primarily for indoor instruction by “any interested group or individual,” but the use of experts in various areas is encouraged. There are no activities that incorporate actual fishing (field trips are recommended to allow students to “practice what they have learned”), although fish cleaning and cooking are

included. Activities are used when dealing directly with fishing (e.g., knots, hook sharpening, casting, etc.), but other content is provided almost entirely in a discussion format. Extensive background materials are provided, and it is left up to the instructor to choose among them and to present the material in a lively and entertaining manner. This program can be used in conjunction with more process-oriented materials (e.g., *Hooked on Fishing, Not on Drugs—Teacher’s Guide*) available from the same organization.

Clean Water, Streams and Fish (1980)

Cost: \$12 plus \$3 shipping and handling

Washington State Office of
Environmental Education
2800 Northeast 200th Street
Seattle, WA 98155-1418 USA
206/365-3893
<http://cifl.ospi.wednet.edu>

This curriculum for grades 3–9 focuses on salmonids but uses a holistic, watershed-based approach to the life history, ecology, and issues surrounding the fishery. A significant amount of time is spent on watershed as habitat and land-based effects on the aquatic system and, in turn, salmonids. Open ocean and estuarine habitats are also addressed, as are the history of and issues related to native subsistence and commercial fisheries. Students are encouraged to identify and trace effects in their local watersheds to their streams and fish communities and to explore ways to mitigate those effects.

Coastal Issues: A Wave of Concern (1991)

Cost: \$15 plus \$1 shipping and handling

Sea Grant Extension Program
University of New Hampshire
Durham, NH 03824 USA
603/749-1565
<http://www.unh.edu/seagrants>

This issues-based program for grades 7–12 focuses on the New Hampshire seacoast, but the processes and issues are applicable to the broader New England region. Information and field trips related to the geography and ecology of southeast New Hampshire provide background and a context for an exploration of the decision making process, key user groups, and current issues facing the state and its citizens. Although there is minimal fisheries information available in the manual, students are encouraged to thoroughly investigate an issue related to either commercial fishing or aquaculture through a case study.

Decision Making: The Chesapeake Bay (1985)

Cost: \$14.95 plus \$1 shipping and handling

Maryland Sea Grant
University of Maryland
0112 Skinner Hall
College Park, MD 20742 USA
301/405-6371
<http://www.mdsg.umd.edu>

This multidisciplinary and self-contained curriculum unit for grades 7–12 examines the management of the Chesapeake Bay, a threatened and complex environmental system. The major goals are to identify and analyze conflicting interests, issues, and public policies concerning the Chesapeake Bay and to determine their effects on the people and their environment. The package contains five components: (1) an introduction to the Bay region, including a slide–tape presentation, a fact sheet, and a set of land use maps; (2) a video introducing various view-



Ontario Ministry of Natural Resources

points concerning the problems confronting the Bay; (3) a conference simulation in which participants assume roles, identify issues, develop policies, and judge the environmental impacts of those policies; (4) a data bank of reference information used to obtain a regional context and biophysical background, identify impacts and issues, and substantiate policy statements; and (5) an application to local concerns, in which students use skills developed in the conference simulation to identify and recommend policies regarding issues in their own area of the Bay or a local watershed.

Early Fishing Peoples of Puget Sound (1983)

Cost: \$11 plus \$2.95 shipping and handling

Ocean Related Curricula
Activities Project
Pacific Science Center
200 2nd Avenue North
Seattle, WA 98109 USA
206/443-2870
<http://www.pacsci.org/public/education/default.html>

The relationship of people, environment, and culture is explored through an examination of the native Puget Sound fishing societies. The resourcefulness of these native peoples

in inventing technologies to use natural resources is stressed. Because fish were a key resource, much of this unit examines fishing methods and materials, as well as the value and importance of fish, particularly salmon, to the native peoples. A number of paper and pencil geography or language arts activities are included, and, modeling after native practices, stories are used as a teaching device. In addition, students make ropes, hooks, and lines with materials and methods similar to those used in traditional cultures. Although the importance of fisheries is stressed, little mention is made of native conservation practices, and the implications of fisheries losses to these cultures is not explored.

The Earth Generation/The Great Lakes (1995)

Cost: Free on the World Wide Web

The Earth Generation
P.O. Box 2005
Midland, MI 48641-2005 USA
517/631-4010
<http://thechalkboard.com/teg>

Content belies the name in this grade 7 level program. Although there is some background and context provided related to the Great Lakes, this is a general environmental issues and education

program that “aims to help students gain a meaningful understanding of a few key issues with impact right in their home state and communities.” The scope is “a manageable, modular, hands-on investigation of a few specific issues relevant to students’ lives and their immediate surroundings.” These issues are quite general and not specific to being on or near one of the Great Lakes. Some relate only peripherally to water. Six of eight projects are related to forms of pollution or waste, and the other two examine effects on habitat (wetlands) and wildlife (birds). Students use the scientific method to investigate and evaluate an issue and then take action to apply what they have discovered. This program is notable for three things: (1) the amount of background provided in each project, (2) a strong process orientation, and (3) a focus on evaluation (assessment options are provided for each project, as well as summary forms and teacher and student forms for evaluating the effectiveness of the program). Unfortunately, few links are made to key fisheries issues.

Everglades National Park: An Activity Guide for Teachers (1991)

Cost: \$34.95 plus \$4 shipping and handling

Everglades National Park
P.O. Box 279
Homestead, FL 33030 USA
305/242-7700
<http://www.nps.gov/ever>

This compilation of activities for grades 4–6 “is designed to meet the needs of teachers and students who may never have an opportunity to visit the park, as well as those who are active participants in the park’s on-site environmental education program.” Active and hands-on, the materials look at the park as a whole, as an ecosystem, through topics such as the Everglades environment, plants, wildlife, and freshwater and saltwater ecology. The estuarine system of Florida Bay receives particular emphasis. Although not directly focused on fish or fisheries, the predominance of water in the

Everglades system leads to an examination, or at least a mention, of a number of fisheries-related issues and concepts within the context of the southern Florida ecosystem as a whole. Although focused on a particular geographic locale, many of the activities are easily adapted to other wetlands situations.



D. Kenyon, Michigan Department of Natural Resources

Fish and Fisheries (1983)

Cost: \$11.50 includes shipping and handling

Alaska Sea Week
Alaska Sea Grant
University of Alaska Fairbanks
P.O. Box 75540-CC
Fairbanks, AK 99775-5040 USA
907/474-7086
<http://www.uaf.alaska.edu/seagrant>

Fish and Fisheries is targeted at grade 5 and examines the full cycle of fisheries, from fish identification and habitat needs to fish processing, retailing, preparation, and eating. Although a significant amount of time is spent on the salmon fishery, other fish (e.g., halibut, herring, and blackfish) are featured, as are various fishing methods used in Alaska, including traditional fishing methods. Aboriginal and subsistence perspectives are prominent, as are the key issues of Alaska fisheries.

Fish Banks, Ltd. (1994)

Cost: \$100 plus shipping and handling

Institute for Policy and Social
Science Research
Thompson Hall
University of New Hampshire
Durham, NH 03824 USA
603/862-2244
<http://www.unh.edu/ipssr/index.html>

Fish Banks is a focused, computer-assisted simulation game (complete with game board, money, and





boats) designed to teach grades 7–12 about sustainable renewable resource principles. Using commercial ocean fisheries as the platform, small groups become “fishing companies,” and each is encouraged to “maximize its assets.” Soon, in the spirit of competition, the groups are almost always on their way to overexploitation and collapse of the resource. The lessons learned are hard, but at least the economic and fisheries losses are only virtual. The computer program does two important things. First, it allows quick computation of catch and assets at the end of each round and keeps a running total of each group’s status. More importantly, however, it accurately models the response of fish populations to fishing pressure. If you wait for significant problems to develop, it is too late, and stocks take a long time to recover. Groups can then go back and start over, applying the lessons learned to create a sustainable fishery through self-regulation. The simulation takes 3–4 hours to run and debrief, and it has been used successfully in grades 7 and up (most commonly in grades 9 and 10) and with resource managers, planners, and policy makers. The lesson plan emphasizes process, allowing considerable latitude for how the game is put in context and how learning is reinforced and extended. A number of pertinent resource articles are included with the game, and users receive bian-

nual newsletters that provide operational tips, announcements of upgrades, resource-related information and references, and upcoming training sessions. Qualified trainers may be available in your area to answer questions or offer suggestions.

Fish Friends (1995)

Cost: \$14.95 plus \$2.70 shipping and handling

Atlantic Salmon Federation
P.O. Box 429
St. Andrews, New Brunswick E0G 2X0
CANADA
506/529-4581
<http://www.asf.ca>

Fish Friends is a focused curriculum supplement for grades 4–6 that links human and aquatic environments through an emphasis on fish, particularly Atlantic salmon. Students may have the opportunity to hatch, rear, and release their own salmon. *Fish Friends* is held together by a number of conceptual threads: habitat, biodiversity, life cycles, change, adaptation to change, freshwater ecology, sustainability, and stewardship. Learning is active and based on discovery. The program is particularly notable for

its emphasis on biodiversity and concepts related to sustainability as well as for the extent of background information. Graphic design is excellent, providing user-friendly materials for both teacher and student.

The Fish Hatchery Next Door (1997)

Cost: Free

Aquatic Education Program
Oregon Department of
Fish and Wildlife
P.O. Box 59
Portland, OR 97207 USA
503/872-5264
<http://www.dfw.state.or.us>

This guide for grade 9 is designed to enhance a class visit to a local hatchery site, but it goes much farther, providing almost a complete course in aquatic resources and their management, with an emphasis on salmonids. Beginning with the water cycle and watersheds, the program moves on to the salmonid life cycle, how fish work, fish habitat needs, and aquatic ecosystem functions before examining hatchery functions and the role of stocking in the preservation of wild fish stocks (the advantages and disadvantages of stocking are addressed from a genetic perspective). From a process perspective, students become involved in planning their trip, preparing a journal, determining a code of behavior, producing their own newspaper, and writing news and feature stories related to what they have learned in their study of fish hatcheries and their effect on salmonid stocks in Oregon. Much of the material could be used wherever anadromous fish occur, and some of the activities have adaptations for Atlantic salmon.

Fish Iowa! (1990)

Cost: Free with training to Iowa educators

Aquatic Education Coordinator
Iowa Department of
Natural Resources
2473 160th Road
Guthrie Center, IA 50115 USA
515/747-8383
<http://www.state.ia.us/fish>

Fish Iowa was developed to complement *Aquatic Project WILD* and links the basic concepts of fish identification, biology, and ecology to the beginning skills of fishing for grades 7–12. Videos are used to reinforce units on an introduction to fishing and the Iowa resource, fish senses and characteristics, basic tackle and spincasting, baits, lures and their presentation, and landing and caring for the catch. This is a simple and effective program for beginning anglers.

Fish Ways (1991)

Cost: Fish Ways can be obtained only through participation in a workshop, and cost varies depending on the state or province

Canadian Wildlife Federation
2740 Queensview Drive
Ottawa, Ontario K2B 1A2
CANADA
613/721-2286
<http://www.cwf.fcf.org>

This two-manual set is divided by grade levels (primary or junior and intermediate or senior) and further divided by age within each manual. The manuals contain activities (primary or junior) or lessons (intermediate or senior) on various topics related to aquatic resources. Each lesson or activity contains behav-

ioral objectives, background information, a procedure, a (generally) nonintrusive evaluation, and extensions. Lessons or activities can be linked to units (some are suggested) or used individually to enhance existing curricula. All examples and issues are found in Ontario, but many issues are broad in scope and most species are common to the northern region of the United States. *Fish Ways* is similar in format to *Project WILD* (a popular environmental education curriculum; see *Aquatic Project WILD*) and is designed to comply with Ontario Ministry of Education curriculum guidelines.



D. Kenyon, Michigan Department of Natural Resources

Fisheries Management (1993)

Cost: Free to teachers

Education Division
Missouri Department of Conservation
P.O. Box 180
Jefferson City, MO 65102-0180 USA
573/751-4115 ext. 630
<http://www.state.mo.us/conservation>

Fisheries Management provides a basic introduction to aquatic resources and the most common methods of sampling, assessing, and managing them for grades 7–12. The information is provided in a narrative, and simple lesson plans outline each topic area and link content to specific investigative field activities from the *Aquatic Field and Classroom Activities* supplement.

Fisheries Tour Packet (1996)

Cost: Price based on copying charges

Minnaqua Urban Angling Program
Minnesota Department of
Natural Resources
500 Lafayette Road
St. Paul, MN 55155 USA
612/296-6157
<http://www.dnr.state.mn.us>

This resource packet is designed to prepare students in grades 4–8 for a tour of a fishery (hatchery) facility; it contains not only a manual and worksheets, but slides, color pictures, keys, diagrams, and three reference books. The packet is received on loan and returned after the tour. There are four lessons designed to cover biology and identification, habitats and food chains, management techniques, and regulations and ethics. The materials make heavy use of the resource books, which include other materials reviewed here (*Aquatic Resources Education Curriculum*, *Sport Fishing & Aquatic Resources Handbook*). The lessons combine discovery-based activities with slide presentations and value-based role playing.

Much of the material is generic and could be easily adapted to other settings, particularly the northern region of the United States and Canada.

Fishing for Answers (1991)

Cost: Free to teachers

Education Division
Missouri Department
of Conservation
P.O. Box 180
Jefferson City, MO 65102-0180 USA
573/751-4115 ext. 630
<http://www.state.mo.us/conservation/>

This short, workbook-based program provides an introduction to aquatic resources and their management for grades 4–8. It uses short, descriptive inputs, comprehension-related questions, and paper and pencil activities to introduce and reinforce basic concepts such as the water cycle, watersheds and land use, water pollution, aquatic ecosystems and food webs, aquatic research, and fishing. The workbook can stand on its own or provide an introduction for an optional pond study and fishing trip. A teacher's edition provides answers and detailed information on preparing for and leading the trips. The lessons are also linked to Missouri's level VI core competencies and key skills.

Fishing Fun for Kids (1996)

Cost: \$1.25 plus 10% of order for shipping and handling

Future Fisherman Foundation
1033 North Fairfax Street, Suite 200
Alexandria, VA 22314 USA
703/519-9691
<http://www.americanoutdoors/fishingfun>

This K–6 comic and activity book is part of the *Hooked on Fishing, Not on Drugs* campaign and provides a short introduction to fishing for young children. It can be used directly by youth or by parents and youth together. Although the emphasis is on gear and basic techniques, responsibility, safety, and environmental awareness are briefly touched on. It is a small black-and-white publication that can be used as a coloring book.



National Fishing Week Steering Committee

Fishing-Get in the Habitat! (1991)

Cost: \$1.75 (youth booklet), \$5.50 (leader's guide) includes shipping and handling

Minnaqua Urban Angling Program
Minnesota Department of
Natural Resources
500 Lafayette Road
St. Paul, MN 55155 USA
612/296-6157
<http://www.dnr.state.mn.us>

This program is designed for youth aged 4–9 with varying levels of fishing ability. It is based on a series of hands-on activities culminating in an actual fishing trip. Suggested use of activities is based on experience levels, but most motivated youth within the age range could work through them all. The program goes beyond angling to include fish identification, biology, and ecology, as well as the relation of responsible angling to resource management and stewardship. Example timetables for events and clinics are provided, as are a planning schedule and planning outlines for each event or clinic type. The program also makes use of a youth booklet that includes fun, simple activities related to the concepts being explored as well as other, easy to obtain materials (e.g., *Fishing Regulations*, *Minnesota Fish Consumption Advisory*). It is also cross-

referenced to sections of the *Sport Fishing & Aquatic Resources Handbook*. Although specific to Minnesota, most of the material is generally applicable and most of the discussed species are native to at least the northern region of the United States and southern Canada.

Fishing is Funtastic! (1997)

Cost: \$2 plus shipping and handling (depends on quantity)

Outdoor Empire Publishing, Inc.
511 Eastlake Avenue East
Seattle, WA 98109 USA
206/624-3845 ext. 251
oeppubs@mail.nwlink.com

This K–6 comic and activity book is similar to *Fishing Fun for Kids* and can be used in the same way.

4-H Marine Project (1989)

Cost: Single copies are free

Virginia Cooperative
Extension Service
Box 9081
Virginia State University
Petersburg, VA 23806 USA
804/524-5848
<http://www.vsu.edu>

A set of booklets and associated leader's guides examine different facets of primarily coastal, estuarine, and

associated freshwater environments for grades 4–6. Several of these booklets focus on the effects of human activity on Chesapeake Bay. The booklets provide background information, review activities, and suggestions to locally examine and evaluate the introduced concepts. The leader's guides provide objectives, concepts, vocabulary, and brief directions but primarily offer answers to the worksheet questions in the booklets. The booklets that relate directly to fisheries education and that were reviewed include: *Marine Resources*, *What is Water Pollution?*, *The Story of Submerged Aquatic Vegetation in Chesapeake Bay*, *The Story of Soil Erosion Around Chesapeake Bay*, and *The Story of Nutrient Enrichment of Chesapeake Bay*. Each unit provides an introduction to each topic. Students then complete a series of paper and pencil activities that both reinforce and extend the concepts learned. Additional research is encouraged, and references are provided. [Note that *Marine Resources*, an additional booklet that relates directly to fisheries education, is currently being rewritten and therefore was not reviewed. Also, although none of the units reviewed are out of print, some of the other units that are part of this resource are no longer available or are being revised.]

Getting to Know the Whales (1995)

Cost: \$16.95 includes shipping and handling

Whales in the Classroom
Singing Rock Press
P.O. Box 1274
Minnetonka, MN 55345 USA
612/935-4910
<http://www.whalebooks.com>

This program, for grades 7–9, takes a comprehensive look at whales and the effect of humans on their populations. Content related to whale biology, behavior, ecology, research, and human interaction is interspersed with paper and pencil activities confirming and extending knowledge gained. One unique feature is a series of interviews with whale researchers that provide personal perspectives on whale biology, profile careers in

oceanographic science, explore some of the experiences and values generated through that experience, and encourage students to consider careers in marine science.

Great Lakes Environmental Education Project (1994)

Cost: Single copy free, may copy as needed.

East Michigan Environmental
Action Council
21220 West 14 Mile Road
Bloomfield Township, MI 48301 USA
248/258-5188

This 2-week curriculum for grades 9–12 focuses on the issue of toxic chemicals in the Great Lakes and addresses fish and fisheries issues within that context. The project has two key components: (1) a packet of

resource materials organized by key focusing questions, and (2) a mock mediation session concerning a specific environmental case involving toxic chemicals. After an overview using maps, brochures, and a slide show, groups are formed and each group is provided with one of the questions and resource packets. Each group is responsible to teach the class that information and to create four quiz questions that cover the material. Valuing exercises relate the material learned to students' personal lives. After group reports are given, the class participates in a detailed mediation role play based on a fictional case involving toxic chemicals. The role play is somewhat unique in that it involves a cross-border issue, focuses on native concerns and fisheries losses, and deals to some extent with the implications of those fisheries losses to

National Fishing Week Steering Committee





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human values. [Note that this is currently a pilot project and not yet available for sale.]

Great Lakes Instructional Materials (1995)

Cost: Free but \$3 for shipping and handling

Ohio Sea Grant College Program
1541 Research Center Building
1314 Kinnear Road
Columbus, OH 43212-1194 USA
614/292-1078
<http://www.sg.ohio-state.edu>

Although this program for grades 5–12 does not focus on fisheries, it addresses the potential effects of global warming on the Great Lakes ecosystem that may have important consequences for regional fisheries. In addition, the program has a number of units that relate directly to fisheries education, including those on nonindigenous species, Great Lakes fish, estuary values and changes, toxic chemicals, and global change. Based on “earth systems education,” a process designed to “create a curriculum more responsive to human needs and future quality of life,” this program provides opportunities for students to access and analyze data and to solve problems concerning current issues and potential scenarios. The program is unique in its extensive use of data sets, its use of computers, and its sys-

tems to access information. Hands-on activities illustrate the concepts and give meaning to the data. Although linked to National Science Education Standards for grades 5–12, the program is most appropriate for intermediate and particularly senior levels.

Hooked on Fishing, Not on Drugs-Teacher's Guide (1993)

Cost: \$35 plus \$4 shipping and handling

Future Fisherman Foundation
1033 North Fairfax Street, Suite 200
Alexandria, VA 22314 USA
703/519-9691 to obtain order form
847/364-1222 to order via credit card or purchase order

Hooked on Fishing, Not on Drugs combines the teaching of fishing, environmental education, and drug prevention. It contains a wide range of program elements and support materials in addition to the Teacher's Guide reviewed here. Two of those materials (*Aquatic Resources Education Curriculum*

and *Sport Fishing & Aquatic Resources Handbook*) have also been included as part of this review and should be considered in an overall analysis of this interdisciplinary program. The Teacher's Guide provides background information and lesson plans that integrate fishing, aquatic resource education, and drug prevention topics. Four grade clusters (K–3, 4–6, 7–8, and 9–12) provide coherent units containing background information, a section on working with parents and communities, and activity-based lesson plans. The Teacher's Guide shows how to use four key elements to meet drug prevention objectives: a discussion of positive actions that individuals can take to stay away from drugs; instruction on how to fish as a positive alternative that can raise self-confidence and self-esteem; instruction on how to become an ethical, environmentally responsible angler; and the involvement of parents or trusted adults in discussing and modeling positive behaviors with their children. The Teacher's Guide also refers to student and instructor manuals reviewed elsewhere, and these can be used to expand and deepen lessons. Several case studies of successful programs are also provided.



M. Zim, University of Michigan

Iowa WILD/ Aquatic (1990)

Cost: Free with participation in workshop

Aquatic Education Coordinator
Iowa Department of
Natural Resources
2473 160th Road
Guthrie Center, IA 50115 USA
515/747-2200
<http://www.state.ia.us/fish>

This manual provides teachers with background information and K–6 student materials and sample worksheets specific to Iowa that can be used to supplement and support *Aquatic Project WILD*. Materials are organized into study units that include background information on a topic that is pertinent to Iowa, a list of *Aquatic Project WILD* activities that relate to the topic, and a list of teacher aids available for use with the activities in the unit. Some units also include an introductory activity. Additionally, each *Aquatic Project WILD* activity related to the study units is listed, together with supplemental information about Iowa, teaching suggestions, evaluations, student materials, and a list of available teacher aids. Although fisheries education issues and concepts are integrated, they are not the focus of these materials.

Junior Anglers Program (1989)

Cost: Free with participation in workshop

Aquatic Resource
Education Program
Wisconsin Department of
Natural Resources
101 South Webster Street, Box 7921
Madison, WI 53707-7921 USA
608/266-2272
<http://www.dnr.state.wi.us/eeek>

The workbook and instructor's guide provide a basic introduction to fish, habitat, fishing gear, and fishing for grades K–6. Lesson plans provide the necessary background and proce-

dures and offer questions that can easily be used by group leaders with limited educational backgrounds. The materials, however, provide less information (particularly related to gear types and fishing methods) than similar programs.

Kids Fishing-It's Catching On! (1997)

Cost: Free

Illinois Department of
Conservation-Fisheries
600 North Grand
Avenue West
Springfield, IL 62706 USA
217/782-6424
<http://www.dnr.state.il.us>

This black-and-white activity book is designed to provide children in grades K–6 with the basic information required to fish responsibly. Primary youth may work through the book with parents or a group leader, whereas junior youth can follow it on their own. Basic information is reinforced through puzzles, games, or suggested practices. Sections on equipment and techniques are balanced with conservation messages.

Lake Effects: The Lake Superior Curriculum Guide (1996)

Cost: \$5 includes shipping and handling

Lake Superior Center
353 Harbor Drive
Duluth, MN 55802 USA
218/720-3033
<http://www.lakesuperiorcenter.org>

Lake Effects offers activities for K–12 in the style of *Project WILD*. The focus is on Lake Superior and its watershed. Coverage is broad, ranging from the lake's physical evolution to

M. Zim, University of Michigan



current human impact concerns. The guide is organized into four sections: the physical, living, and cultural aspects of Lake Superior, and a synthesis. Each of the first three sections includes background information, and additional background information is contained within each activity. Although some fisheries issues and concepts are addressed, they are not the primary focus of these materials. Related issues that receive significant coverage are pollution and exotics.

Lake Erie (1986)

Cost: \$5 each includes shipping and handling

Ohio Sea Grant College Program
1541 Research Center Building
1314 Kinnear Road
Columbus, OH 43212-1194 USA
614/292-1078
<http://earthsys.ag.ohio-state.edu>

There are three booklets in this K–4 series: *Take a Bow* (physical and cultural geography of the Great Lakes), *Build a Fish to Scale* (fish parts, basic classification, and identification), and *A Day in the Life of a Fish*

(fish behavior, adaptation, and habitat). In these materials, fairly simple, interdisciplinary activity ideas are linked to basic facts about the Great Lakes and fish, although only a few links to key fisheries issues are made. Notably, the last booklet provides fairly detailed observations and activities to introduce experimentation and the scientific method.

The Lake Superior Game (1991)

Cost: Free

Minnesota Sea Grant Publications
2305 East 5th Street
Duluth, MN 55812-1445 USA
218/726-6191
<http://www.d.umn.edu/seagr>

Students in grades 4–12 role-play various Lake Superior users and simulate their actions by adding things to, or taking water from, a bucket of water representing Lake Superior. Roles are reinforced with information on the consequences of behaviors and actions that can be taken (particularly by individuals) to mitigate or eliminate negative consequences. Although a few specific examples relate directly to Lake Superior, most of the effects are general enough that the role play could be used with almost any lake. Indeed, similar versions (e.g., *The Lake Game/Youth*, *The Lake Game for Adults*) are available from the same source for lakes in general.

The Life of the Lakes (1996)

Cost: \$40 for all materials (or \$7.50 per manual, \$5 per guide, \$1.50 per each poster, \$25 per video) includes shipping and handling

Michigan Sea Grant
Michigan State University
334 Natural Resources Building
East Lansing, MI 48824-1222 USA
517/353-9748
<http://www.engin.umich.edu/seagrant>

A 1-hour video forms the centerpiece of this detailed examination of Great Lakes fisheries. The video is supported by educational materials, a guide, and posters. The educational materials include activities, curriculum materials, concepts, discussion questions related to video segments, and teaching ideas appropriate for grades 7–12. The guide provides comprehensive background information related to the video, including graphics and posters. The six posters feature maps of each Great Lake and the basin and provide text describing aspects of the

fisheries and illustrations of Great Lakes fishes. Together, these resources divide the history of the Great Lakes and their fisheries into five eras and examine the social, technological, and environmental changes that resulted in fisheries changes. The approach is holistic and ecosystemic and ends with an exploration of the future and the questions and issues that students will have to address in their adult lives.

Living in Water (2nd edition) (1989)

Cost: A 3rd edition (1997) is available for \$23.95 plus \$4 shipping and handling

Kendall Hunt
4050 West Mark Drive
P.O. Box 1840
Dubuque, IA 52004-1840 USA
800/228-0810
<http://www.kendallhunt.com>

This is a basic, hands-on aquatic science curriculum for grades 4–6 that touches but does not focus on a number of fisheries-related issues and concepts. The material provides extensive background on the basic principles and concepts of aquatic ecology, from the solubility of water and its effects on the distribution of aquatic life, to adaptations to aquatic environments, food web interactions, and the importance of aquatic research and exploration. Students are always actively involved. [Note that the current 3rd edition was not reviewed. The developers indicate that fisheries education content in the revised edition has increased.]

D. Kenyon, Michigan Department of Natural Resources



Marine Mammals, Coastal and River Issues (1984)

Cost: \$12.50 includes shipping and handling

Alaska Sea Week
Alaska Sea Grant
University of Alaska Fairbanks
P.O. Box 75540-CC
Fairbanks, AK 99775-5040 USA
907/474-7086
<http://www.uas.alaska.edu/seagrant>

Alaska Sea Week is a set of seven manuals that provide a complete aquatic resource curriculum for grades 6–12. Initially developed in 1984 by the Alaska Sea Grant Program, it was reprinted in 1994 and therefore contains some dated material. Where currency is critical, students are encouraged to update content through research. Alaska Sea Grant provided two manuals for detailed program review. These manuals use a community perspective to examine a number of fisheries and related resource development issues. The major issues examined include whales and whaling, logging, oil, and community planning. Aboriginal and subsistence perspectives are prominent, and the use of local experts is encouraged. A major theme is the need to resolve conflicts related to sustainability and multiple resource use. A broad range of classroom approaches is combined with community surveys and field trips. The manuals also include reviews of related resource materials and a process unit for planning and leading a 3- to 5-day Sea Week camp.

Ontario Ministry of Natural Resources



Massachusetts Aquatic Resources Education Program (1986)

Cost: Free to trained volunteers

Aquatic Resources Education Program
Massachusetts Division of
Fisheries and Wildlife
Field Headquarters
Westborough, MA 01581 USA
508/792-7270 ext. 109
<http://www.magnet.state.ma.us>

This is an instructor training manual. Although the manual provides extensive information on many aspects of fishing gear, fishing, aquatic resources, and human effects and responsibilities, “information taken from it will be dependent on the level of expertise of the individual students.” There is no suggested age range, but the materials are best adapted to fit grades 4–8. The manual is a compendium of text, outlines, brochures, and handouts published by a number of authors, but no lesson plans or supporting activities are provided. Some discussion questions are suggested. The topics addressed are typical for an aquatic resources education program, but more information than usual is provided on the historical aspects of fishing, fishing equipment and care, and the care, cleaning, storage, and preparation of the catch. [Note that the *Aquatic Resources Education Program* is currently being revised.]

Master Anglers Program (1988)

Cost: Free with participation in workshop

Aquatic Resource
Education Program
Wisconsin Department of
Natural Resources
101 South Webster Street, Box 7921
Madison, WI 53707-7921 USA
608/266-2272
<http://www.dnr.state.wi.us>

The *Master Anglers Program* is designed for grades 4–12 and youth with some fishing experience. Although “the basics” are provided, more time is spent on advanced tackle and techniques. This program is similar to the *Aquatic Resources Education Program* in content coverage but generally offers less depth. Also, less time is spent on pollutants and more on species-specific habitat requirements, behaviors, and fishing techniques. Like the *Aquatic Resources Education Program*, this program contains considerable background text, but it has more extensive lesson plans and supporting activities. Although most of the information has broad applications, examples of management and regulations are from Wisconsin. [Note that this program is currently being updated.]

The Ocean Crisis (Our Only Earth) (1990)

Cost: \$22 plus \$3 shipping and handling

Zephyr Press
P.O. Box 66006
Tucson, AZ 85728 USA
520-322-5090
<http://www.zephyrpress.com>

This process-oriented program is one in a series of seven that follow the same format. They integrate science, language arts, and social studies in a problem solving process that culminates in a youth summit, which, in turn, results in the presentation and implementation of solutions. Although directed at students in grades 4–12, this program would be most appropriate for the intermediate and senior levels. The focus of *The Ocean Crisis* is pollution, with secondary references to problems created by overfishing and bycatch, particularly of marine mammals. Because much of the information is generated by students during the research phase, only minimal introductory content is provided.

Pathway to Fishing (In- Fisherman) (1991)

Cost: \$61 includes shipping and handling

Order: S-N 024-010-00697-8
U.S. Government Printing Office
Superintendent of Documents
P.O. Box 371954
Pittsburgh, PA 15250-7954 USA
202/512-1800
http://www.access.gpo.gov/su_docs

This material provides a minimum 1-hour basic introduction to fishing for grades 4–12. It incorporates those aspects of habitat, biology, and ecology that relate to finding and catching fish. Participants rotate through 12 stations in a short time, resulting in great reliance on demonstrations and discussions. Opportunities exist, however, for knot tying and casting. The program provides the necessary presentation materials, but fishing gear and some fish models are needed.

National Fishing Week Steering Committee



Ready, Set...Go Fishing! (1995)

Cost: \$2 plus shipping and handling
(depends on quantity)

Outdoor Empire Publishing, Inc.
511 Eastlake Avenue East
Seattle, WA 98109 USA
206/624-3845 ext. 251
oeppubs@mail.nwlink.com

This is a K–3 coloring and activity book that is geared to younger ages than are *Fishing Fun for Kids* and *Fishing is Funtastic*. It has simpler content and messages but a similar approach and scope.

Resources Management (1992)

Cost: \$15 includes shipping and handling

Project WATER
Louisiana Sea Grant
College Program
3990 West Lakeshore Drive
Baton Rouge, LA 70803 USA
504/388-6710
<http://www.csc.noaa.gov/SCSeaGrant/text/publications.html>

This 15-minute video and discussion guide for grades 4–9 provides an introduction to resource management issues and techniques using examples from sportfisheries. A question-based discussion format is used before, during, and after the video to promote involvement, extend learning, and monitor results.

Salmonids in the Classroom-Primary (1978)

Cost: \$60 includes shipping and handling

Head, Public Involvement Program
Department of Fisheries
and Oceans
555 West Hastings Street
Vancouver, British Columbia V6B 5G3
CANADA
604/666-6614
<http://www.pac.dfo.ca>

There are two sets of curriculum materials that make up *Salmonids in the Classroom*: primary and intermediate. Each provides the opportunity for students to raise salmon eggs to the fry stage, but the emphasis and processes of the supporting materials differ. At the primary level, the emphasis is on the basic life stages of salmonids, their needs, and their interactions with the environment (human impacts are included but not emphasized). Students read, or are read, the story of Chuck E. Chum, a chum salmon. Each chapter has related activities and worksheets to reinforce, extend, and evaluate lessons. There are lists of related audiovisual materials, posters, and brochures for each chapter. Also included are directions for science projects, field trips, and integrated learning centers. Materials are exceptionally well organized, clear and easy to use, and age appropriate.

Salmonids in the Classroom-Intermediate (1978)

Cost: \$70 includes shipping and handling

Head, Public Involvement Program
Department of Fisheries
and Oceans
555 West Hastings Street
Vancouver, British Columbia V6B 5G3
CANADA
604/666-6614
<http://www.pac.dfo.ca>

This set of materials is more extensive than that for the primary level. Two stories and a set of videos provide the thematic structure and introduction for three units. The first unit describes the basic characteristics and life cycle of the salmon, but in more depth and with more emphasis on human impacts than in the primary curriculum. The second unit looks in detail at the commercial, recreational, and native food fisheries. The final unit deals with human impacts in some depth, as well as the role of regulation, management, and research in the attempted protection and enhancement of salmonid stocks. Science projects and integrated activities support and enhance the basic units. Format, lesson plans, and available resources are similar to those for the primary level.

Save Our Seas and Adopt-A-Beach (1993)

Cost: \$10 includes shipping and handling

California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105 USA
415/904-5200
<http://ceres.ca.gov/coastalcomm/index.html>

Save Our Seas is a K–12, interdisciplinary curriculum on marine debris, although it touches on other aspects of marine pollution. The material is divided into four grade levels: K–3, 4–6, 7–8, and 9–12. Each level stands alone and addresses (1) why the marine environment should be cared about, (2) the marine debris problem, and (3) how individuals can be part of the solution. Each level also links marine debris to the larger issue of solid waste. Participation in a waterway or beach cleanup is encouraged at each level. In addition, each level addresses different aspects of the issue so that repetition is limited should youth get involved in the program at more than one level. Although the values of marine fisheries are mentioned, and fishing-related debris and “ghost netting” are discussed, no strong link is made between marine debris or solid waste and core fisheries issues.

Adopt-A-Beach, a related youth group program, provides youth group leaders with the structure, processes, and formal support to conduct beach cleanups. This program provides related educational activities that are similar to but simpler than those in *Save Our Seas*. It also suggests additional resources. One value of these programs lies in their link to a national marine debris survey coordinated by the Center for Environmental Education in Washington, D.C. Data cards completed by each group contribute to a national database that will help policy makers develop solutions to the marine debris problem. In addition, groups are encouraged to conduct their own analysis and engage in local actions that will help reduce the marine debris problem.



National Fishing Week Steering Committee

Seals, Fish and You (1994)

Cost: Free to teachers

International Marine Mammal Association, Inc.
P.O. Box 515
Guelph, Ontario N1H 6K9 CANADA
519/767-1948
<http://www.imma.org>

This is a multimedia program for grades 11–12 that allows examination of all perspectives on the current dispute over the hunting of seals in Atlantic Canada. Although focused on the interactions between seals and commercially important fish stocks, the issues raised are global in nature and importance. Content can be generalized to any competition for food among commercial fish stocks and other species. Students are encouraged to read widely, evaluate the sources, and draw their own conclusions. The program is designed as either an independent study or a combined independent and small group experience, with a structured discussion and role play recommended for both. A significant number of primary and secondary sources are provided, as well as a description of each resource. It is recommended that at least 12 hours be scheduled for completion of the program, and an optional “mini-package” is proposed if less time is available. The material is designed to comply with Ontario Ministry of Education curriculum guidelines.

Sport Fishing & Aquatic Resources Handbook (1991)

Cost: \$3.95 plus \$4.60 shipping and handling

Future Fisherman Foundation
1033 North Fairfax Street, Suite 200
Alexandria, VA 22314 USA
703/519-9691 to obtain order form
847/364-1222 to order via credit card or purchase order

This *Handbook* is part of the *Hooked on Fishing, Not on Drugs* program but is often used on its own for

grades 4–9. It is an introductory information manual to fishing, fish biology, and habitat. Fairly simple activities are appended to the back of each chapter. It is designed for youth to use with the help of their parents or group leaders.

Sportfishing and Aquatic Resources Education Program (1993)

Cost: \$13 includes shipping and handling

New York State Department of Environmental Quality
4-H Youth Development
108 Fernow Hall, Cornell University
Ithaca, NY 14835 USA
607/255-2814
<http://sarep.dnr.cornell.edu>

Sportfishing and Aquatic Resources Education Program is New York’s fishing-based aquatic education program for grades 5–8. The program exists “to ensure the future of fishing, fish, and the aquatic and marine habitats that support them.” The program provides an introductory instructor’s manual and a series of booklets: *Aquatic Biology*, *Community Service*, *Angling Ethics*, *Fisheries Management*, *Safety*, *Angling Skills*, and *Aquatic Sampling*. The instructor’s manual gives tips on organizing a club or program, shows how to plan and lead sessions (including teaching techniques), and discusses liability, risk management, and safety. Fishing is approached differently here than in

other fishing-based materials in that this program provides an extensive outline and key points but depends on other available sources of information for actual content. There is significant emphasis on the nonfishing aspects of the program, although fishing is linked to other topics whenever possible (e.g., food preferences and lure types, cover, and fishing locations).

Supplemental Curriculum Activities for Youth with Paddle-to-the-Sea (1988)

Cost: \$10 includes shipping and handling

Ohio Sea Grant College Program
1541 Research Center Building
1314 Kinnear Road
Columbus, OH 43212-1194 USA
614/292-8949
<http://www.sg.ohio-state.edu>

This series of activities for grades 3–6 reinforces and extends the experiences and knowledge provided in Holling Clancy Holling’s *Paddle-to-the-Sea*. Many of the activities emphasize the language arts, but the curriculum fits well with an examination of the Great Lakes region’s geography and human development. Several activities also touch on a number of fisheries issues and concepts, but actual fisheries content is minimal.



Ontario Ministry of Natural Resources



National Fishing Week Steering Committee

Coverage of the curriculum is dependent on the particular interests of the teacher and class and the quality and depth of discussion about the book and activities.

Teacher's Guides for Lake and Stream Ecosystem Posters (1997)

Cost: Free

Kentucky Department of Fish and
Wildlife Resources
Arnold L. Mitchell Building
1 Game Farm Road
Frankfort, KY 40601 USA
502/564-4336
[http://www.state.ky.us/agencies/
fw/teacher.html](http://www.state.ky.us/agencies/fw/teacher.html)

In this material for grades 4–12, two detailed posters drive the learning process and provide a central focus for related content and action. The guides add specific content related to ecology, ecosystems, biodiversity, and human impacts. Some simple activities are provided in the stream guide, but many links are made to specific *Aquatic Project WILD* activities (which are assumed to be available and used).

WOW! The Wonders of Wetlands (1995)

Cost: \$15.95 plus \$4.50 shipping and handling

Environmental Concern, Inc.
P.O. Box P
St. Michaels, MD 21663 USA
410/745-9620
<http://www.wetland.org>

This is a major K–12 activity manual similar in format and process to *Project WILD* or *Project WET* (WOW is a companion piece to *Project WET*) with a focus on wetlands. Within that context, fish and fisheries are introduced but not emphasized. Related concepts are covered in some detail, but often with minimal direct

relation to fish and fisheries. Additional resources are required to make some of those connections strong. The activities are grouped in thematic sections: (1) So this is a Wetland (introductory wetland concepts and definitions); (2) The Wetland Community (wetland concepts and processes); (3) Drip, Drop, Dribble and Splash! (the role of water in wetlands and water-related wetland functions; includes productivity, pollution, and erosion); (4) Going Down Under (the role of soil and soil processes); and (5) Wetlands and People (interactions and issues, stewardship and involvement).

Zebra Mussel Mania (1997)

Cost: \$45 per guide, \$35 per portfolio, \$400 per trunk includes shipping and handling

Illinois-Indiana Sea Grant
University of Illinois
65 Mumford Hall
1301 West Gregory Drive
Urbana, IL 61801-3068 USA
217/244-8809
<http://www.ansc.purdue.edu/sgnis>

Zebra Mussel Mania is a traveling trunk program designed to provide students in grades 5–6 with an introduction to zebra mussels and the array of problems commonly associated with these and other exotic species. The activities and materials are hands-on and emphasize inquiry-based, small group cooperative learning. Process is highlighted and reinforced through an attitude survey, student learning strategies, assessment alternatives, and interdisciplinary links. [Note that this evaluation is based only on the teacher's guide because no other materials were provided for review.]

ADDITIONAL RESOURCES

OTHER RESOURCES FOR FISHERIES EDUCATION

The following materials or programs are reviewed but not included in the materials summary chart. They may provide unique supporting resources.

Many of the reviewed materials are being revised, and contact information and prices are subject to change. Also, prices listed here are in U.S. dollars for single copies only. Most organizations offer bulk discounts for larger orders.

Materials received after the deadline

Charting Our Course (1995)

Cost: Free

Maine Coastal Program
Station 38
State Planning Office
Augusta, ME 04333 USA
207/287-8062 or 207/287-3261
<http://www.state.me.us/education>

This activity guide for grades 6–12 focuses on the Gulf of Maine and is designed to enhance Maine’s annual Coastweek, a week of “educational and recreational events highlighting the beauty and productivity of our coastal resources.” It is designed to help students understand the importance of the Gulf of Maine’s resources, learn about the pressures facing the Gulf, and develop the skills and commitment necessary to make sound decisions regarding the Gulf’s future. Although there is information on the

Gulf per se, the guide is general enough to be adapted to any coastal area. There is coverage of the water cycle and watersheds, but the focus is on various aspects of marine pollution and students’ role in contributing to and solving related problems. Student activities range from discussion of questions and role plays to experimentation, demonstrations, field trips, and on-site beach cleanups. Some fisheries education issues and concepts are addressed in this program, particularly those related to pollution (Issue 2) and habitat (Issue 1). However, fisheries education content is peripheral and provided only in connection with the effects of pollution on fisheries resources.

Our Great Lakes Connection (1985)

Cost: Out of print, available on loan

University of Wisconsin Extension
Environmental Resources Center
1450 Linden Drive
University of Wisconsin-Madison
Madison, WI 53076 USA
608/262-5951

This activity guide provides a broad look at the Great Lakes for K–8 students. Ranging from the tip of Lake Superior to Montreal and from space satellites to lake bottoms, these materials are designed to fit into existing language arts, history, geography, social studies, art, mathematics, and science curricula. They do not present a curriculum on their own. Coverage of

fisheries education issues and concepts is limited; only the following are touched on: (1) the value of fish to woodland Indians and the fishing techniques they used; (2) some of the major sport, commercial, and forage fish in the Lakes and recent effects of exotic introductions (e.g., smelt, lamprey, alewife); and (3) the impact of pollutants on the Lakes (through a PCB problem solving activity). The strength of the material lies in its use for history, geography, and social studies.

Table Talk (1996)

Cost: \$40 plus \$8 shipping and handling

British Columbia Teachers’ Federation
Lesson Aids Service
100-550 West 6th Avenue
Vancouver, British Columbia V5Z 4P2
CANADA
604/871-2181
<http://www.bctf.bc.ca>

Table Talk is a comprehensive learning resource designed to teach grades 7–9 students to use decision making skills to solve a land use conflict. Students learn about decision making and watersheds and use this knowledge to participate in an extensive role play simulation, representing different sectors or interest groups (forestry, settlement, tourism and recreation, fishing, agriculture, mining, and conservation). They work together to plan the future land use and water use in the Pangea River Valley (a hypothetical area in British Columbia). This integrated (science, social studies, and language arts) unit can take from 80 (quick program) to more than 150 (complete program) hours. Information is provided through two short

background videos, three editions of a newspaper containing realistic information about the environmental and economic impacts of each sector, a play that focuses on sustainable development, stewardship, and the impacts of job losses, and a series of skits that illustrate the pros and cons of various issues related to land use in British Columbia. Fishing and fisheries represent a sector in this role play. Sport, commercial, and subsistence (native) fishing provide just over 5% of all jobs in Pangea. One spokesperson and three alternates provide various fisheries-related perspectives to round table discussions. Some fisheries education issues are addressed, including pressures on fish habitat from development (Concept 1.5), the effects of pollution (Issue 2), the roles of watersheds (Concept 5.2), and conflicts among resource users (Concept 4.14).

Water Wisdom (1990)

Cost: \$15.70 includes shipping and handling

Alameda County Office
of Education
Media Sales
313 West Winton Avenue
Hayward, CA 94544-1198 USA
510/887-0152
<http://www.score.k12.ca.us>

Water Wisdom consists of three instructional units aimed at grades 4–8. These are: (1) “Water Nurturing Nature,” which is primarily a science unit that focuses on the importance of water to all biological systems and on the dilemmas we face as we consider other organisms’ rights to water; (2) “Water Rights and Responsibilities,” which is a social science unit that examines the notion of water ownership and the factors that influence decisions about water use and distribution; and (3) “Water Symbolism,” which is a literature unit that explores the thematic and symbolic role of water in myths and folklore from various cultures (through these stories, students gain further in-

sight into the importance of water as a life sustaining element). Lessons within each unit build on each other to provide an increasingly sophisticated understanding of water, its physical properties, importance to living systems, and value in an environment of scarcity. Units may be completed independently or integrated based on suggested themes. The lessons are active and based on student discovery and involve the students in an examination of their own water use and responsibilities. This program is specific to California, but most of the lessons are general enough to be adapted to other settings. Fisheries education issues and concepts are covered peripherally, but competition between species (Concept 4.15) and competing demands on water in general (Concept 4.14) are examined.

The Watershed Works (1995)

Cost: \$12 plus \$2.40 shipping and handling

British Columbia Teachers’ Federation
Lesson Aids Service
100-550 West 6th Avenue
Vancouver, British Columbia V5Z 4P2
CANADA
604/871-2181
<http://www.bctf.bc.ca>

This process-oriented program designed for grades 5–8 takes a peer teaching approach to the study of the social, economic, and environmental workings of the Fraser River watershed in British Columbia. After an introduction to watersheds, groups of two or three students conduct an in-depth study of one aspect of the basin. Using a jigsaw technique, students act as experts and present the information to the class. Topics for study include the watershed, biodiversity, wildlife, history, settlement, agriculture, fishing, forestry, mining, tourism, river health, and working together. Resource information and maps are provided for each topic, as are presentation ideas, evaluation forms, and methods. Fact sheets and maps

give a summary of commercial, sport, and native food fisheries in British Columbia in general and the Fraser River in particular. Beyond the breakdown of catch among the three fisheries and some information on methods, the program depends on the integration of information from various groups to put fisheries in context and explore related issues (e.g., the effects of development and resource extraction).

Materials that did not meet the selection criteria

Acid Rain Curricula and Science Projects (1988)

Cost: student guide \$63.20 for all three series plus shipping and handling, teacher’s edition \$127.20 for all three series plus shipping and handling

Kendall Hunt
4050 West Mark Drive
P.O. Box 1840
Dubuque, IA 52004-1840 USA
800/258-5622
<http://www.kendallhunt.com>

This is a set of 12 interdisciplinary activities that provide an introduction to the global problem of acid rain for students in grades 4–8. Students use art, science, mathematics, social studies, and language arts to explore the causes, effects, and implications of acid rain. Hands-on activities lead to an understanding of the pH scale, measurement of pH for rain and snow, and methods of neutralization. The *Acid Rain Reader* provides basic content at the appropriate reading level, and a catalogue of acid rain resources is included. Although these materials cover concepts related to pollution, they do not explore the implications for fisheries (with the ex-

ception of a brief mention of pH tolerances for several sport fish species). A more extensive grade 6–12 curriculum is also available.

Adopt-A-Watershed Program (1995)

Cost: Varies depending on unit purchased

The Tides Foundation
P.O. Box 356
Hayfork, CA 96041 USA
916/628-5334
<http://www.tcoe.trinity.k12.ca.us/awww/>

The *Adopt-A-Watershed Program* describes itself as “a K–12 community–school learning experience.” It encourages stewardship through community service and cooperates with local government, business, and the community in its education efforts. A number of units in the program have been completed, and others are in draft form or under development. Most materials focus on northwestern California but are adaptable to other locations. Much of this watershed-based program can be used to support fisheries education. The *Adopt-A-Watershed Program* makes extensive use of existing resources and programs, particularly *The Rivers Project*, which is available through Southern Illinois University Extension. Results of students’ research are recorded in program databases for comparison and review by the same or other classes.

Alaska Water Watch Program (1990)

Cost: Free on the World Wide Web

Alaska Department of
Fish and Game
P.O. Box 25526
Juneau, AK 99802 USA
907/465-6186
http://www.state.ak.us/local/akpages/FISH.GAME/sportf/geninfo/aaq_ed/aeindex.htm

The *Alaska Water Watch Program* is a hands-on program of stream surveys and water quality sampling for

grades 5–12. It contains three booklets (*Alaska Stream Survey*, *Water Quality Sampling*, and *Stream Macroinvertebrates*) as well as a teacher’s guide. Information has been taken from nationwide programs, but a section has been modified to allow for undisturbed watersheds, and the booklet on macroinvertebrates is specific to some Alaska streams. Each of the three booklets covers safety, data collection tips, quality control, documentation, and basic survey and collection techniques and provides forms for recording of data. Laboratory procedures are also provided for dissolved oxygen, pH, conductivity, total alkalinity, turbidity, hardness, and nitrate. The program is used with both schools and volunteer groups and has four primary themes: aquatic education, water quality monitoring, pollution prevention, and fish habitat maintenance and restoration. The collection of different kinds and numbers of fish with help from a biologist who knows the stream is suggested. No links to fisheries per se are made, and habitat maintenance or restoration is mentioned only briefly in the teacher’s guide in relation to data analysis and follow-up. No suggestions or methods are provided for actual habitat protection or restoration.

Always a River (1991)

Cost: Free

Order: AWBERC-91-09
Environmental Protection Agency
Office of Research and
Development
Center for Environmental Learning
26 West Martin Luther King Boulevard
Cincinnati, OH 45268 USA
513/569-7563

This K–12 environmental education curriculum was developed as a component of a six-state collaboration devoted to exploring the historical and cultural development of the Ohio River. Its primary purpose is to provide people living in the states through which this river flows with an opportu-

nity to explore their local cultural and natural history. *Always a River* consists of a series of interactive, hands-on activities in the style of *Project WILD* related to four primary objectives, each of which constitutes a study unit: (1) to demonstrate that the Ohio River is part of a total ecosystem that includes its floodplain and watershed, (2) to introduce the biological, physical, and chemical aspects of water and their importance to living things, (3) to explore human use of the Ohio River and the environmental effects of human activity on the river and its watershed, and (4) to examine the Ohio River’s influence on historical cultures and its implications for shaping modern life. Significant background information and references are provided. The program addresses some fisheries education issues and concepts, particularly those related to pollution (Issue 2) and other habitat effects (Issue 1). However, fisheries receive only passing mention, and the fisheries supported by this ecosystem are not addressed.

Beginning Freshwater Angling Kit (1994)

Cost: \$15 includes shipping and handling, available only to Virginia residents or Virginia fishing license holders

Virginia Department of Game
and Inland Fisheries
Virginia Water Resources Education
4010 West Broad Street, Box 11104
Richmond, VA 23230-1104 USA
804/367-9369 or 804/367-6778
<http://www.state.va.us/~dgif/index.htm>

This kit is a compendium of materials for the beginning angler that includes both state-produced and commercial materials, including a video on America’s favorite sport fish, *American Fishing Tackle Manufacturers Association Pocket Guide to Fishing Lakes and Reservoirs*, a fish poster, a pocket guide to sport fish identifica-

tion, the *Virginia Freshwater Fishing Guide*, the *Virginia Freshwater and Saltwater Fishing Regulations*, and the Parent's Guide to *Hooked on Fishing, Not on Drugs*. These materials cover many aspects of fishing (Issue 7), but they do not constitute an educational program that fit the review selection criteria.

Connections to the Sea: A 4-H Guide to Marine Education (2nd edition) (1990)

Cost: Out of print but will copy for \$2.50, which includes shipping and handling (may be revised during 1999)

University of Maine
Cooperative Extension
Room 105, 5741 Libby Hall
Orono, ME 04469-5741 USA
207/581-3188
<http://www.umext.maine.edu>

This program is designed to increase awareness and knowledge of the ocean in general and the Maine coastal environment in particular, but it could easily be adapted to North Atlantic provinces and states. Most of the activities take place during a field trip to the shore, although pretrip activities introduce water, currents, and tides. The activities emphasize observation, particularly of rocky shores, and lead to examinations of waves, currents, tides, and adaptations to coastal (particularly intertidal) life. One activity addresses observable pollution, and extension activities touch on commercial and recreational connections to the sea.

The Dead River (1973)

Cost: \$23.95 plus \$5.95 shipping and handling

Item# P7443205
Carolina Biological Supply Co.
2700 York Road, Main Office
Burlington, NC 27215 USA
800/334-5551

Although called a "simulation game" of river restoration, this program is neither a simulation in the true

sense nor a competition. Rather, it is a fairly detailed role play in which five different teams playing various government agency, community association, and industry groups determine the type and level of river restoration to pursue (given the costs and benefits of each and of the whole). The program is almost entirely process, although a brief transcript of a pollution control commission hearing provides essential background. *The Dead River* was not reviewed for content, which must come from elsewhere to make the role play effective. However, the program would be useful as a culminating exercise or as an evaluation of programs related to rivers or watersheds.

Earth: The Water Planet (1992)

Cost: \$18.50 plus \$4.25 shipping and handling

National Science Teachers Association
1840 Wilson Boulevard
Arlington, VA 22201-3000 USA
800/722-6782
<http://www.nsta.org>

Earth: The Water Planet examines water, including its scarcity or abundance, where it is found, its unique physical properties, how it moves through the atmosphere, and how it reshapes solid earth. It shows ways of examining problems resulting from the limited amount of water available, the necessity of water treatment and management, and the difficult political questions that sometimes arise over water allocation. The program is divided into five modules that use a variety of instructional methods, including hands-on experiments, conservation-oriented activities, and group activities or role plays. Audiovisual materials (ordered separately) are integral parts of several activities. Included is a collection of readings that give detailed explanations and provide additional examples. *Earth: The Water*

Planet generally does not address fisheries education issues and concepts and only touches on sedimentation in relation to pollution (Issue 2). It does, however, provide an examination of the physical properties of water and how that affects its relationship to people. Of note is a five-activity module on groundwater.

Educational Resource Guide for Teachers and Youth Leaders (1993)

Cost: \$10 plus \$3 shipping and handling

Great Lakes Lighthouse
Keepers Association
c/o Henry Ford Estate
4901 Evergreen Road
Dearborn, MI 48128 USA
313/436-9150

The activities in this guide have been created to help introduce K–12 students to Great Lakes lighthouses. Some attention is paid to the geographic and social context of the Great Lakes, but fisheries education issues and concepts are not addressed. Activities are divided into sections for social studies, language arts, music, art, mathematics, science, and computer science. Instructors are encouraged to combine select activities into units, preferably including a trip to visit a functioning or historic lighthouse. Although focused on the Great Lakes, much of the information is general. The manual provides a good introduction to the history, function, and importance of lighthouses in maritime travel. [Note that this resource is currently being revised.]

Fishing, A Lifetime Sport (1993)

Cost: Free to Idaho residents and program participants, \$10 for others includes shipping and handling, additional cost for instructor's guide

Idaho Department of Fish and Game
600 South Walnut, P.O. Box 25
Boise, ID 83709 USA
208/334-2633
<http://www.state.id.us/fishgame>

This is a comprehensive "how to" book for beginning anglers that touches on fisheries management, personal responsibilities, safety, fish identification, and biology as well as cleaning and cooking the catch. The material covers many fisheries education issues and concepts, but it is not an educational program or manual that fits the review selection criteria. The material could serve as a background reference for instructors or be used directly by intermediate and senior level youth. Although the materials were designed for Idaho, most of the content is not specific to the state and could be used across a broad geographic range. The sport fish described are common across the northern region of the United States and Canada.

Great Bay Living Lab (1991)

Cost: \$10 includes shipping and handling

Sea Grant Extension Program
University of New Hampshire
Durham, NH 03824 USA
603/749-1565
<http://www.unh.edu/seagrant/index.html>

This manual provides background and activities related to Great Bay, a major estuary system in southeastern New Hampshire. It deals pri-

marily with geography and ecology, but some sections address fishing within the estuary and the effects of pollution on fisheries, particularly on shellfish harvesting.

Great Lakes Climate and Water Movement (1996)

Cost: \$8 includes shipping and handling

Ohio Sea Grant College Program
1541 Research Center Building
1314 Kinnear Road
Columbus, OH 43212-1194 USA
614/292-8949
<http://www.sg.ohio-state.edu>

This program for middle and high schools uses hands-on experimentation and actual data sets to examine water movement through and within the Great Lakes and the impact of the Lakes on nearshore climate. There is a focus on Lake Erie, particularly in the areas of storm surges, lake level changes and regulation, and lake stratification and its effects on water quality. The material stresses cooperative learning and refers to the guidelines provided by the Earth Systems Understandings, the National Science Education Standards, and the Benchmarks for Science Literacy. Links to relevant World Wide Web sites are also suggested. Fisheries education issues and concepts are not addressed directly, but some implications for fisheries related to lake stratification and the growth of anoxic zones are discussed.

Lake Erie...Build a Fish to Scale (1986)

Cost: \$5 includes shipping and handling

Ohio Sea Grant College Program
1541 Research Center Building
1314 Kinnear Road
Columbus, OH 43212-1194 USA
614/292-1078
<http://www.sg.ohio-state.edu>

This unit provides lower elementary students with a largely visual introduction to fish, including their visible features, shapes, adaptations, and roles within Lake Erie. It contains largely paper and pencil "puzzles" and other art activities.

Lake Erie...Take a Bow (1986)

Cost: \$5 includes shipping and handling

Ohio Sea Grant College Program
1541 Research Center Building
1314 Kinnear Road
Columbus, OH 43212-1194 USA
614/292-1078
<http://www.sg.ohio-state.edu>

This elementary unit provides an introduction to Lake Erie within the context of the Great Lakes. It consists of simple classroom activities based mostly within the language arts. A limited amount of information about Lake Erie is provided, and that information is largely specific to Ohio. Almost no information is provided about the Canadian side of Lake Erie. Coverage of fisheries education issues and concepts is very limited. Only some values of fish and fishing and the effects of pollution receive brief mention.

Land and Water Interactions in the Great Lakes (1996)

Cost: \$8 includes shipping and handling

Ohio Sea Grant College Program
1541 Research Center Building
1314 Kinnear Road
Columbus, OH 43212-1194 USA
614/292-1078
<http://www.sg.ohio-state.edu>

This program for middle and high schools uses hands-on experimentation, data sets, and maps and

photographs to examine the historic and contemporary interactions of land and water in the Great Lakes basin. The physical geography of the region is covered in some detail, including rock formation, glaciation, and both preglacial and postglacial erosion effects and features. Much time is devoted to Lake Erie, particularly in the areas of shoreline interactions and current erosion processes. The material stresses cooperative learning and refers to the guidelines provided by the Earth Systems Understandings, the National Science Education Standards, and the Benchmarks for Science Literacy. Links to relevant World Wide Web sites are also provided. Fisheries education issues and concepts are not addressed directly, but an introductory activity includes a comparison of the annual commercial fish harvests from each of the Great Lakes.

Largemouth Angling Kit (1994)

Cost: \$15 includes shipping and handling, available only to Virginia residents or Virginia fishing license holders

Virginia Department of Game and Inland Fisheries
Virginia Water Resources Education
4010 West Broad Street, Box 11104
Richmond, VA 23230-1104 USA
804/367-9369 or 804/367-6778
<http://www.state.va.us/~dgif/index.htm>

This kit is a compendium of materials for the intermediate angler that includes both state-produced and commercial materials, including a video entitled *How, When and Where to Catch Bass*, a *Largemouth Bass Tips and Techniques* booklet, boating infor-

mation, a *Catch-&Release* tape measure, the *Virginia Freshwater Fishing Guide*, and the *Virginia Freshwater and Saltwater Fishing Regulations*. The materials cover many aspects of fishing (Issue 7 specifically) in relation to bass, but they do not constitute an educational program based on the review selection criteria.

Mapping Fish Habitats (1987)

Cost: \$10.50 plus \$3 shipping and handling

Great Explorations in Math and Science
Lawrence Hall of Science
University of California, Berkeley
Berkeley, CA 94720 USA
510/642-7771
<http://www.lhs.berkeley.edu>

This is an experimental Great Explorations in Math and Science teaching unit designed for students in grades 6–10. The material uses an aquarium with common aquarium fish in a series of experiments that differentiate fish by behavior based on observation and a fish mapping system. The activities reinforce concepts such as home range, territory, habitat, and ecosystem.

Oceanography (1992)

Cost: \$16.95 includes shipping and handling

Whales in the Classroom
Singing Rock Press
P.O. Box 1274
Minnetonka, MN 55345 USA
612/935-4910
<http://www.whalebooks.com>

This beginning text on oceanography is designed for either class or individual use by students aged 10–14. The material takes an interdisciplinary

approach to both physical and biological oceanography and includes short interviews with working oceanographers. Activities involve paper and pencil problem solving. Fisheries education issues and concepts are not a focus, but fisheries are mentioned in relation to upwellings and productivity. Marine pollution also receives some attention, but not in relation to fisheries. [Note that a 3rd edition became available in late 1997.]

On Sandy Shores (1996)

Cost: \$18 plus \$4 shipping and handling

Great Explorations in Math and Science
Lawrence Hall of Science
University of California, Berkeley
Berkeley, CA 94720 USA
510/642-7771
<http://www.lhs.berkeley.edu>

This active, interdisciplinary Great Explorations in Math and Science unit helps grades 2–4 students discover the origins, characteristics, and life on a sand beach. The material tries to bring the beach to school through an extensive series of sessions combined into five major activities. The methods used foster cooperative learning and encourage the acquisition of both science and language skills. “Oil on the Beach” (activity 5) reinforces fisheries education Issue 2 (pollution) through an examination of the effects of an oil spill and an active attempt to clean the spill.

Project WET (1995)

Cost: Project WET can be obtained only through participation in a workshop, and cost varies depending on the state or province

The Watercourse
201 Culbertson Hall
Montana State University
Bozeman, MT 59717-0057 USA
406/994-5392
<http://www.montana.edu/wwwwet>

Project WET follows a format similar to that of the popular *Project WILD* but concentrates on the physical aspects of water and how those aspects affect, and are affected by,

living things. Emphasis is placed on the human relationships to water and the effects we have on it. Key concept areas include the physical and chemical characteristics of water; the dependence of life on water; the water cycle as a connector of earth systems; water as a natural resource (limitations to supply, multiple use, and resource issues); management of water; values, attitudes, and beliefs related to water; relationship to political and economic systems; and art, music, language, and customs related to water. These core areas are supported by a section on teaching strategies that covers assessment, student action, and cooperative learning, as well as appendices that provide a curriculum framework (conceptual, affective, skills) and planning charts that cross-reference each activity by topic, subject area, time required, grade level, setting, and teaching method. *Project WET* is designed for K–12, but some activities also include alternative, concrete options for K–2 students. Fisheries are mentioned in relation to the effects that pollution (Issue 2) can have, and there are relevant ties to habitat (Issue 1) and resource conflicts (Concept 4.14).

Water Matters (1994)

Cost: \$14 each for volume 1 and 2 plus \$4.25 shipping and handling if ordered separately or \$6 if ordered together

Order: PB 116X1
National Science Teachers Association
1840 Wilson Boulevard
Arlington, VA 22201-3000 USA
800/722-6782
<http://www.nsta.org>

This is the first in a series of water-related posters in a volume that contains three posters and a teacher's guide. The posters include "Wetlands: Water, Wildlife, Plants and People!," "Water: The Resource that Gets Used and Used for Everything!," and "How Do We Treat Our Wastewater?" Each poster comes in a middle school or grade school edition. The posters are identical, but the informa-

tion and activities on the back vary by age level. The posters also connect and form a mural to reinforce the interconnectedness of water systems. Each set comes with two posters so that the material on the back can be used. The teacher's guide contains additional background information and integrated activities for each poster. Fisheries education issues and concepts are touched on only in relation to wetlands (as nursery habitat) and the impact of sedimentation on fish.

BIBLIOGRAPHIES, DIRECTORIES, AND CATALOGS FOR ADDITIONAL INFORMATION

Educating Young People about Water: A guide to goals and resources with an emphasis on nonformal and school enrichment settings (1995) E. Andrews

Cost: \$9 includes shipping and handling

Order: A-117
ERIC, Clearinghouse for Science,
Mathematics and Environmental
Education
1929 Kenny Road
Columbus, OH 43210-0180 USA
614/292-6717
<http://www.ericse.org>

California EE Compendia for Natural Communities and Water (1995)

Cost: \$8.50 plus \$4.95 shipping and handling

California Department of Education
Office of Environmental Education
721 Capitol Mall
Sacramento, CA 95814 USA
800/995-4099
<http://goldmine.cde.ca.gov/publications>

Directory of Great Lakes Education Materials (6th edition in progress, earlier editions no longer available)

Cost: not available at this time

Erie County Environmental
Education Institute
P.O. Box 56
Buffalo, NY 14205 USA
716/858-6370
<http://www.erie.gov>

Marine Education: A bibliography of educational materials available from the nation's Sea Grant programs (1994)

Cost: \$2.50 includes shipping and handling
Mississippi-Alabama Sea Grant Consortium
P.O. Box 7000
Ocean Springs, MS 39566-7000 USA
228/875-9341
<http://waidsoft.com/seagrant>

Currently being revised. Copies of the revised version will be available through all Sea Grant offices.

Survey of State Fish and Wildlife Aquatic Resources Education Programs (1994)

Cost: Free
International Association of Fish and Wildlife Agencies
444 North Capitol Street, NW, Suite 544
Washington, DC 20001 USA
202/624-7890

The Wild Gulf Almanac (1995)
(Educational resources about habitats and ecosystems of the Gulf of Maine watershed)

Cost: \$15 includes shipping and handling
The Chewonki Foundation
485 Chewonki Net Road
Wicasset, ME 04578 USA
207/882-7323
or:
U.S. Fish and Wildlife Service
Gulf of Maine Program
4R Fundy Road
Falmouth, ME 04105 USA
207/781-8364
<http://www.fws.gov/ncep.maine.html>

FISHERIES-RELATED ORGANIZATIONS FOR ADDITIONAL INFORMATION

A variety of organizations and groups with an interest in educating youth about fish, fishing, and fisheries management issues exist. Most of these serve as advisory, technical, and public information sources.

American Fisheries Society

5410 Grosvenor Lane, Suite 110
Bethesda, MD 20814-2199 USA
301/897-8616
<http://www.fisheries.org>

An international society of fisheries professionals. Home of the Youth Education Committee that produced this guide.

American Sportfishing Association

1033 North Fairfax Street, Suite 200
Alexandria, VA 22314 USA
703/519-9691

A conservation, education, and advocacy group consisting of the Future Fisherman Foundation, the National Fishing Week Steering Committee, and the FishAmerica Foundation.

American Zoological Association

7970D Old Georgetown Road
Bethesda MD 20814 USA
301/907-7777
<http://www.aza.org>

This is a professional organization of zoos and aquaria in the Americas dedicated to the conservation of wildlife and their habitats through conservation, education, scientific studies, and recreation.

Aquatic Resources Education Association

Contact information changes each year depending on elected president. To obtain information on current

president, contact the International Association of Fish and Wildlife Agencies.

An affiliate of the International Association of Fish and Wildlife Agencies composed of professionals involved in teaching aquatic resources topics. Contact this organization to identify the aquatic resource educator for your state.

Canadian Department of Fisheries and Oceans

Communications Directorate
1478-200 Kent Street
Ottawa, Ontario K1A 0E6 CANADA
613/993-0999
<http://www.dfo-mpo.gc.ca>

The principal Canadian federal marine fisheries management agency.

Consortium for Oceanographic Research and Education

Sarah Schoedinger
Education Specialist
1755 Massachusetts Avenue, NW, Suite 800
Washington, DC 20036-2102 USA
202/232-3900 ext. 221
<http://core.cast.msstate.edu>

This organization's goal is to establish links between the various segments of the ocean sciences community (including K-12 educators). One of its current activities includes a review of K-12 ocean sciences programs.

International Association of Fish and Wildlife Agencies

444 North Capital Street, NW, Suite 544
Washington DC 20001 USA
202/624-7890

An international association of directors of fish and wildlife management agencies.

International Joint Commission

Great Lakes Regional Office
100 Oulette Avenue, 8th Floor
Windsor, Ontario N9A 6T3 CANADA
519/257-6700
or:
P.O. Box 32869
Detroit, MI 48232-2869 USA
313/226-2170
<http://www.ijc.org>

The International Joint Commission is an independent international organization established under the Boundary Waters Treaty of 1909. Its purpose is to help prevent disputes over use of waters shared by Canada and the United States. This office provides a variety of information about the Great Lakes.

Izaak Walton League of America

Save Our Streams Program
707 Conservation Lane
Gaithersburg, MD 20878-2983 USA
301/548-0150 or 800/BUG-IWLA
<http://www.iwla.org>

A conservation organization seeking to conserve habitat and promote outdoor ethics.

National Marine Educators Association

P.O. Box 1470
Ocean Springs, MS 39566-1470 USA
601/374-7557
<http://www.marine-ed.org>

An organization of marine educators who teach marine science to students of all ages.

National Fish and Wildlife Foundation

1120 Connecticut Avenue, NW,
Suite 900
Washington, DC 20036 USA
202/857-0166
<http://www.nfwf.org>

This foundation supports conservation activities, partnerships, education, and policy through partnerships.

National 4-H Sportfishing Committee

Dr. Ronald A. Howard, Jr., Chair
State 4-H Office
7607 Eastmark Drive, Suite 101
Texas Agricultural Extension Service
College Station, TX 77843-2473 USA
409/845-1214
<http://4hsportfish.leviathon.tamu.edu>

The National 4-H Sportfishing Committee sponsors state programs emphasizing youth development of life skills, sportfishing ethics, angling skills, and knowledge of aquatic ecology. Cosponsored by the U.S. Department of Agriculture and Cooperative States Research Education Extension Service, state 4-H and fishing extension programs, state agencies, and the American Sportfishing Association.

National Marine Fisheries Service

Office of Public Affairs
Silver Spring Metro Center 3
1315 East-West Highway
Silver Spring, MD 20910 USA
301/713-2370
<http://kingfish.ssp.nmfs.gov>

The principal U.S. federal marine fisheries management agency.

National Science Teachers Association

1840 Wilson Boulevard
Arlington, VA 22201-3000 USA
703/243-7100
<http://www.nsta.org>

An organization of science educators who teach students of all ages.

National Sea Grant College Program

Dr. Shirley Fiske
National Oceanographic and
Atmospheric Administration
1315 East-West Highway
Silver Spring, MD 20910 USA
301/713-2431
<http://www.mdsg.umd.edu/NSGO>

Each of the 29 Sea Grant programs in coastal states of the United States has an education component with information of use to fisheries educators.

North American Association for Environmental Education

P.O. Box 400
Troy, OH 45373 USA
513/676-2514
<http://eelink.umich.edu/naaee.html>

An organization of environmental educators and other professionals who believe that environmental education must prepare and encourage individuals of all ages to help solve environmental problems.

Trout Unlimited

1500 Wilson Boulevard, Suite 310
Arlington, VA 22209-2404 USA
703/522-0200
<http://www.tu.org>

National fishing organization with various chapters offering youth fishing and conservation programs.

U.S. Fish and Wildlife Service

4401 North Fairfax Drive
Arlington, VA 22203-3247 USA
703/358-1744
<http://www.fws.gov>

Federal agency working to conserve and enhance fish and wildlife and their habitats.

FISHERIES EDUCATION FRAMEWORK

The Fisheries Education Framework used to direct the review of the instructional materials in this guide consists of 8 key fisheries issues and 55 related concepts. Each material in the summary chart in the back was reviewed to determine the extent to which it covered these issues and concepts. A description of how the framework was developed and how the review was conducted is provided on pages 2–3.

ISSUE 1: MAINTAIN AND RECOVER FISHERIES HABITAT.

- 1.1 Habitat forms a key element of sustainable fisheries.
- 1.2 Habitat protection, mitigation, and enhancement are primary fisheries management activities.
- 1.3 Most aquatic ecosystems support, or could support, commercial, sport, and subsistence fisheries: streams, lakes, rivers, coastal waters, and open ocean waters.
- 1.4 Particular aquatic or semiaquatic ecosystems provide critical habitat for some species; these ecosystems include freshwater wetlands, floodplain and riparian zones, tributary streams, estuaries, tidal flats, and other saltwater wetlands. Loss of these habitats significantly reduces the potential of fisheries dependent on them.
- 1.5 Many critical habitats have been, and are, under pressure from historic and current development. Several have been damaged or lost.
- 1.6 Remaining critical habitats can be, and in some cases are being, protected and maintained; damaged habitats can be, and in some cases are being, rehabilitated.
- 1.7 Some former fisheries can be, and in some cases are being, reestablished through the reintroduction of native species into rehabilitated habitat.

ISSUE 2: IDENTIFY AND REDUCE SOURCES OF POLLUTION AFFECTING FISHERIES HABITAT.

- 2.1 One specific cause of fisheries habitat degradation is pollutants, which can affect both water and substrate quality.
- 2.2 In general, sources of pollution must be stopped or reduced if safe, quality fisheries are to exist.
- 2.3 Pollutants fall into a number of categories, including
 - acid rain,
 - agricultural and landscape (e.g., lawns, golf courses, roads) runoff,
 - biological (e.g., exotics, disease),
 - industrial (toxic) waste and spills,
 - postconsumer petroleum products,
 - sewage,
 - silt or sediment,
 - thermal,
 - radioactive,
 - solid waste (especially litter and plastics).

Each of these creates particular effects on fisheries habitat and, if the pollution is severe enough, may cause habitat loss.

- 2.4 Point source pollutants enter the environment from a specific point (e.g., sewage outfall) that can usually be identified.
- 2.5 Nonpoint source pollutants usually enter the environment from numerous sources (e.g., lawn fertilizer runoff, pesticides, acid rain) and can be harder to identify and treat than point source pollutants.
- 2.6 Although industries and sectors (e.g., government) have a responsibility to control potential pollutants, each individual also has a responsibility to act in ways that can directly or indirectly reduce the impact of pollutants on the environment.

ISSUE 3: MAINTAIN AND REBUILD BIODIVERSITY WITHIN COMMERCIAL, SPORT, AND SUBSISTENCE FISHERIES.

- 3.1 The ecological values related to biodiversity apply to commercial, sport, and subsistence fisheries.
- 3.2 Biodiversity issues need to be addressed at the individual (genetic), population (stock), species, and community levels.
- 3.3 In particular, the trend toward decreased species and population diversity needs to be reversed.
- 3.4 Decreased diversity can occur through habitat loss, overharvest, intentional or accidental species introductions, and the effects of some stocking practices on genetic or stock variability.
- 3.5 Introductions have the potential to reduce the diversity of native systems and need to be carefully controlled.
- 3.6 Commercial fisheries in particular may directly affect the diversity of nontarget species (e.g., entanglement of marine mammals or turtles in active or “ghost” nets, habitat destruction), and means must be found to limit this type of conflict.

ISSUE 4: BUILD SUSTAINABLE COMMERCIAL, SPORT, AND SUBSISTENCE FISHERIES.

- 4.1 Both historic and current fisheries have considerable economic, cultural, and social significance.
- 4.2 Both historic and current fisheries losses and closures have considerable economic, cultural, and social impact.
- 4.3 Given projected world population increases, the value of future fisheries will likely increase, as will pressure on them; a global perspective will be required to appropriately plan and manage fisheries.
- 4.4 The act of fishing, including type and intensity (harvest), forms a key element of sustainable fisheries.
- 4.5 Self-control, regulation of harvest, and promotion of alternative methods (e.g., selective harvest, different netting techniques) and species are primary fisheries management activities.

- 4.6 Stocking is an important management tool; it has the potential to have both positive and negative consequences.
- 4.7 Overfishing can and does threaten sustainable fisheries and must be controlled.
- 4.8 Research and assessment are critical to determining sustainable levels of catch for any fishery.
- 4.9 Controlled, commercial aquaculture can contribute to sustainability by reducing pressure on wild populations. Key concerns include introduced populations and potential escapes, stock genetics, and genetic engineering.
- 4.10 Enforced legislation and international agreements are essential to maintaining sustainable fisheries.
- 4.11 Public awareness, understanding, and action related to the biological, economic, cultural, and social consequences of overharvest are important to maintaining sustainable fisheries in general and are critical to sport fisheries.
- 4.12 Bycatch can and does threaten sustainable fisheries and must be monitored and controlled; move toward “no waste” fisheries. Perspectives on bycatch are different in the developing world, where it is often used locally for food; this use must be accommodated without threatening the sustainability of the resource.
- 4.13 Contaminants and their bioaccumulative risks to both species and human health threaten sustainable fisheries and must be minimized.
- 4.14 Conflicts exist within and between commercial, sport, and subsistence fisheries and between fisheries and other consumptive and nonconsumptive resource users. Any resolution must consider the needs of all groups and the sustainability of the resource.
- 4.15 Real or perceived conflict may result from competition for food among fish and other species (e.g., birds and marine mammals). Any resolution must consider the integrity of the ecosystem as a whole.

ISSUE 5: MANAGE FOR SUSTAINABLE COMMERCIAL, SPORT, AND SUBSISTENCE FISHERIES.

- 5.1 Fisheries management should involve diverse interests with a stake in fisheries or aquatic resources.
- 5.2 Fisheries management must consider the effects of land-based actions, that is, take a watershed-based approach. This will involve interactions among agencies and jurisdictions.
- 5.3 Fisheries managers must be involved with
 - assessment,
 - allocation,

- control of harvest (including enforcement),
- habitat conservation, restoration, and enhancement,
- stock conservation, restoration, and enhancement,
- public education, including ethical angling.

5.4 Where appropriate, fisheries managers should make anglers and other consumers aware of alternative species to reduce the pressure on popular commercial and sport fish (e.g., encourage anglers to engage in diverse fishing opportunities).

ISSUE 6: PROMOTE RESOURCE STEWARDSHIP.

- 6.1 Anglers and nonanglers should understand that they have a vested interest in the conservation, restoration, and enhancement of aquatic resources.
- 6.2 Anglers and nonanglers must understand their rights, privileges, and responsibilities, that is, they should be made aware of methods to personally help protect and improve the resource and have the opportunity to practice and apply them. Programs that teach natural resources ethics and skills are important to this effort.
- 6.3 Anglers and nonanglers must understand and respect the resource, the regulations, and the rights of others, including anglers, property owners, and the nonfishing public.
- 6.4 Anglers must be aware of, and practice, proper release and harvest techniques.
- 6.5 Anglers must be aware of their potential role in the dispersal of nonnative species and the transmission of disease and take steps to avoid contributing to these problems.
- 6.6 Anglers should be encouraged to enjoy the experience of fishing as well as the act of actually catching fish.

ISSUE 7: PROMOTE RESPONSIBLE RECREATIONAL FISHING.

- 7.1 Fishing is a positive and acceptable recreational activity for males and females of all races, ages, socioeconomic status, and physical and mental abilities.
- 7.2 The benefits of fishing vary from person to person. Some people enjoy the relaxation and beauty of the surroundings, some enjoy the competition, and some fish to put food on the table. All forms are considered acceptable as long as the anglers' actions sustain the resource, respect others, and are within the law.

- 7.3 Anglers should understand the variety of equipment and tackle they may choose from and use them effectively.
- 7.4 Fishing safety is important to anglers and those around them.
- 7.5 Anglers must have a vested interest in aquatic resource conservation, restoration, and enhancement.
- 7.6 Maintaining and increasing the number of responsible anglers can help fund management of the fisheries resource. In the United States, anglers provide funding for the management of the fisheries resource through licenses and the Federal Aid to Sport Fish Restoration excise tax.
- 7.7 Materials should address beginning angling techniques, intermediate angling techniques, advanced angling techniques, and specific species techniques.

ISSUE 8: DEVELOP AN AWARENESS OF FISHERIES SCIENCE AS A PROFESSION AND HELP PREPARE YOUTH FOR CAREERS IN THIS PROFESSION.

- 8.1 Fisheries and aquatic sciences, together with economics and other social sciences, provide the basis for managing sustainable aquatic resources.
- 8.2 Fisheries professionals are a credible and reliable source of scientific and technical information concerning conservation and management of fisheries and aquatic resources.
- 8.3 A variety of fisheries and aquatic management and conservation careers exist. The fields of fisheries science and aquatic conservation and management provide opportunities for motivated, scientifically prepared, and service-oriented people from diverse backgrounds.
- 8.4 Preparation for a career in fisheries and aquatic science includes a sound understanding of mathematics and the sciences. Professionals should also be well rounded, with education and experiences in such areas as economics, law, communications, social sciences, and resource management. Fisheries professionals are committed to lifelong learning through continuing education programs designed to increase their understanding of ecosystem management.

CHECKLIST OF MATERIAL CHARACTERISTICS

The checklist of material characteristics below was developed to help you select the fisheries education materials most appropriate to your target audience. They also help you understand the information in the summary chart.

TARGET AUDIENCES

The material is targeted toward the following grade levels and settings:

- ☐ preschool
- ☐ K-3 (primary)
- ☐ K-6 (elementary)
- ☐ 4-6 (junior)
- ☐ 7-9 (intermediate)
- ☐ 7-12 (secondary)
- ☐ (9)10-12 (high school)
- ☐ 10-12 (senior)
- ☐ college and university
- ☐ adult
- ☐ formal emphasis
- ☐ nonformal emphasis

INSTRUCTIONAL FORMATS

The material suggests the following formats:

- ☐ indoor classroom
- ☐ outdoor classroom
- ☐ aquatic site(s) required for some lessons
- ☐ aquarium required for some lessons
- ☐ field trip required for some lessons
- ☐ fishing involved

Lessons emphasize

- ☐ activity and action
- ☐ seatwork

INSTRUCTOR AND STUDENT MATERIALS

The material provides the following resources:

Instructor materials

- ☐ background materials
- ☐ lesson plan(s)
- ☐ manual
- ☐ maps
- ☐ references
- ☐ slides
- ☐ software

Student materials

- ☐ book or magazine
- ☐ CD-ROM
- ☐ comic book
- ☐ computer links
- ☐ fishing gear
- ☐ overheads
- ☐ poster
- ☐ samples and specimens
- ☐ sampling equipment
- ☐ software
- ☐ video
- ☐ workbook and -sheets

INSTRUCTOR APPROACHES

The material suggests the following approaches:

- ☐ activities
- ☐ case studies
- ☐ cooperative learning
- ☐ decision making
- ☐ demonstrations and observations
- ☐ discussions and debates
- ☐ experiments
- ☐ games and competitions
- ☐ guided imagery

- ☐ inquiries
- ☐ involvement in issues:
- ☐ local
- ☐ state or provincial
- ☐ national
- ☐ international
- ☐ (use of) local experts
- ☐ mentoring
- ☐ peer teaching
- ☐ presentations
- ☐ problem solving
- ☐ research (field)
- ☐ role play and drama
- ☐ small group
- ☐ simulations

SUBJECT AREAS

The material is targeted at the following subject areas:

- ☐ art (A)
- ☐ environmental studies (ES)
- ☐ geography (Geo)
- ☐ health (Hea)
- ☐ history (His)
- ☐ language arts (LA)
- ☐ mathematics (M)
- ☐ music (Mu)
- ☐ physical education (PhE)
- ☐ science (Sci)
- ☐ social studies (SS)

APPLICABILITY AND SCOPE

The materials are:

- ☐ general and universal
- ☐ specific to a continent
- ☐ specific to a country
- ☐ specific to a region
- ☐ specific to a province or state

[Most materials varied in scope. For example, most of the skills-related information in a fishing-based material may be general, but the fish that are identified and described may be more typical for a region and the regulations specific to a state.]

CURRENCY

The materials are:

- ☐ leading edge in content
- ☐ leading edge in process
- ☐ current
- ☐ dated

FISHERIES EDUCATION MATERIALS SUMMARY CHART

The following abbreviations are used throughout the Summary Chart:

A = Arts
ES = Environmental Science
Geo = Geography
Hea = Health
His = History
LA = Language Arts
M = Math
Mu = Music
PhE = Physical Education
Sci = Science
SS = Social Studies

No  = no coverage

 = limited coverage relative to all issues and materials

 = fair coverage relative to all issues and materials

 = moderately good coverage relative to all issues and materials

 = good coverage relative to all issues and materials

FISHERIES EDUCATION MATERIALS SUMMARY CHART

Fisheries education material	Grade and setting	Main emphasis	Subject	Issue 1 Habitat	Issue 2 Pollution	Issue 3 Biodiversity	Issue 4 Build fisheries	Issue 5 Manage fisheries
Aquatic Project WILD	K–12 Formal	A, ES, LA, M, Sci, SS	Habitat, environmental issues, water science, biology, ecology and ecosystem, animals, plants					
Aquatic Resources Education Curriculum	Estimate 7–12, Adult Formal Nonformal	ES, PhE, Sci	Fisheries, management and regulations, recreational fishing, ecology and ecosystem					
Clean Water, Streams and Fish	3–9 Formal	A, ES, LA, M, Sci, SS	Habitat, environmental issues, ecology and ecosystem, animals					
Coastal Issues: A Wave of Concern	7–12 Formal	ES, Sci, SS	Environmental issues					
Decision Making: The Chesapeake Bay	7–12 College and university Adult Formal Nonformal	ES, LA, Sci, SS	Environmental issues					
Early Fishing Peoples of Puget Sound	7–9 Formal	A, His, LA, Sci, SS	Fisheries					
The Earth Generation/The Great Lakes	7 Formal	ES, LA, M, Sci, SS	Environmental issues					
Everglades National Park: An Activity Guide for Teachers	4–6 adaptable Formal	A, ES, LA, M, Mu, PhE, Sci, SS	Habitat, environmental issues, water science, ecology and ecosystem					

Curriculum Framework for Environmental Education										
Issue 6 Stewardship	Issue 7 Fishing	Issue 8 Careers	Goal 1 Awareness/ Understanding	Goal 2 Attitudes/ Values	Goal 3 Skills/ Action	Format	Material	Approach	Scope	Currency
			Yes	Yes	Yes	Indoor and outdoor, aquatic site, aquarium, action based	Background, lesson plans, manual, worksheets	Activities, discussions, experiments, games, guided imagery, inquiries, local involvement, presentations, research, role play, simulations	General	Current
			Yes	Yes		Indoor and outdoor, aquarium, fishing, action based and seatwork	Background, lesson plans, manual, references, fishing gear, lure catalogs	Activities, demonstrations, discussions, presentations	North America, United States	Current
			Yes		Yes	Indoor and outdoor, aquatic site, action based	Background, lesson plans, manual, references, worksheets	Activities, demonstrations, discussions, experiments, games, inquiries, local and state involvement, research, role play	North America, Canada, United States, Pacific Northwest, Washington, British Columbia	Current
					Yes	Indoor and outdoor, aquatic site, field trip, seatwork	Background, lesson plans, references, manual, slides, video, worksheets	Cooperative learning, discussions, inquiries, local cases, local and state involvement, presentations, research, role play	General, Northeast Coast	Current
			Yes	Yes	Yes	Indoor, seatwork	Background, lesson plans, manual, maps, references, slides, video	Debates, discussions, local and state involvement, presentations, problem solving, research, role play	Chesapeake Bay, District of Columbia, Delaware, Maryland, Pennsylvania, Virginia	Some dated content but current process
			Yes			Indoor and outdoor, aquatic site, action based and seatwork	Background, lesson plans, manual, references, worksheets	Activities, demonstrations, discussions, experiments, inquiries, small group	Pacific Northwest, British Columbia, Oregon, Washington	Current
			Yes	Yes	Yes	Indoor and outdoor, action based	Background, lesson plans, manual, references, posters, software, worksheets, video, 1-800 support	Activities, debates, demonstrations, discussions, experiments, local cases, local and state involvement, inquiries, research, role play, simulation	Great Lakes, Michigan	Current
			Yes	Yes	Yes	Indoor and outdoor, action based and seatwork	Background, lesson plans, manual, references, worksheets	Activities, demonstrations, discussions, games, role play	General, Southeastern United States, Florida	Current

Fisheries education material	Grade and setting	Main emphasis	Subject	Issue 1 Habitat	Issue 2 Pollution	Issue 3 Biodiversity	Issue 4 Build fisheries	Issue 5 Manage fisheries
Fish and Fisheries	5 Formal	A, LA, M, Mu, PhE, Sci, SS	Fisheries, management and regulations, biology					
Fish Banks, Ltd.	7–12 College and university Adult Nonformal	ES, Sci, SS	Fisheries, environmental issues					
Fish Friends	4–6 Formal	A, LA, M, Sci, SS	Habitat, biology, ecology and ecosystem, animals					
The Fish Hatchery Next Door	9 Formal	A, ES, LA, M, Sci, SS	Fisheries, environmental issues, ecology and ecosystem					
Fish Iowa!	7–12 Formal Nonformal	Hea, PhE, Sci	Recreational fishing					
Fish Ways (primary and junior)	K–6 Formal	A, ES, LA, M, Mu, PhE, Sci, SS	Habitat, environmental issues, biology, ecology and ecosystem, animals					
Fish Ways (intermediate and senior)	7–12 Formal	A, ES, LA, M, Mu, PhE, Sci, SS	Habitat, environmental issues, biology, ecology and ecosystem, animals					
Fisheries Management	7–12 Formal	LA, Sci, SS	Fisheries, management and regulations					
Fisheries Tour Packet	4–8 Formal	ES, Sci	Fisheries, management and regulations, biology, ecology and ecosystem, animals					

Issue 6 Stewardship	Issue 7 Fishing	Issue 8 Careers	Goal 1 Awareness/ Understanding	Goal 2 Attitudes/ Values	Goal 3 Skills/ Action	Format	Material	Approach	Scope	Currency
			Yes	Yes	Yes	Indoor and outdoor, aquatic site, aquarium, fishing, action based and seatwork	Lesson plans, manual, references, posters, worksheets	Activities, demonstrations, local experts, local involvement, presentations, field research, role play	Canada, United States, Pacific Northwest, British Columbia, Alaska	Current
			Yes		Yes	Indoor, seatwork	Background, lesson plans, manual, references, game board, newsletters, overheads, software, video, worksheets	Problem solving, role play, simulations	General	Leading edge content and process
			Yes	Yes	Yes	Indoor, aquatic site, aquarium, action based and seatwork	Background, lesson plans, manual, posters, worksheets	Activities, consensual decision making, demonstrations, discussions, experiments, guided imagery, research, role play, small group	Northeast Atlantic Coast, Canada, United States	Leading edge content
			Yes	Yes	Yes	Indoor and outdoor, aquatic site, action based and seatwork	Background, lesson plans, manual, worksheets	Activities, cooperative learning, discussions, research, role play, small group	Canada, United States, Pacific Northwest, Oregon	Leading edge content
			Yes	Yes		Indoor and outdoor, aquatic site, fishing, action based and seatwork	Background, lesson plans, manual, video, worksheets	Activities, demonstrations, discussions, games	General, Canada, United States, Iowa	Current
			Yes	Yes	Yes	Indoor and outdoor aquatic site, aquarium, fishing, action based and seatwork	Background, lesson plans, manual, references, posters, workbook	Activities, discussions, experiments, games, local involvement, demonstrations, research, role play, simulations	General, North America Canada, United States, Great Lakes, Ontario	Current
			Yes	Yes	Yes	Indoor and outdoor aquatic site, aquarium, fishing, action based and seatwork	Background, lesson plans, manual, references, posters, workbook	Activities, discussions, experiments, games, local involvement, demonstrations, research, role play, simulations	General, North America, Canada, United States, Great Lakes, Ontario	Current
			Yes	Yes	Yes	Indoor and outdoor, aquatic site, action based and seatwork	Background, lesson plans, manual, references, overheads, worksheets	Research, discussions	Missouri	Current
			Yes	Yes		Indoor and outdoor, aquatic site, action based and seatwork	Background, lesson plans, manual, slides, color pictures, worksheets	Activities, discussions, games, presentations, role play	Minnesota	Current

Fisheries education material	Grade and setting	Main emphasis	Subject	Issue 1 Habitat	Issue 2 Pollution	Issue 3 Biodiversity	Issue 4 Build fisheries	Issue 5 Manage fisheries
Fishing for Answers	Target 6 but range 4–8 Formal	LA, M, Sci, SS	Recreational fishing, environmental issues, water science, ecology and ecosystem					
Fishing Fun for Kids	K–6 Nonformal	PhE	Recreational fishing					
Fishing—Get in the Habitat!	4–9 Nonformal	ES, PhE, Sci	Habitat, recreational fishing					
Fishing is Funtastic!	K–6 Nonformal	PhE	Recreational fishing					
4-H Marine Project	4–6 Formal Nonformal	ES, Sci, SS	Habitat, management and regulations, environmental issues, biology, ecology and ecosystem, animals					
Getting to Know the Whales	7–9 Formal	A, ES, LA, M, Sci, SS	Fisheries, careers, environmental issues, biology, animals					
Great Lakes Environmental EducationProject	9–12 Formal	ES, Sci, SS	Environmental issues					
Great Lakes Instructional Materials	5–12 College and university Formal	ES, Hea, M, Sci, SS	Environmental issues, ecology and ecosystem					
Hooked on Fishing, Not on Drugs	K–12 Formal	A, ES, Hea, LA, M, PhE, Sci	Management and regulations, recreational fishing, environmental issues					
Iowa WILD/Aquatic	K–6 Formal	ES, LA M, Sci, SS	Habitat, general recreation, environmental issues, biology, ecology and ecosystem, animals, plants					
Junior Anglers Program	K–6 Formal Nonformal	ES, PhE	Recreational fishing					

Issue 6 Stewardship	Issue 7 Fishing	Issue 8 Careers	Goal 1 Awareness/ Understanding	Goal 2 Attitudes/ Values	Goal 3 Skills/ Action	Format	Material	Approach	Scope	Currency
			Yes	Yes		Indoor and outdoor, aquatic site, fishing, action based and seatwork	Background, lesson plans, manual, references, workbook	Activities, discussions, field research	General, North America, United States, Missouri	Current
				Yes		Action based	Comic and activity book	Self-directed	General	Current
			Yes	Yes		Indoor and outdoor, aquatic site, fishing, action based	Background, forms, lesson plans, manual, references, fishing gear (loan), workbook	Activities, demonstrations, role play, simulations	General, North America, Canada, United States, Minnesota	Current
				Yes		Action based and seatwork	Comic and activity book	Activities, self-directed	General	Current
			Yes	Yes	Yes	Indoor and outdoor, aquatic site, seatwork	Background, lesson plans, manual, references, workbook	Activities, demonstrations, discussions, experiments, local involvement, research	General, United States East Coast, Virginia	Dated
				Yes		Indoor, seatwork	Background, worksheets	Activities	General	Current
			Yes	Yes	Yes	Indoor, seatwork	Background, manual, map, slides	Discussions, peer teaching, presentations, research, role play	Great Lakes	Current
			Yes	Yes	Yes	Indoor, action based	Background, lesson plans, manual, references (including World Wide Web), computer links, workbook	Activities, demonstrations, discussions, experiments, inquiries, local and regional cases, presentations, research, role play	General, Canada, United States, Great Lakes	Leading edge content and process
			Yes	Yes	Yes	Indoor, aquatic site, aquarium, fishing, action based and seatwork	Background, lesson plans, manual, references, book, video	Activities, cooperative learning, discussions, local involvement, peer teaching, presentations, problem solving, research, role play	General	Current
			Yes	Yes	Yes	Indoor, aquarium, action based and seatwork	Background, lesson plans, manual, references, video, worksheets	Activities, demonstrations, discussions, local and state involvement, research	Iowa	Current
			Yes	Yes	Yes	Indoor and outdoor, aquatic site, fishing, action based and seatwork	Background, lesson plan, manual, references, workbook	Activities, demonstrations, discussions, games	General, North America, Canada, United States, Wisconsin	Current

Fisheries education material	Grade and setting	Main emphasis	Subject	Issue 1 Habitat	Issue 2 Pollution	Issue 3 Biodiversity	Issue 4 Build fisheries	Issue 5 Manage fisheries
Kids Fishing— It's Catching On!	K–6 Nonformal	ES, PhE, Sci	Recreational fishing		 			
Lake Effects: The Lake Superior Curriculum Guide	K–12 Formal	A, ES, LA, M, Mu, Sci, SS	Ecology and ecosystem	 	   	  	 	 
Lake Erie	K–4 Formal	A, ES, LA, M, Mu, SS	Biology, animals					
The Lake Superior Game	4–12 Adult Formal Nonformal	ES	Environmental issues	 	   		 	 
The Life of the Lakes	7–12 Formal Nonformal	ES, Hea, M, Sci, SS	Fisheries	   	   	  	   	   
Living in Water	4–6 Formal	LA, M, Sci	Habitat, water science, biology, ecology and ecosystem, animals, plants		 		 	
Marine Mammals, Coastal and River Issues	6–12 Adult Formal	A, ES, LA, M, Mu, Sci, SS	Environmental issues	  	   		  	   
Massachusetts Aquatic Resources Education Program	4–8 Adult Nonformal	ES, PhE, Sci	Recreational fishing		   	 		 
Master Anglers Program	4–12 Adult Formal Nonformal	ES, PhE, Sci	Habitat, management and regulations, recreational fishing, ecology and ecosystem	   	  		 	   
The Ocean Crisis (Our Only Erath)	4–12 Formal	A, ES, LA, Mu, Sci, SS	Environmental issues		   	 	 	

Issue 6 Stewardship	Issue 7 Fishing	Issue 8 Careers	Goal 1 Awareness/ Understanding	Goal 2 Attitudes/ Values	Goal 3 Skills/ Action	Format	Material	Approach	Scope	Currency
			Yes	Yes		Indoor and outdoor, aquatic site, fishing, action based and seatwork	Activity book	Activities	General, Northcentral United States, Illinois	Current
			Yes	Yes		Indoor and outdoor, aquatic site, aquarium, action based and seatwork	Background, lesson plans, manual, references, worksheets	Activities, cooperative learning, demonstrations, discussions, experiments, games, inquiries, local involvement, presentations, research, role play, state case	Canada, United States, Lake Superior, Michigan, Minnesota, Ontario, Wisconsin	Current
			Yes	Yes		Indoor, action based and seatwork	Manual, lesson plans, background, references, worksheets, posters	Activities, research, experiment, demonstration	General, Great Lakes	Dated
			Yes	Yes	Yes	Indoor, action based and seatwork	Background, lesson plans, references, worksheets	Activities, discussion, research, role play	General, Great Lakes, Lake Superior	Current
			Yes	Yes	Yes	Indoor, aquatic site, action based and seatwork	Manual, lesson plans, background, references, worksheets, video, posters	Activities, cooperative learning, demonstrations, discussions, research	North America, Canada, United States, Great Lakes	Current
			Yes		Yes	Indoor and outdoor, aquatic site, aquarium, action based	Background, lesson plans, manual, references, worksheets	Activities, demonstrations, discussions, experiments, games, presentations, research, simulations	General	Current
			Yes	Yes	Yes	Indoor and outdoor, aquatic site, action based and seatwork	Background, lesson plans, manual, references, workbook	Activities, demonstrations, discussions, inquiries, local experts, local involvement, peer teaching, research, role play	General, North America, Canada, United States, Arctic North Pacific, Alaska, Northwest Territories	Current
			Yes	Yes		Indoor and outdoor, aquatic site, fishing, action based and seatwork	Background, handouts, manual, references, posters, video	Discussions, presentations	General, North America, Massachusetts	Current
			Yes	Yes	Yes	Indoor and outdoor, aquatic site, field trip, fishing, action based and seatwork	Background, lesson plans, manual, references, workbook and worksheets	Activities, discussions, games, local involvement, demonstrations, research, role play	General, Wisconsin	Current
			Yes	Yes	Yes	Indoor, action based and seatwork	Lesson plans, manual, references	Activities, cooperative learning, international involvement, peer teaching, research, role play	General	Leading edge process

Fisheries education material	Grade and setting	Main emphasis	Subject	Issue 1 Habitat	Issue 2 Pollution	Issue 3 Biodiversity	Issue 4 Build fisheries	Issue 5 Manage fisheries
Pathway to Fishing (In-Fisherman)	4–12 Adult Nonformal	PhE, Sci	Recreational fishing					
Ready, Set... Go Fishing!	K–3 Nonformal	PhE	Recreational fishing					
Resources Management	4–9 Formal	ES, Sci	Fisheries, management and regulations, ecology and ecosystem	 		 	 	 
Salmonids in the Classroom—Primary	1–3 Formal	A, LA, M, Mu, PhE, Sci	Habitat, ecology and ecosystem, biology, animals	  	 		 	
Salmonids in the Classroom—Intermediate	4–7 Formal	A, ES, Geo, LA, M, Mu, PhE, Sci, SS	Fisheries, management and regulations, environmental issues	  	 		  	  
Save Our Seas (Adopt A Beach)	K–12 Formal	A, ES, LA, M, Sci, SS	Environmental issues		  			
Seals, Fish and You	11–12 College and university Formal	ES, Geo, LA, Sci, SS	Fisheries, environmental issues			 	  	
Sportfishing and Aquatic Resources Education Program	5–8 Formal Nonformal	ES, M, PhE, Sci	Habitat, management and regulations, recreational fishing, environmental issues, ecology and ecosystem	  	  	  	 	  
Sport Fishing & Aquatic Resources Handbook	4–9 Nonformal	ES, PhE, Sci	Recreational fishing, biology, ecology and ecosystem	 	  			 
Supplemental Curriculum Activities for Youth with Paddle-to-the-Sea	3–6 Formal	A, ES, LA, M, Sci, SS	Ecology and ecosystem		  			
Teacher's Guides for Lake and Stream Ecosystem Posters	Estimate 4–12 Formal	A, M, Sci	Ecology and ecosystem	 		 		 

Issue 6 Stewardship	Issue 7 Fishing	Issue 8 Careers	Goal 1 Awareness/ Understanding	Goal 2 Attitudes/ Values	Goal 3 Skills/ Action	Format	Material	Approach	Scope	Currency
			Yes	Yes		Indoor and outdoor, action based and seatwork	Manual, decal, fishing gear, posters, video	Activities, demonstrations, discussions	General	Current
						Indoor, seatwork	Coloring and activity book	Self-directed	General	Current
			Yes	Yes	Yes	Indoor, seatwork	Background, lesson plans, manual, video	Discussions	Southern United States	Dated
			Yes	Yes	Yes	Indoor and outdoor, aquatic site, aquarium, field trip, action based	Background, lesson plans, manual, slides, posters, specimens, video, worksheets	Activities, cooperative learning, demonstrations, discussions, drama, experiments, presentations, problem solving, small group	North America, Canada, United States, Pacific Northwest, California, Oregon, British Columbia, Washington	Leading edge process
			Yes	Yes	Yes	Indoor and outdoor, aquatic site, aquarium, action based and seatwork	Background, lesson plans, manual, references, specimens, video, worksheets	Activities, debates, demonstrations, discussions, drama, experiments, games, inquiries, local and state involvement, presentations, problem solving, research, role play	North America, Canada, United States, Pacific Northwest, California, Oregon, British Columbia, Washington	Current
			Yes	Yes	Yes	Indoor and outdoor, aquatic site, action based and seatwork	Background, lesson plans, manual, slides, references, posters, video, worksheets	Activities, discussions, experiments, guided imagery, local and international involvement, presentations, problem solving, research, role play	General	Current
			Yes		Yes	Indoor, seatwork	Manual, lesson plans, background, references, audiotape, workbook, video	Activities, discussions, inquiries, national and international involvement, presentations, research, role play	General, North America, Canada, Atlantic Canada	Leading edge content
			Yes	Yes	Yes	Indoor and outdoor, aquatic site, fishing, action based	Background, lesson plans, manual, references, worksheets	Activities, debates, demonstrations, discussions, games, research	General	Leading edge content
			Yes	Yes	Yes	Indoor and outdoor, aquatic site, aquarium, action based	Manual, book	Activities, demonstrations	General, North America, United States	Current
			Yes	Yes	Yes	Indoor and outdoor, action based and seatwork	Lesson plans, manual, references, worksheets	Activities, demonstrations, discussions, games, role play	Great Lakes	Current
			Yes			Indoor	Background, lesson plans, manual, posters	Activities, discussions, research	General, Central United States, Mississippi Valley	Current

Fisheries education material	Grade and setting	Main emphasis	Subject	Issue 1 Habitat	Issue 2 Pollution	Issue 3 Biodiversity	Issue 4 Build fisheries	Issue 5 Manage fisheries
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Wow! The Wonders of Wetlands	K–12 Formal Nonformal	A, ES, LA, M, Mu, Sci, SS	Habitat, management and regulations, environmental issues, water science, ecology and ecosystem					
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Zebra Mussel Mania	5–6 Formal	A, ES, LA, M, Sci, SS	Environmental issues					
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Issue 6 Stewardship	Issue 7 Fishing	Issue 8 Careers	Goal 1 Awareness/ Understanding	Goal 2 Attitudes/ Values	Goal 3 Skills/ Action	Format	Material	Approach	Scope	Currency
			Yes	Yes	Yes	Indoor and outdoor, aquatic site, aquarium, action based and seatwork	Background, lesson plans, manual, references, worksheets	Activities, decision making, demonstrations, discussions, drama, experiments, games, inquiries, local involvement, research, role play	General	Current
			Yes	Yes		Indoor, action based and seatwork	Background, lesson plans, manual, posters, specimens, video, worksheets	Activities, demonstrations, discussions, experiments, inquiries, observations, presentations, research, role play, simulations	North America	Current

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