

# CHALLENGES AND REWARDS OF TRANSDISCIPLINARY COLLABORATION TO SUSTAIN ECOSYSTEM SERVICES



Social Science for Coastal Decision-Making

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Francis Marlon Hotel  
Charleston, South Carolina

**Christine Feurt PhD**

Director Coastal Training Program, Wells National Estuarine Research Reserve  
Director Center for Sustainable Communities, Department of Environmental Studies,  
University of New England

**February 9, 2016 Charleston, SC**



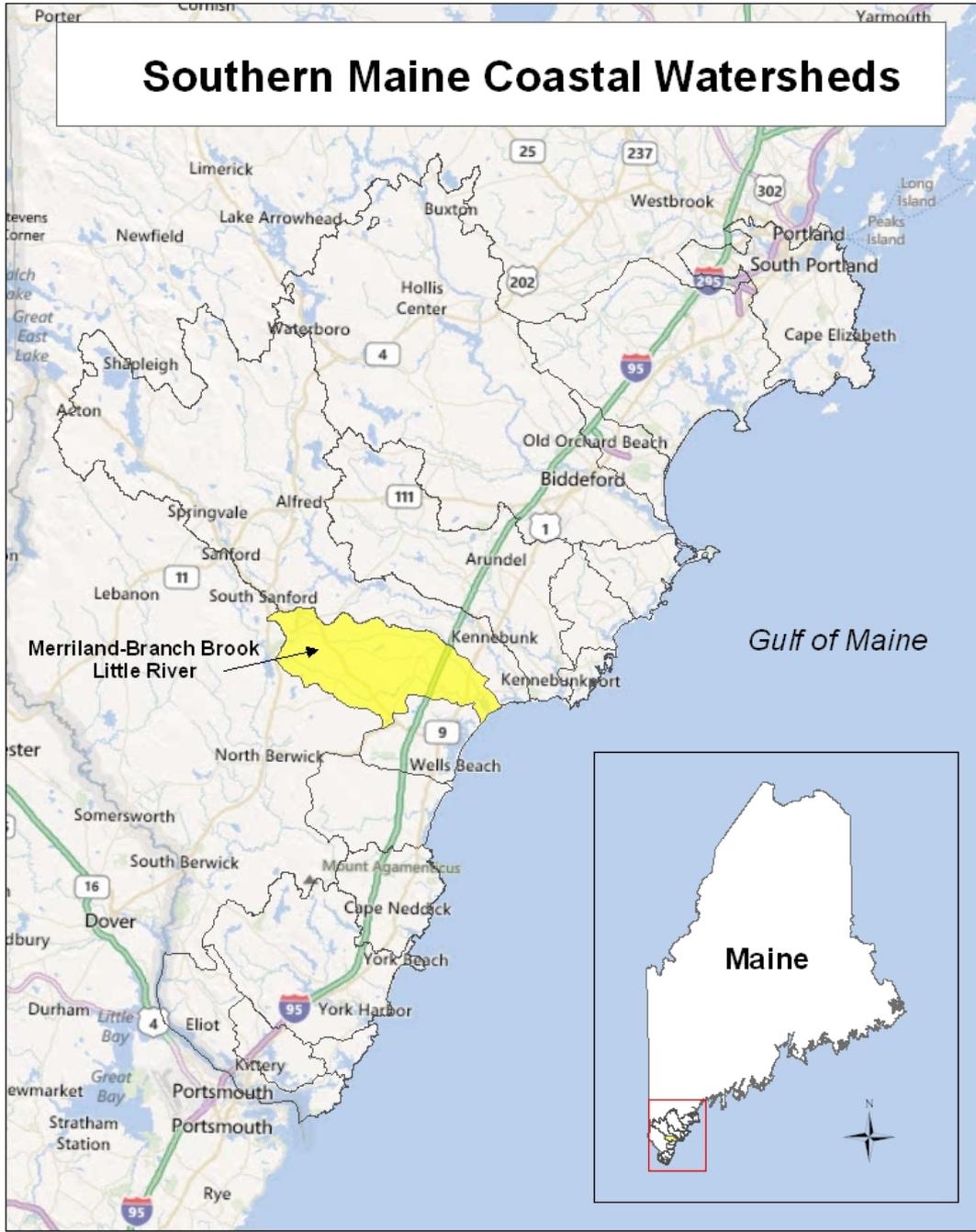
**wellsreserve**  
Wells National Estuarine  
Research Reserve

# What's the story?

- Ecosystem Service Valuation (ESV) research in the National Estuarine Research Reserve System
- Setting the stage
- Why abandon a perfectly familiar model of research to venture into uncharted territory?
- Cast of characters
- The architecture of the research
- What did we learn?



# Southern Maine Coastal Watersheds



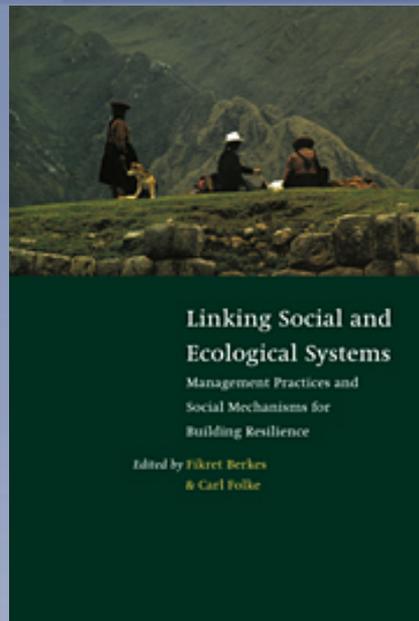




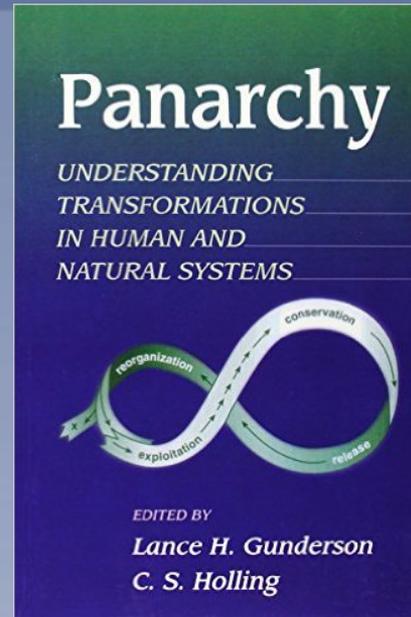
# Evolving Research Paradigms



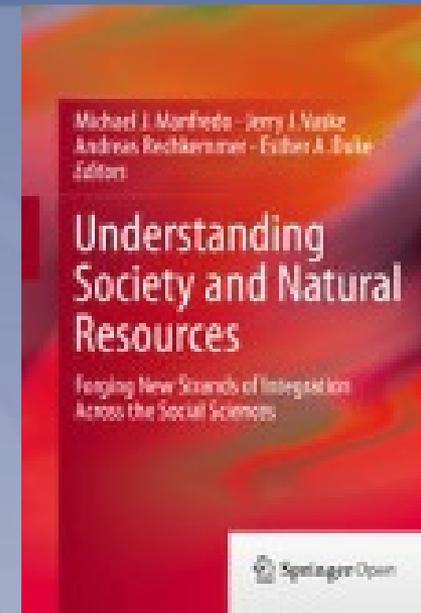
1995



1998



2002



2014



# Transdisciplinary Research

...is defined as research efforts conducted by investigators from different disciplines working jointly to create new conceptual, theoretical, methodological, and translational innovations that integrate and move beyond discipline-specific approaches to address a common problem.

<http://www.hsph.harvard.edu/trec/about-us/definitions/>



# “Sustaining Coastal Landscapes and Community Benefits”



*“Developing an Interdisciplinary Model for  
Enhancing the Impact of NERRS Science”*

Three integrated research themes:

1. Ecological assessment
2. Economic choice experiment
3. Communication audit with mental models development



# Engage the *Kaleidoscope of Expertise* working to sustain riparian buffer ecosystem services



*(Feurt, 2007)*

# Link the project to National Policy Stakeholders

- Interdisciplinary research community working on ecosystem service valuation
- National Estuarine Research Reserve System
- NOAA: Office for Coastal Management & Ecosystem Services Working Group
- A Community on Ecosystem Services (ACES) member organizations & participants



# Challenges of Ecological Assessment of Ecosystem Services

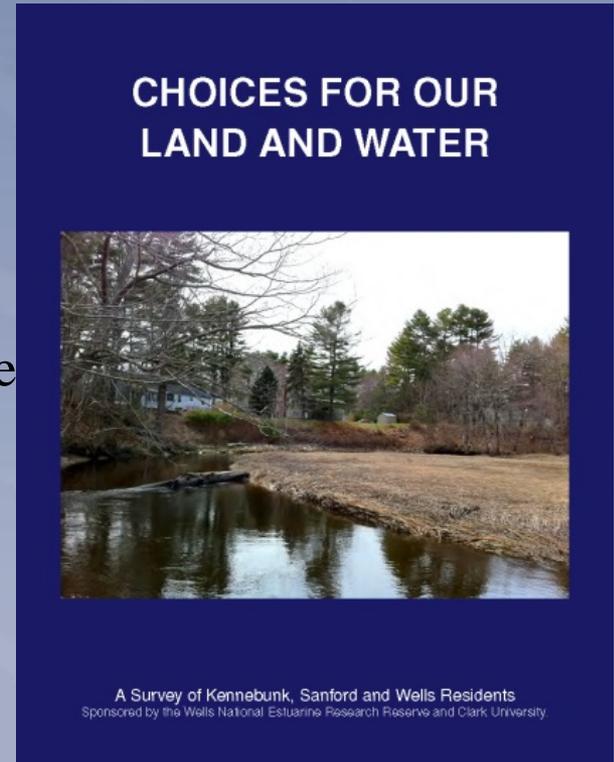


# Measuring ecosystem service values and tradeoffs requires careful consideration of research objectives and stakeholder engagement



Robert J. Johnston

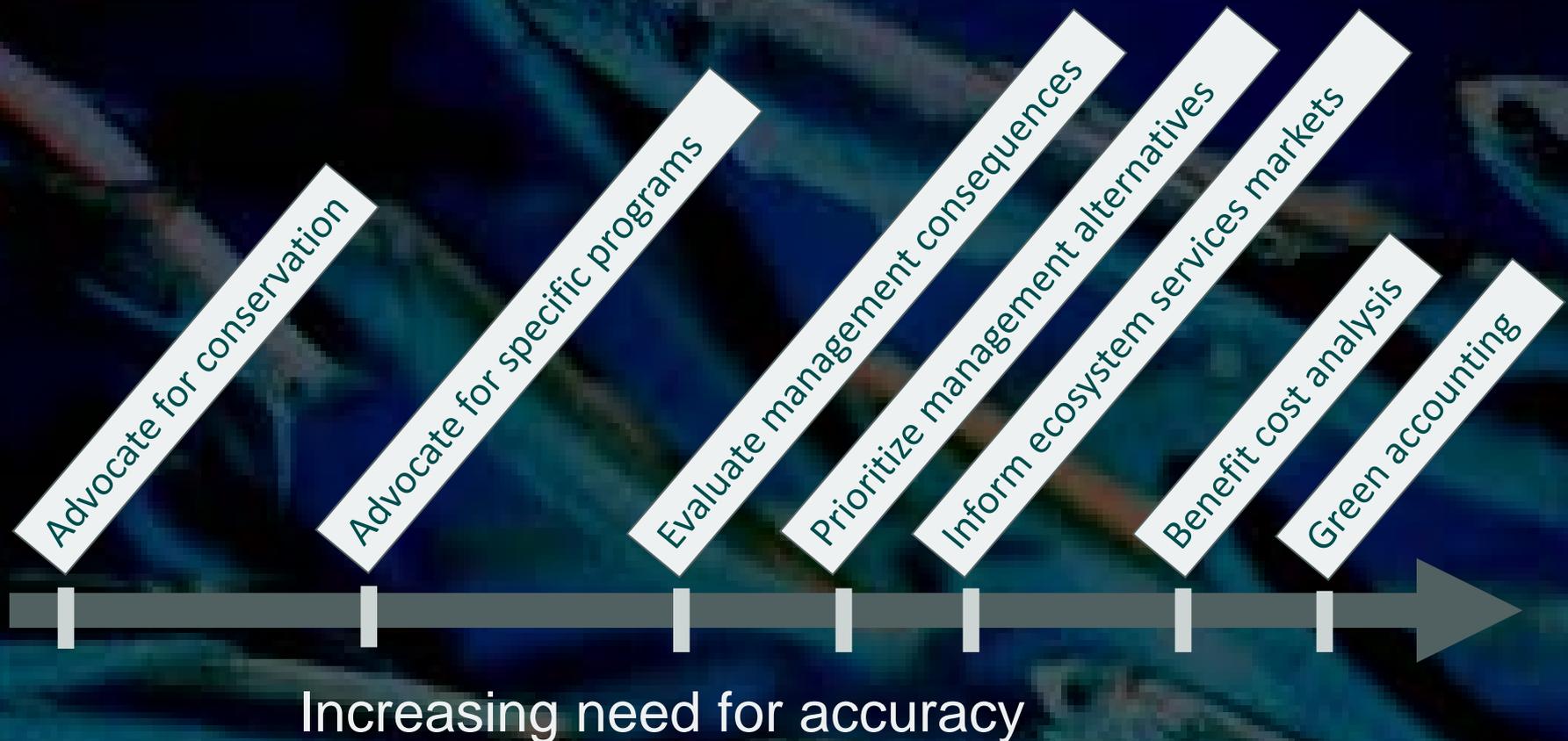
Director, George Perkins Marsh Institute  
Professor, Department of Economics  
Clark University



# The Need for Accuracy in Ecosystem Service Valuation Research Varies

(Rob Johnson slide)

Different purposes require different levels of accuracy, and hence different methods.



# Questions guide the design of meaningful ecosystem service valuation methodologies

(Rob Johnson slide)

Question #1 What is the Goal of the Analysis?

Question #2 What Ecosystem Services Are Being Valued

Question #3 How Are Ecosystem Services Measured?

Question #4 Whose Values Count?

Question #5 How to Measure Values?



# LAND AND WATER IN SOUTHERN MAINE

What happens on land in Maine affects its rivers and streams. **The area where land meets the water is called riparian land.** Riparian land within **300 feet** of the water is considered most important by scientists.



Natural Riparian Land



Partially Cleared Riparian Land

Natural riparian land in southern Maine is forested, with trees and low level plants. This land provides a number of services. For example, riparian land:

- **Filters out pollutants** before they reach the water
- **Prevents erosion** and collapse of river banks
- **Prevents flooding** of homes and property by absorbing flood waters
- **Improves habitat** for fish, birds and other wildlife
- **Provides natural scenery** for residents and visitors.

When this land is cleared or developed, many of these services decline.

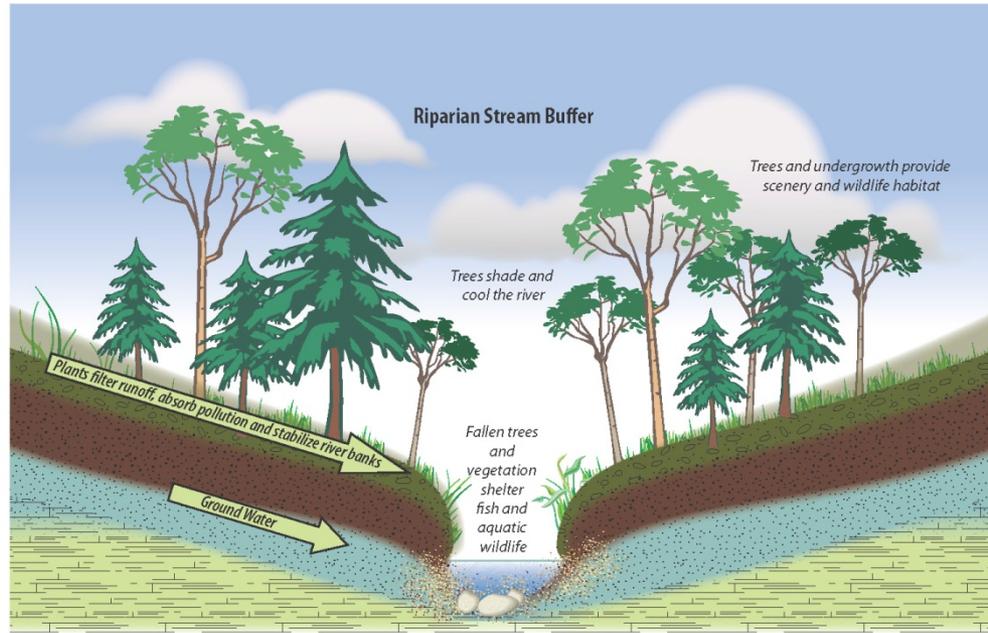
This survey asks for your opinions about how riparian land is managed in areas surrounding the Merriland, Branch Brook, and Little Rivers in your area.

Your answers will help state and local governments decide how to manage this land.



# WHAT RIPARIAN LAND DOES

The figure below illustrates some of the main natural services provided by riparian land, such as absorbing pollution, improving wildlife habitat and providing natural scenery.



Natural Services of Riparian Land

Development in Kennebunk, Sanford, and Wells is removing trees and vegetation on more riparian land each year. This is affecting scenery, river ecosystems, fish, and water quality. Because of this, some people have called for additional restrictions on clearing and development of this land. At the same time, other people do not want the development rights of private landowners to be further restricted.



## QUESTION 6

**OPTION A** and **OPTION B** are possible preservation options for the area surrounding the Meriland, Branch Brook, and Little River. The current situation is the status quo with **NO ADDITIONAL PRESERVATION**.

Given a choice between the three, how would you vote?

Method or Effect of Preservation	In 5-10 years under the Current Situation	In 5-10 years under Option A	In 5-10 years under Option B
 <b>Riparian Land Condition</b>	<b>86%</b> 4000 out of 4700 riparian acres covered by natural vegetation	<b>98%</b> 4600 out of 4700 riparian acres covered by natural vegetation	<b>98%</b> 4600 out of 4700 riparian acres covered by natural vegetation
 <b>River Ecology</b>	<b>53%</b> of best possible (100%) ecological condition	<b>64%</b> of best possible (100%) ecological condition	<b>69%</b> of best possible (100%) ecological condition
 <b>Recreational Fish</b>	<b>57%</b> 17 out of 30 possible fish per 1000 sq. feet	<b>70%</b> 21 out of 30 possible fish per 1000 sq. feet	<b>70%</b> 21 out of 30 possible fish per 1000 sq. feet
 <b>Safe Swimming</b>	<b>85%</b> of beach tests meet safe swimming guidelines	<b>87%</b> of beach tests meet safe swimming guidelines	<b>87%</b> of beach tests meet safe swimming guidelines
 <b>Development Setback</b>	<b>100 feet</b> required between development and river	<b>100 feet</b> required between development and river	<b>125 feet</b> required between development and river
 <b>Land Inspections</b>	<b>No</b> Random inspections <b>NOT ALLOWED</b>	<b>Yes</b> Random inspections <b>ALLOWED</b>	<b>No</b> Random inspections <b>NOT ALLOWED</b>
 <b>Cost to your Household per Year</b>	<b>\$0</b> Increase in Annual Taxes or Fees	<b>\$25</b> Increase in Annual Taxes or Fees	<b>\$15</b> Increase in Annual Taxes or Fees
<b>HOW WOULD YOU VOTE? (CHOOSE ONLY ONE)</b> I vote for	<input type="checkbox"/> <b>NO NEW PRESERVATION</b>	<input type="checkbox"/> I vote for <b>OPTION A</b>	<input type="checkbox"/> I vote for <b>OPTION B</b>



# Survey Implementation

- ◆ Surveys implemented December 2013 – January 2014.
- ◆ Random sample of Kennebunk, Sanford and Wells residents.
- ◆ Multiple wave mailings to maximize response.
- ◆ Laudholm Trust incentive
- ◆ Of 3,816 mailed surveys, 3,460 were deliverable. 1,223 of these were returned for a response rate of 34.5%.



FNAME LNAME  
STREET  
TOWN, ME  
ZIP

December 2, 2013

You have been selected to participate in an important survey by the Wells Reserve at Laudholm that will help local officials make decisions for southern Maine.

Dear FNAME LNAME:

Over time, human activities have caused many changes in Maine's rivers, streams, and shore lands. Government agencies and nonprofit organizations are now considering different options to protect and restore these areas for the benefit of Maine residents and visitors.

Through a random process, you have been selected to receive a survey about some of these options. This survey, *Choices for Our Land and Water - A Survey of Kennebunk, Sanford, and Wells Residents*, will help officials understand your priorities for the environment, property rights, and the use of public funds. As a token of our appreciation, the Wells Reserve at Laudholm has agreed to give a free one-year membership to everyone who returns a survey (for information see <http://www.wellsreserve.org/visit/>). Details will arrive with the survey in a few days.

The survey is being conducted through a joint effort of the Wells National Estuarine Research Reserve and Clark University, in partnership with other public and private groups in Maine. We cannot send this survey to everyone, so your answers will represent the opinions of many other Maine residents like you. We hope that you will complete the survey when you receive it.

Thank you in advance for your assistance with this important project.

Christine Feurt, PhD  
Coordinator, Coastal Training Program  
Wells National Estuarine Research Reserve  
342 Laudholm Farm Road  
Wells, ME 04090

Robert J. Johnston, PhD  
Director, George Perkins Marsh Institute  
Clark University  
950 Main Street  
Worcester, MA 01610  
(508) 751-4699  
wells\_survey@clarku.edu

# Some Choice Experiment Results

Results often counter the common wisdom of policymakers and stakeholders.

Kennebunk, Wells and Sanford residents are willing to pay significant amounts to enhance ecological outcomes associated with riparian land.

- Greater restrictions on development (*SETBACK*) are positively valued by residents. This pattern holds for both owners and non-owners of riparian land.
- Residents also support greater inspections and enforcement of development restrictions on private land (*ENFORCE*).



# Qualitative methods yield understanding of how people think about the value of shoreline buffers

1. Research Approach: Communications Audit  
Mental Modeling to Design Communication Strategies

2. Building NERRS Capacity for Qualitative Approaches  
Qualitative Research Training On-line  
Bridging the Gulfs Workshops



**Verna DeLauer**  
George Perkins Marsh  
Institute, Clark University  
Franklin Pierce University



# A Story About Choices and Assumptions

- ✓ Responding to a local need to make a stronger case for natural resource protection, focusing on the economic value of riparian buffers.
- ✓ Modeling a paradigm of research in the NERRS to integrate ecological and social sciences using an ecosystem services approach.
- ✓ *Increasing the impact of NERRS science with collaborative research designed to support stakeholders' work protecting the things people care about (ongoing)*



# To Learn More about Wells NERR Ecosystem Services Research

*Google “Wells Reserve” and ...*

- Sustaining Coastal Landscapes and Community Benefits
- Bridging the Gulfs
- Qualitative Research methods



# Selected References

**Barriers and Bridges to the Renewal of Regional Ecosystems: Barriers and Bridges to the Renewal of Ecosystems and Institutions Hardcover – May 15, 1995**

by [Lance H. Gunderson](#) (Editor), [C. S. Holling](#) (Editor), [Stephen S. Light](#) (Editor)

**Berkes, F., and C. Folke, editors.** 1998.. Cambridge University Press, New York, New York, USA. *Linking sociological and ecological systems: management practices and social mechanisms for building resilience*

**Panarchy: Understanding Transformations in Human and Natural Systems 2nd Edition**

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**Understanding Society and Natural Resources Forging New Strands of Integration**

Across the Social Sciences

Michael J. Manfredo • Jerry J. Vaske Andreas Rechkemmer • Esther A. Duke Editors

**Collaborative Learning Guide for Ecosystem Management.** 2007. by Christine Feurt

Available from [http://www.wellsreserve.org/sup/downloads/collaborative\\_learning\\_guide.pdf](http://www.wellsreserve.org/sup/downloads/collaborative_learning_guide.pdf)

