

An Ecosystem Services Approach to Setting Restoration Objectives



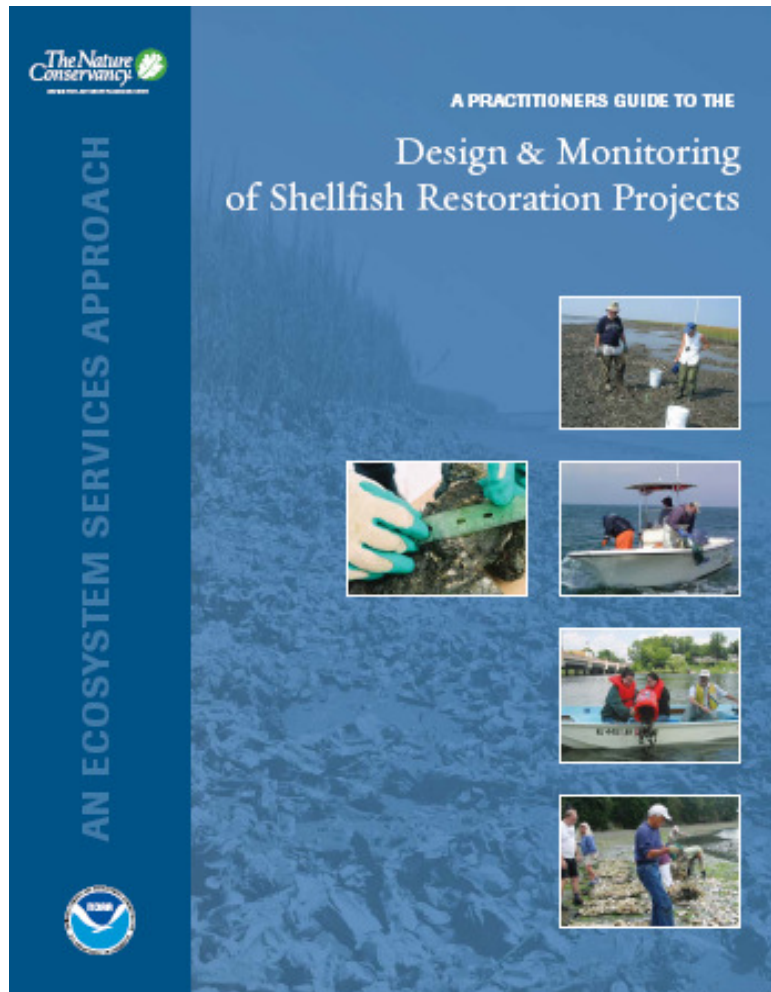
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Acknowledgements



- TNC staff leading shellfish restoration projects in 11 U.S. states: *Anne Birch, Marci Bortman, Cindy Brown, Rafael Calderon, Chris Clapp, Jeff DeBlieu, Mark Dumesnil, Patrick Ertel, Jared Laing, Carl LoBue, Betsy Lyons, Wayne Grothe, Aaron McCall, Jay Odell, Adam Starke, Barry Truitt, Dick Vander Schaaf, Nicole Vickey, Jacques White;*
- Projects funded in part through a National Partnership with NOAA's Community-based Restoration Program and The Kabcenell Foundation;
- Many partners in public management agencies, conservation organizations and academic research institutions who contribute to the Shellfish Restoration Network;

Practitioner's Guide



New handbook summarizes lessons learned and provides advice on:

- The case for restoration
- Identifying target species
- Site selection
- Monitoring approaches
- Forming effective partnerships

Brumbaugh, R.D., M.W. Beck, L.D. Coen, L. Craig and P. Hicks. 2006. The Nature Conservancy, Arlington VA. 28 pp.

“Restoration Clamor”



SAVING THE LAST GREAT PLACES ON EARTH

TNC Shellfish Restoration Network



Shellfish RESTORATION CLAMOR OCTOBER 2006

SHELLFISH RESTORATION NETWORK
Native shellfish play vital ecological roles in many estuaries, but are imperiled in many estuaries by habitat loss, over fishing, and pollution. Through a Shellfish Restoration Network, The Nature Conservancy and its partners are working to improve the design and implementation of restoration projects that help to illustrate the ecosystem services that shellfish provide. Through this network, we also hope to demonstrate the elements necessary to expand restoration and conservation to ecosystem scales.

GLOBAL MARINE INITIATIVE'S VISION

"The Nature Conservancy and partners working together in polar, temperate and tropical seas worldwide to conserve marine biodiversity effectively across seascapes and landscapes through transformative strategies and integrated planning and action."

TO JOIN THE NETWORK, CONTACT:

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For more information about The Nature Conservancy's Global Marine Initiative, visit: www.seasources.org/brnbaio



SAVING THE LAST GREAT PLACES ON EARTH

Advancing Oyster Restoration in Puget Sound



© Joan Fish/TNC

The Nature Conservancy, working with the Puget Sound Restoration Fund, recently implemented Phase II of a three-phase effort to restore habitat for the native Olympia oyster in Woodard Bay, an embayment within Puget Sound. Phase I involved surveys to establish baseline conditions and experiments to quantify local oyster recruitment and survival rates. These results were used to identify specific locations with high larval supply and the appropriate habitat characteristics for successful restoration.

Phase II, a pilot-scale habitat enhancement involved placement of bagged oyster shell culch in 21 plots at 4 locations varying in tidal elevation from -1' to -7' MLLW. Plots were 1 square meter in size and shell depth in bags was approximately 6". Weekly monitoring was conducted through summer 2006 to quantify recruit-

ment and survival, and will continue at less frequent intervals through Spring 2007. The monitoring of post-settlement survival by location and elevation will help guide decisions about locations/elevations for expanded restoration.

Phase III, planned for 2007, includes expand habitat restoration over approximately 5 acres and will be informed by all the monitoring data collected to date. This phased "build it and they will come" strategy in Puget Sound will focus restoration in areas with a known larval supply and help to protect and enhance remnant populations of oysters.

Funding for the project was provided through the TNC-NOAA Community-based Restoration Program.

Contact: Betsy Lyons, bjlyons@tnc.org

looking ahead

November 15-19, 2006
The 8th International Conference on Shellfish Restoration.
DoubleTree Guest Suites, Charleston, SC
Deadline for Abstracts - July 31
<http://www.sceasources.org/icsr.htm>

December 9-13, 2006
3rd National Conference on Coastal and Estuarine Habitat Restoration.
Hilton Riverside Hotel, New Orleans, LA
Hosted by Restore America's Estuaries
<http://www.estuaries.org/conference>

February 26-March 2, 2007
98th Annual National Shellfisheries Association meeting, in conjunction with World Aquaculture and American Fisheries Society.
San Antonio, TX
<http://www.shellfish.org/meetings.htm>

TNC's Marine Ecoregional Assessments available on-line:

The Nature Conservancy's Marine Ecoregional Assessments, spatially explicit tools for planning conservation action, are available at Conserve Online, a publicly-accessible clearinghouse for conservation documents, tools and other products:
<http://conserveonline.org/workspaces/MECA>

Our challenge



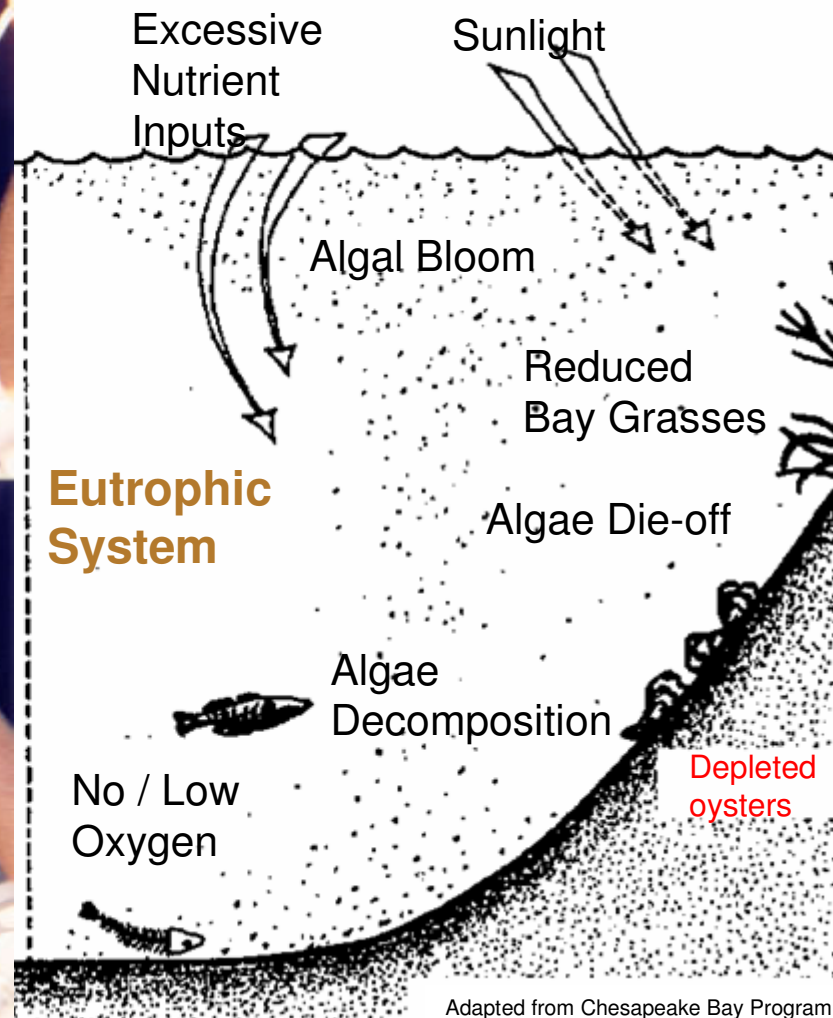
“The nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased and not impaired in value.”

- Theodore Roosevelt

Our challenge

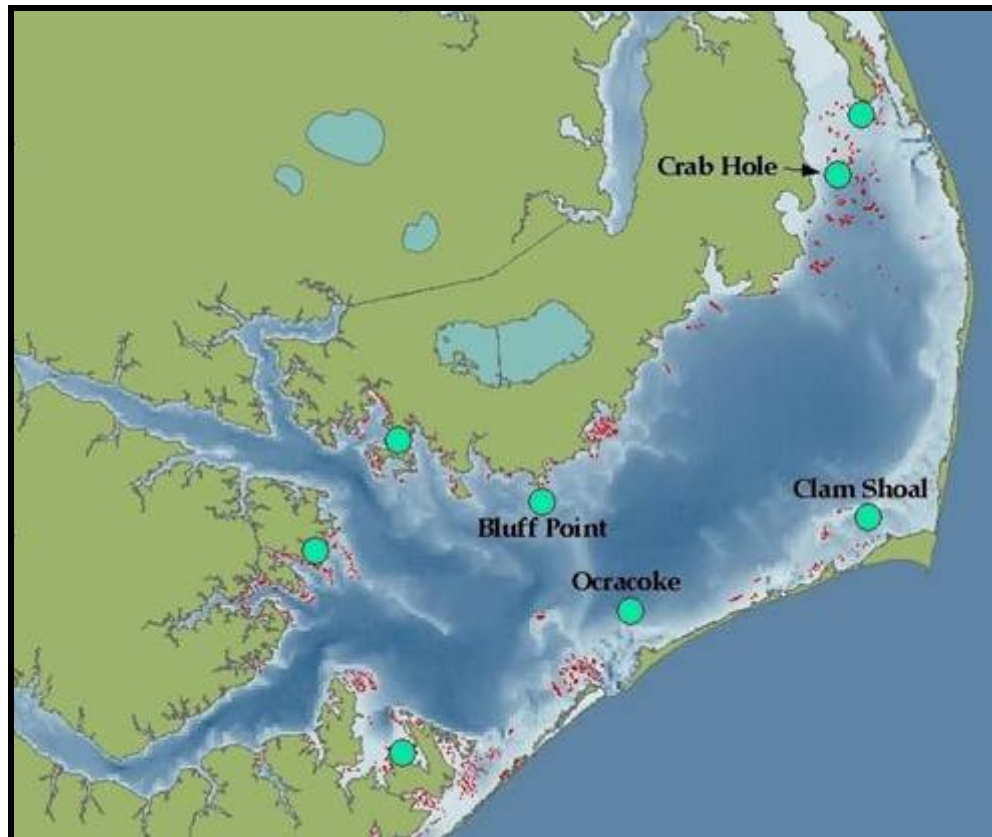
- 1) Recognize that oyster reefs are an ecosystem;
- 2) Better describe ALL of the value (ecosystem services) provided by oyster reefs;
- 3) Manage for ALL of those services;

Regime Shift



Restoration Progress

State-managed program for sanctuary-based restoration



Spawner sanctuaries guard against recruitment failure



Bivalve Shellfish - Ecosystem Services Valued

- **Provisioning – shellfish landings**

- > Lots of information on landings, economic impact of fisheries, etc. (e.g., US \$69M / year for eastern oyster)

- **Regulating – nursery habitat**

- > Grabowski and Peterson (2007): \$3,700/year/hectare for fish and crab production from restored reefs in SE U.S.

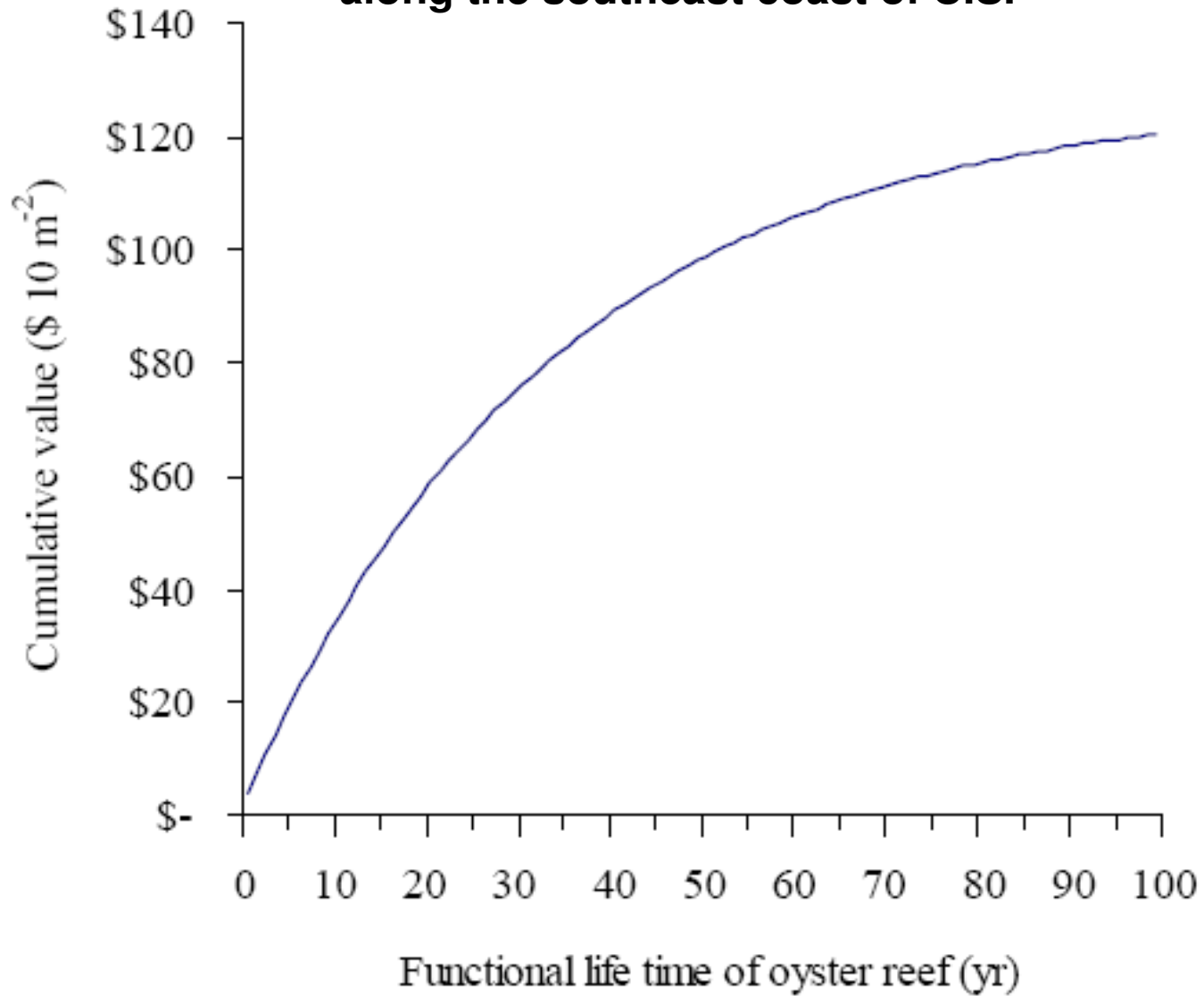
- **Cultural – tourism, recreation**

- > License revenue and numbers of participants

- **Supporting - filtration and nutrient cycling**

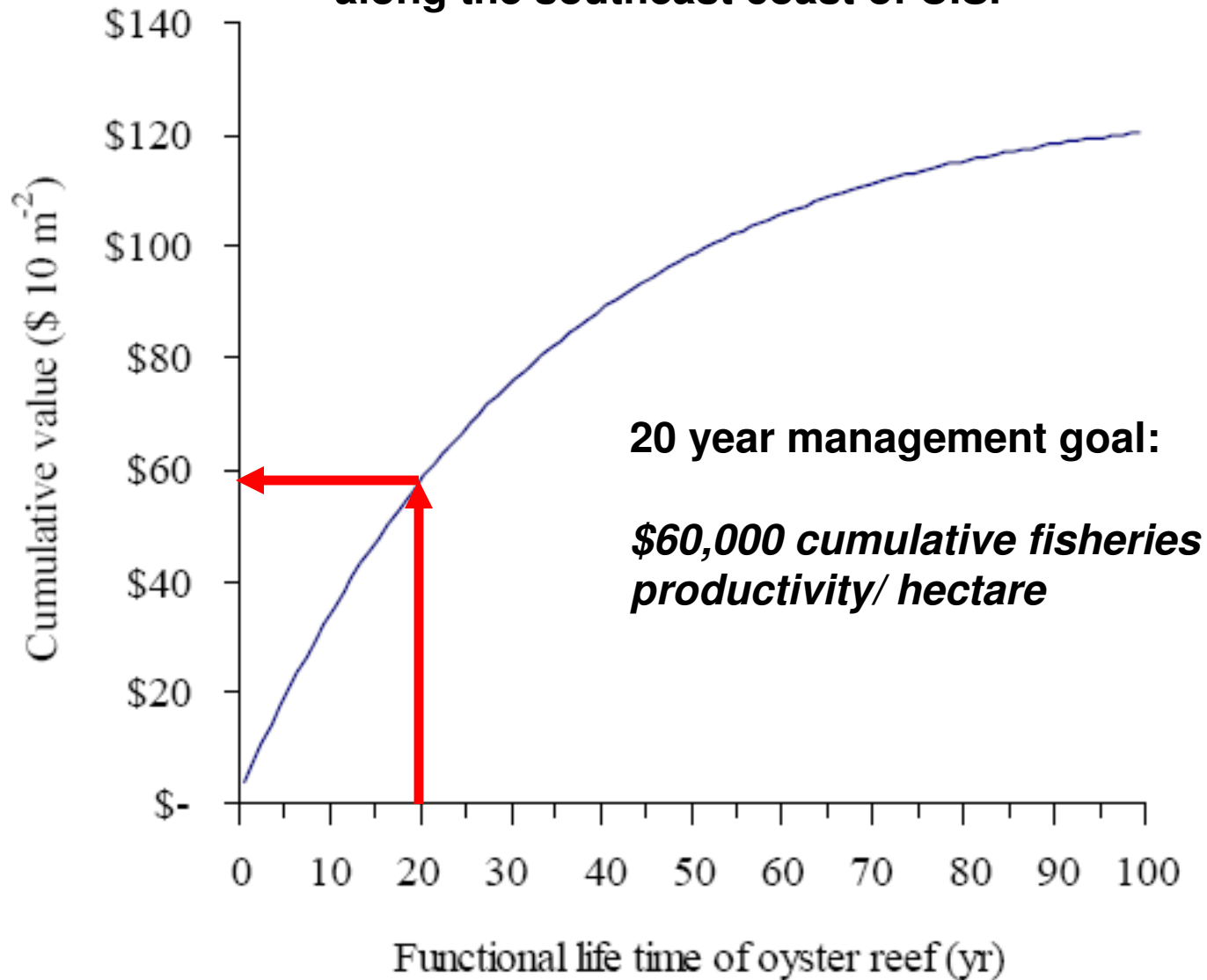
- > Newell *et al* (2005): \$314,836/yr for N removal by oysters in Choptank River;
 - > Doug Lipton, University of MD (pers. comm.): \$818M in N-removal as avoidance-cost for restored oyster population (i.e., in lieu of payment for other N-removal approaches);

Fin-fish and crab fisheries production value of restored oyster reef along the southeast coast of U.S.



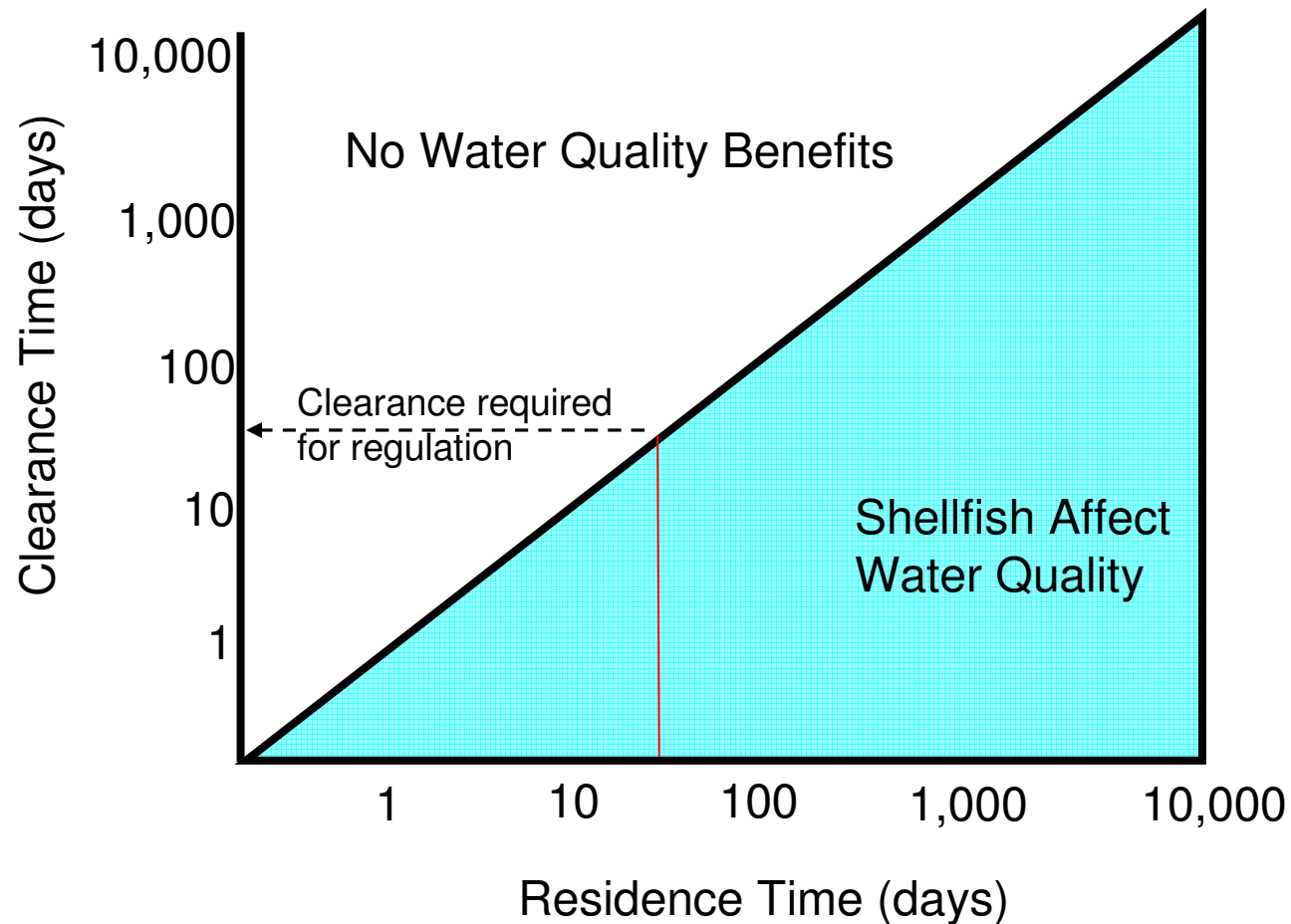
From Grabowski and Peterson, 2007 (in press)

Fin-fish and crab fisheries production value of restored oyster reef along the southeast coast of U.S.

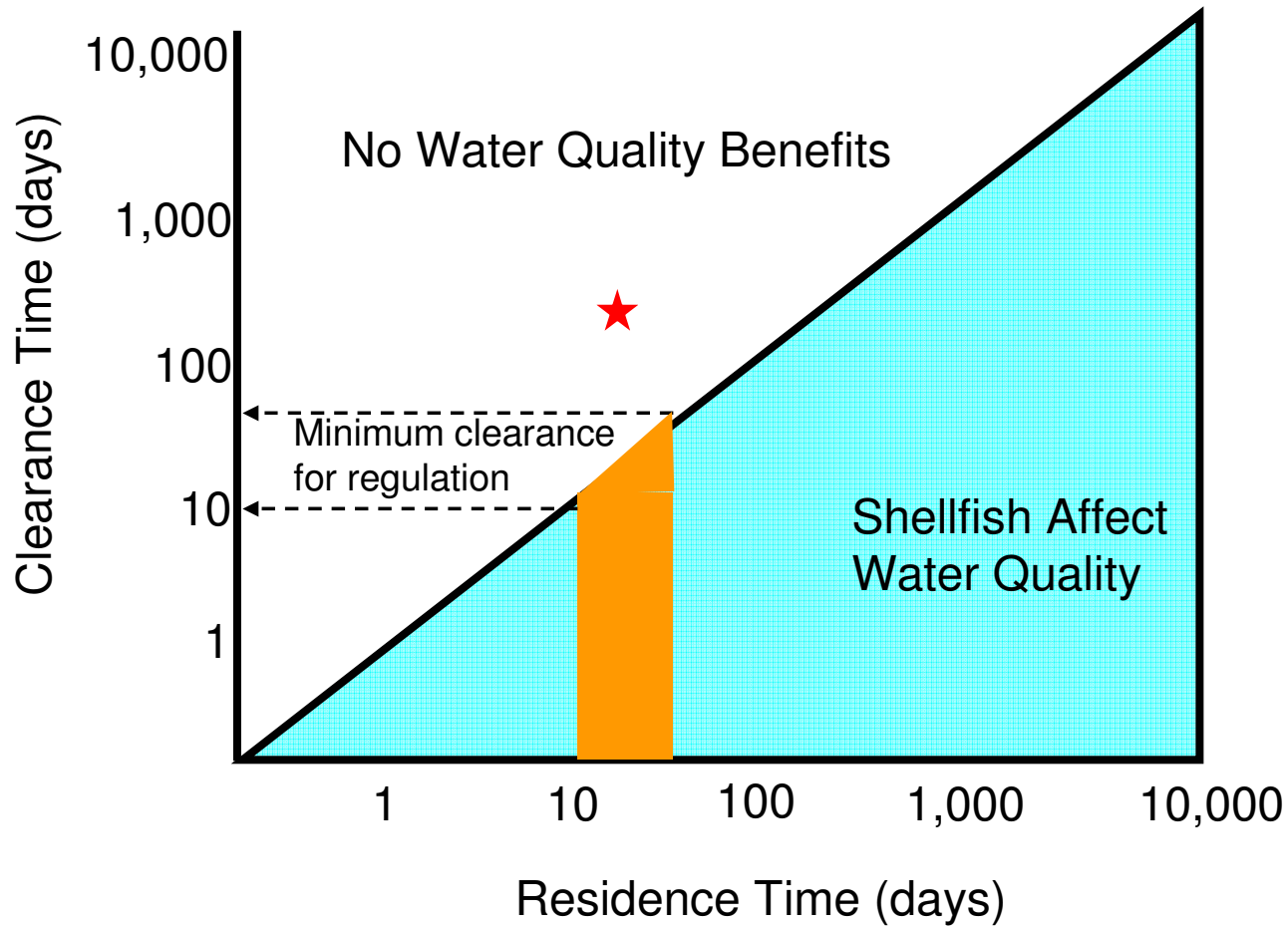


From Grabowski and Peterson, 2007 (in press)

WATER QUALITY "REGULATION" BY SHELLFISH IS FUNCTION OF ABUNDANCE

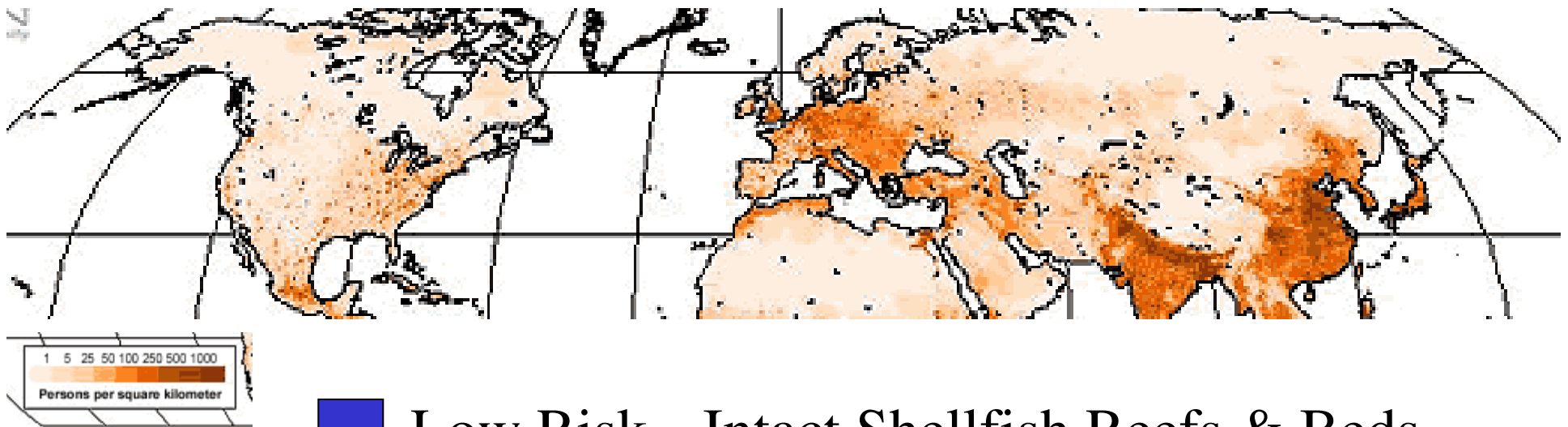


15 - 86 Acres of restored reefs required to filter Lynnhaven River within residence time of river



Looking Globally... Shellfish *Reefs at Risk*

Temperate Northern Hemisphere



■ Low Risk-- Intact Shellfish Reefs & Beds

- No synthesis of distribution, condition or threats (risk)
- No compelling case for action

An underwater photograph of a rocky reef. The scene is dominated by numerous green, feathery anemones of various sizes, some with prominent tentacles. The rocks are covered in a layer of green algae or coral. In the lower right corner, a small, vertically striped fish is visible. The overall lighting is dim and greenish, typical of an underwater environment.

**Assembling global dataset on
distribution, abundance, condition
& threats**

Conclusions

- A lot of projects underway - some real progress, new and innovative partnerships have elevated restoration, novel monitoring and assessment approaches;
- Tremendous value in sharing outcomes!
- Need to sharpen focus on ecosystem services and manage for these services;
- TNC has Shellfish Restoration Network to connect projects and practitioners;
- Global Reefs at Risk Assessment underway - seeking your involvement! [Rob Brumbaugh: rbrumbaugh@tnc.org](mailto:rbrumbaugh@tnc.org)