Introduction to the Teacher's Guide

**What does this guide offer you and your students?**

Alaska and her people enjoy one of the world's premium and increasingly rare resources—healthy stocks of wild Pacific salmon. In spring 2002 the Alaska Department of Fish and Game published and distributed to every school in the state multiple copies of *Alaska's Wild Salmon,* a 64-page book celebrating this remarkable resource. This teacher's guide suggests ways to use that book to help middle school students appreciate their priceless heritage.

Many Alaska schools teach at least part of the story of wild salmon. But a 2003 Alaska Department of Education needs assessment found that many students are not studying salmon. The story of Alaska's wild salmon includes how salmon evolved their remarkable freshwater/saltwater life cycle, and the habitats they depend on during various stages of their lives. It is about the story of human interactions with salmon through centuries of harvest for economic and spiritual gain. The story includes management efforts to protect the integrity of wild stocks, and an understanding of the laws, traditions, and public decision making that determine if healthy wild stocks will survive to benefit future generations of Alaskans. These are all areas of study that, according to the 2003 survey, are not normally covered in schools.

**Does studying about salmon relate to Alaska standards?**

The activities, readings, and resources described here support student progress in achieving Alaska content and performance standards. A table following this introduction suggests just a few of the ways that specific activities support Alaska content standards in science, geography, history, English/language arts, cultural literacy, and other areas. Many activities also support Alaska performance standards.

**How this guide is organized**

The salmon saga spins out in seven separate chapters of *Alaska's Wild Salmon*. The teacher's guide follows that structure and adds an introduction to help students relate the study of salmon to their daily lives.

Each section of the guide is keyed to a specific chapter in the book. Each section provides:

? key concepts,
? objectives,
? terms students should know
? additional background for teachers,
? questions for class discussions,
? ideas for classroom activities,
? resources for teachers and students, and
? a question to help prepare students for the next chapter.

We hope every Alaska middle school student will be exposed to the story of wild salmon, whether through studying *Alaska's Wild Salmon* or through other school or district curriculum components. It is most important that students relate the ideas and information they gather from *Alaska's Wild Salmon* to their own lives and communities. The activities suggested here work toward that goal.

**What resources can help me plan lessons?**

In preparing to teach about *Alaska's Wild Salmon,* we suggest you review some of the excellent resources for teaching about salmon that are available in print and on the Internet. Following this introduction, you will find an annotated list of some general references. At the end of the guide you will find appendices that give overviews specific to Alaska on Salmon Biology and Fish Habitat in Alaska.

Each chapter of the guide also suggests resources teachers can use for planning lessons and resources teachers and students can use together.

**Please help improve these materials for Alaska teachers.**

This electronic teacher's guide is a pilot edition, and we are eager to revise it to improve its use in the classroom. Please help benefit other teachers by filling out the survey at the end of the teacher's guide, and send your suggestions to Jon Lyman, Aquatic Education Coordinator, Alaska Department of Fish and Game, jon_lyman@fishgame.state.ak.us,
(907) 465-6186.

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***Please note***: Classroom sets of *Alaska's Wild Salmon* are available only to Alaska classroom teachers. Individual copies are available to teachers outside Alaska.

Selected General Resources for Teaching about ***Alaska's Wild Salmon***

*Notes:*

1. Materials for teaching about salmon that were written outside of Alaska can be useful in many respects. Teachers should note, however, that the story of salmon in Alaska is unique:
(1) 98% of Alaska's salmon stocks are healthy, so emphasis here is on maintaining salmon stocks and their habitats, and harvesting salmon. In Washington, Oregon, California, and British Columbia the emphasis is toward healing and restoration.
(2) Alaska salmon have adapted to habitat conditions, such as lower water temperatures, that stocks in other regions cannot tolerate.
(3) Regulations (such as those for subsistence harvest or hatcheries) and Native traditions are often different in Alaska from those in British Columbia and the Lower 48.
2. Web site addresses often change. If you have problems accessing any sites listed in this guide, please let Jon know and he will try to help.

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**Alaska Department of Fish and Game** web site - http://www.adfg.state.ak.us - includes a wealth of information about salmon fisheries, research, and management. Follow links to Teacher Resources and materials especially for kids.

**Alaska Natural Resources and Outdoor Education Association (ANROE)** - http://www.anroe.org - has a "Guide to Alaska Natural Resource Education Materials" and a link to "Aquatic/Marine Resources" in the Alaska Science and Math Curriculum materials. Also see their publication *Targeting Excellence: Aligning Alaskan Environmental Education with Standards.*

**Salmonids in the Classroom** is a creative and complete Intermediate and Primary level curriculum developed by the Canada Department of Fisheries and Oceans. The Intermediate curriculum covers freshwater beginnings, life at sea, and return to the river. The Primary curriculum has been modified for Alaska by the Alaska Department of Fish and Game. This is available from B.C. Teachers' Federation, Lesson Aids Service, 100-500 West 6th Ave., Vancouver, B.C. V5Z 4P2.

**Alaska Sea Grant College Program** – www.uaf.edu/seagrant/index.html
This web site has good general information on Alaska fisheries and offers publications on managing fishing businesses, seafood handling & harvesting, and more.

**Publication on Pacific Salmon Fisheries** -http://www.esig.ucar.edu/HPmiller/pubs/millercc45/text.html
This web site contains the full text of "Pacific Salmon Fisheries: Climate, Information and Adaptation in a Conflict-Ridden Context" by Kathleen Miller of the Environmental and Societal Impacts Group at the National Center for Atmospheric Research. It provides excellent, though fairly technical, background on several key topics covered in this teacher's guide, including:

? why genetic diversity and preserving wild salmon stocks is important (*Alaska's Wild Salmon,* chapter 1),
? climate change and the changing abundance of salmon (*Alaska's Wild Salmon*, chapter 3), and
? the Pacific Salmon Treaty and issues of fish management between the U.S. and Canada (*Alaska's Wild Salmon*, chapter 7).

**Project Wild, Project Wild Aquatic – ADF&G Div. of Wildlife Conservation**
These curricula include some information on salmon. Note that you must take training to get the materials. Information on these and other workshops for teachers are found under the Education link of the Alaska Department of Fish and Game Division of Wildlife Conservation.
Wildlife Conservation page

**North American Association for Environmental Education** web site has a huge section on Classroom Resources. http://eelink.net

**EPA Environmental Education Center** has a link on Water Curriculum Resources and activities. http://www.epa.gov/teachers/

**FishBanks Ltd.** web site describes (and sells) a PC simulation game from the University of New Hampshire Institute for Policy and Social Research.

www.unh.edu/ipssr/FishBank.html

**Kidfish** web site from British Columbia is described as a "web-based tool for teaching grade 5 to 7 students." It focuses on aquatic fish, freshwater habitat, fly-tying, and stewardship. The site includes information and activities for students, thought-provoking questions and lesson plans for teachers.

**Discovering Alaska's Salmon: A Children's Activity Book** by Laurel Devaney and Putt Clark may be useful for younger middle school students, with 29 pages of puzzles, coloring, and other activities. Available from Alaska Natural Resources and Outdoor Education Association, P.O. Box 110536, Anchorage, AK 99511-0536, or from www.anroe.org

**The Pacific Salmon and Steelhead Coloring Book**, produced by the U.S. Fish and Wildlife Service and available for printing off the web, is filled with valuable information. The page touting the value of hatcheries, however, is controversial. http://pacific.fws.gov/publications/salmnbk.pdf

**Alaska Science Forum,** from the University of Alaska Geophysical Institute, publishes articles written for newspapers in an entertaining, accessible style. Topics among the 61 articles on salmon include "otolith marking" of hatchery and wild salmon, pollutants found in Alaska salmon, and how salmon navigate.

www.gi.alaska.edu/ScienceForum

**Web searches** using any search engine often produce teacher lesson plans on salmon from students and teachers at colleges, universities, and school districts. Try terms such as "teaching about salmon" or "teacher materials salmon."

Key Concepts and Objectives

| Chapter | Key Concepts | Chapter Objectives |
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| **Introduction to Salmon in Alaska** | Salmon are a crucial part of life for nearly all Alaskans. Alaska is the last great stronghold for healthy stocks of wild salmon. Each one of us is responsible for helping to sustain this resource. | After completing this introduction, students will:<br>? think about the importance of salmon to themselves, their families, and their community;<br>? wonder why Alaska is the last great stronghold for healthy stocks of wild salmon;<br>? think about what they can do to help assure sustainable stocks of wild salmon in Alaska. |
| **1) How Salmon Evolved & Adapted** | Salmon and related species have evolved and changed over millions of years. Genetic diversity allowed different species and populations to adapt and survive under different conditions in various streams, lakes, and rivers. The genetic variety among these fishes is crucial to the survival of Alaska's salmonids. | After completing this chapter students will be able to explain:<br>? how salmon and related fishes evolved over the ages;<br>? some of the evolutionary benefits salmon have gained by adaptations such as being anadromous;<br>? why genetic diversity and healthy habitats are essential to the survival of wild salmon in Alaska. |

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| **2) Pacific Salmon Biology** | Over millions of years Alaska's wild salmon have developed a complex life cycle that allows them to thrive and expand into new areas. Each of the five species has developed distinct physical characteristics, different habitat needs, and different timetables for spawning and rearing. All five species are a crucial part of the food web that binds together Alaska's land and oceans. | After completing this chapter students will understand and appreciate:<br>? the life cycle of salmon and their stages of development;<br>? the importance of salmon at each stage in their life cycle to the entire ecosystem;<br>? differences among the five species of wild salmon, plus rainbow and cutthroat trout;<br>? why these differences are so important to the survival of Alaska's wild salmon;<br>? how salmon expand into new areas and why it is important that they do. |
| **3) Alaska's Salmon Habitats** | Healthy watersheds are crucial to sustaining Alaska's wild salmon. Alaska is unique in that it has tremendous numbers of healthy watersheds. We have the ability to sustain salmon populations by understanding and maintaining these watersheds. | After completing this chapter students will be able to describe:<br>? geographic areas and terms of the essential environmental elements found in healthy watersheds,<br>? how each contributes to good salmon habitat, and<br>? how the elements of salmon habitats are interconnected.<br>They will also be able to describe:<br>? human behavior that can threaten elements of good salmon habitat;<br>? steps they and their communities can take to assure healthy salmon spawning, rearing, and growing areas; and<br>? the major salmon-producing areas in Alaska. |
| **4) Protecting Our Clean Water** | Individuals and communities make choices that produce positive and negative impacts on salmon and their habitats. It is important that Alaskans understand the consequences of their actions on the health of watersheds and salmon resources.<br>The health and future of Alaska's wild salmon will depend, in part, upon our conservation efforts and responsible development | Students will be able to explain how choices we make in land and water use can affect the survival of Alaska's wild salmon. They will understand effects of:<br>? pollution and contamination,<br>? changes in water volume or flow,<br>? invasive species,<br>? Atlantic salmon, and<br>? fish farming<br>on wild salmon.<br>Students will also understand:<br>? steps they can take to help decrease negative impacts on wild salmon, and<br>? actions they can take to help protect and restore important salmon habitat. |

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| | with regard to:<br>? potential pollution & contaminants,<br>? non-point source pollution,<br>? invasive species,<br>? spread of Atlantic salmon in the Pacific Ocean, and<br>? fish farming. | |
| **5) The Harvest of Salmon** | The harvest of salmon has long been an important part of Alaska's history. Salmon harvests will continue to play an important part in the economic and cultural life of Alaskans. | Students will be able to describe:<br>? the four categories of Alaska salmon harvesters and their gear: commercial, subsistence, sport, and personal use;<br>? the history and importance of each, both culturally and economically;<br>? the challenge of balancing these uses with changing economic conditions and maintaining healthy salmon populations;<br>? how they can help their community respond to this challenge. |
| **6) Alaska's Salmon Management & Research** | The goal of salmon management in Alaska is to allow enough returning salmon to reach spawning grounds to sustain salmon populations and related ecosystems, and to provide for the harvest of salmon that are surplus to those needs. Sound research provides the foundation for effective conservation, management, and harvest practices. | Students will be able to:<br>? explain how salmon in Alaska are managed on the basis of conservative management, sound science, and habitat protection;<br>? explain the need and importance of in-season, abundance-based management;<br>? describe or demonstrate some of the research techniques used to count, observe, and monitor salmon and to monitor environmental conditions necessary to salmon;<br>? discuss the pros and cons, problems and advantages of hatcheries in Alaska. |
| **7) Partners for Salmon** | Partnerships of many kinds are crucial to protecting and restoring Pacific wild salmon stocks and the habitats that support their various life stages. | Students will be able to:<br>? explain why partnerships among individuals, tribes, businesses, harvesters, and state, federal, international, and non-governmental organizations are essential to preserving the health of Alaska's wild salmon;<br>? describe the goals and activities of major agencies and organizations working to protect Alaska's wild salmon.<br>? demonstrate how they can play a role in determining how Alaska salmon stocks |

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| | | will be managed. |