

The Stream Scene

Watersheds, Wildlife and People

Second Edition



An Aquatic Education Program Publication
Distributed by Oregon Department of Fish & Wildlife
P.O. Box 59
Portland, OR 97207

2nd Edition © 1999



This publication was partially funded through the Oregon Department of Fish and Wildlife Aquatic Education program. The program is funded by the 1984 Wallop-Breaux Amendment to the Federal Aid in Sport Fish Restoration Act of 1950. Funds are derived from a ten percent tax on fishing and boating equipment and supplies. The funds are distributed to state fish and wildlife agencies based on the number of fishing licenses sold in that state. Seventy-five percent of the Oregon Aquatic Education program is financed from this source, a sum of \$293,975 in fiscal year 1999.

Funds for pilot testing the original curriculum and for completing the 1999 revisions were provided by the Governor's Watershed Enhancement Board through ORS 541.350 through ORS 541.395. Technical review and classroom field testing occurred from 1988 to 1990.

Additional funding and classroom and field support for trained teachers has been provided by the Salmon-Trout Enhancement Program (STEP) of the Oregon Department of Fish and Wildlife.

Authors

Patty (Farthing) Bowers
Don Wolf
Bill Hastie
Shann Weston

Contributors

Tori Anderson
Steve Andrews
Rich Berry
Wayne Bowers
William Bullard
Dave Courtney
Tony Faast
Michael Goodrich
Patrick Griffiths
Carolyn Hensley Johnson
Al Hughes
Eldon Korpela
Judy Li
Nancy MacHugh
Rosanna Mattingly
Judy Miller
Linda Pelroy
Marta Turksel
Dennis Wise

Layout & Design

Anne Merydith-Wolf

Illustration

David Creekmore
Sharon Torvik

This program receives federal assistance in Sport Fish Restoration and prohibits discrimination on the basis of race, color, national origin, age, sex, or disability. If you believe that you have been discriminated against as described above in any program, activity, or facility, or if you desire further information, please contact ADA Coordinator, Oregon Department of Fish and Wildlife, PO Box 59, Portland, OR 97207, 503-872-5264, or write Office for Human Resources, US Fish and Wildlife Service, Department of the Interior, Washington, DC 20240.

This material will be furnished in alternative format for people with disabilities if needed. Please call 503-872-5265 (voice) or 503-872-5259 (Portland TTY) to request.

Copyright © 1999 by the Oregon Department of Fish and Wildlife. All rights reserved. Earlier editions copyright 1990 and 1992. Reproduction of pages for classroom use is allowed with credit. Otherwise, no part of this publication may be reproduced without written permission of the Oregon Department of Fish and Wildlife, Aquatic Education Program.



Contents

1	Using this book	1
2	Getting started	9
3	Water cycle	13
	• The water cycle	17
	• Water drop crossword puzzle	25
4	Watersheds	33
	• A sense of place: your ecological address	43
	• Tour of a topo	59
	• What a relief!	83
	• Snow way!	97
5	Uplands	105
	• Hold that raindrop	117
	• Timing is everything	123
	• Winter watersheds	131
	• Water? Right!	153
6	Riparian areas	161
	• A dirty subject ... soil, vegetation, and watersheds	171
	• Made in the shade	179
	• Passin' through	183
	• Things that go bump in the night	191
7	Hydrology	199
7.1	Water dynamics	201
	• Go with the flow	203
7.2	Water quantity	213
	• A study in streamflows	215
7.3	Streambed	231
8	Water quality	235
8.1	Nutrients	241
	• Too much of a good thing	245
8.2	Water temperature	253
	• When it's hot	257
	• Temperature and respiration rate	265
8.3	Dissolved oxygen	273
	• A South Twin story	275
8.4	pH	283
	• Lakes and pH	287
8.5	Sediments	295
	• Don't runoff	299

[• denotes activities]

9	Aquatic organisms	307
9.1	Food processing	309
	• Build a bug	319
	• Water wigglers	335
9.2	Salmon life cycle	353
	• Riffles and pools	357
	• Salmon language crossword puzzle	365
	• Coming home	373
9.3	Fish habitat needs	387
	• Home wet home	393
	• The stream doctor—a fish biologist at work	399
	• Clackamas carrying capacity	409
10	Make-and-take field equipment	419
11	Salmon-Trout Enhancement Program	427
12	Field investigations	439
	General stream survey team	445
	Wildlife inventory team	449
	Photo record team	451
	Fish survey team	455
	Water quality survey team	465
	Macroinvertebrate survey team	471
	Stream mapping survey team	477
	Other field investigations and monitoring techniques	481
13	Oregon’s Education Standards	483
14	Resources	505
14.1	Oregon’s watershed council program	505
14.2	Metric conversion	511
14.3	Hot links	513
14.4	Curriculum resources	519
14.5	Words and water: a study of watersheds through literature	533
15	Glossary	537

[• denotes activities]