Contents

Contributors ix
Preface xv
Reviewers xvii

Where are We? Resources at the Brink
Deanna J. Stouder, Peter A. Bisson, and Robert J. Naiman 1

Introduction to a Complex Problem
Introduction to a Complex Problem
Curt Smitch 13

Old Traditions that Led to Abuses of Salmon and Their Ecosystems
Henry A. Regier 17

The Origin and Speciation of Oncorhynchus Revisited
J.D. McPhail 29

Status of Pacific Northwest Salmonids
Pacific Salmon Status and Trends—A Coastwide Perspective
Willa Nehlsen 41

ANALYZING TRENDS AND VARIABILITY
On the Nature of Data and Their Role in Salmon Conservation
Jay W. Nicholas 53

Information Requirements for Salmon Management
Carl Walters 61

Evaluating Salmon Management Institutions: The Importance of Performance
Measures, Temporal Scales, and Production Cycles
James Lichatowich 69

REGIONAL TRENDS
California Salmon and Steelhead: Beyond the Crossroads
Terry J. Mills, D. McEwan, and M.R. Jennings 91
vi / Contents

Idaho’s Salmon: Can We Count Every Last One? 113
Peter F. Hassemer, S. W. Kiefer, and C. E. Petrosky

Status of Wild Salmon and Steelhead Stocks in Washington State 127
T. H. Johnson, R. Lincoln, G. R. Graves, and R. G. Gibbons

The Status of Salmon and Steelhead in Oregon 145
Kathryn Kostow

Status of Alaska Salmon 179
Alex C. Wertheimer

Pacific Salmon Abundance Trends in the Fraser River Watershed Compared with Other British Columbia Systems 199
Thomas G. Northcote and D. Y. Atagi

FACTORS CONTRIBUTING TO STOCK DECLINES

Genetic Factors Contributing to Declines of Anadromous Salmonids in the Pacific Northwest 223
Reginald R. Reisenbichler

The Role of Competition and Predation in the Decline of Pacific Salmon and Steelhead 245
Kurt L. Fresh

Degradation and Loss of Anadromous Salmonid Habitat in the Pacific Northwest 277
Stanley V. Gregory and P. A. Bisson

The Role of Harvest Management in the Future of Pacific Salmon Populations: Shaping Human Behavior to Enable the Persistence of Salmon 315
Phillip R. Mundy

Salmon Production in Changing Ocean Domains 331
William G. Pearcy

Salmon Policies and Politics

Salmon Fisheries in the Pacific Northwest: How are Harvest Decisions Made? 355
Larry G. Rutter

Habitat Policy for Salmon in the Pacific Northwest 375
James R. Sedell, G. H. Reeves, and P. A. Bisson

Water Management and Water Quality Decision Making in the Range of Pacific Salmon Habitat 389
Charles F. Gauvin
A Resource in Crisis: Changing the Measure of Salmon Management
Christopher A. Frissell, W. J. Liss, R.E. Gresswell, R. K. Nawa, and J. L. Ebersole

Technological Solutions: Cost-Effective Restoration
Watershed Management and Pacific Salmon: Desired Future Conditions
Peter A. Bisson, G. H. Reeves, R. E. Bilby, and R. J. Naiman

Restoration of Riparian and Aquatic Systems for Improved Fisheries Habitat in the Upper Columbia Basin
Robert L. Beschta

Rehabilitation of Pacific Salmon in Their Ecosystems: What Can Artificial Propagation Contribute?
Anne R. Kapuscinski

Managing Resources with Incomplete Information: Making the Best of a Bad Situation
Robert C. Francis

Is Ecological Risk Assessment Useful for Resolving Complex Ecological Problems?
Robert T. Lackey

An Ecosystem-based Approach to Management of Salmon and Steelhead Habitat
Jack E. Williams and Cindy Deacon Williams

Institutional Solutions: Effective Long-Term Planning and Management
Do We Need Institutional Change?
Robert Hughes

To Till the Water: A History of Ideas in Fisheries Conservation
Daniel L. Bottom

Values in the Valuing of Salmon
Courtland L. Smith and Brent S. Steel

Organizational Systems and the Burden of Proof
David A. Bella

Salmon, Stewardship, and Human Values: The Challenge of Integration
Robert G. Lee
Where Do We Go From Here?

Where Do We Go From Here? An Outsider's View
James F. Kitchell 657

Sustaining Salmon: Three Principles
Kai N. Lee 665