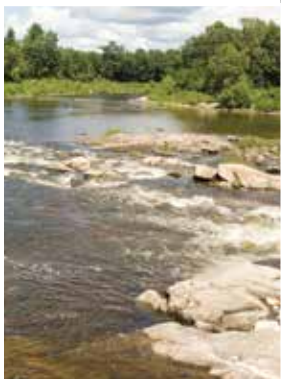
More habitat means more fish



The big challenges that fisheries face are increasingly habitat challenges. Without healthy habitat, we cannot sustain the fisheries that will feed Americans now and into the future.

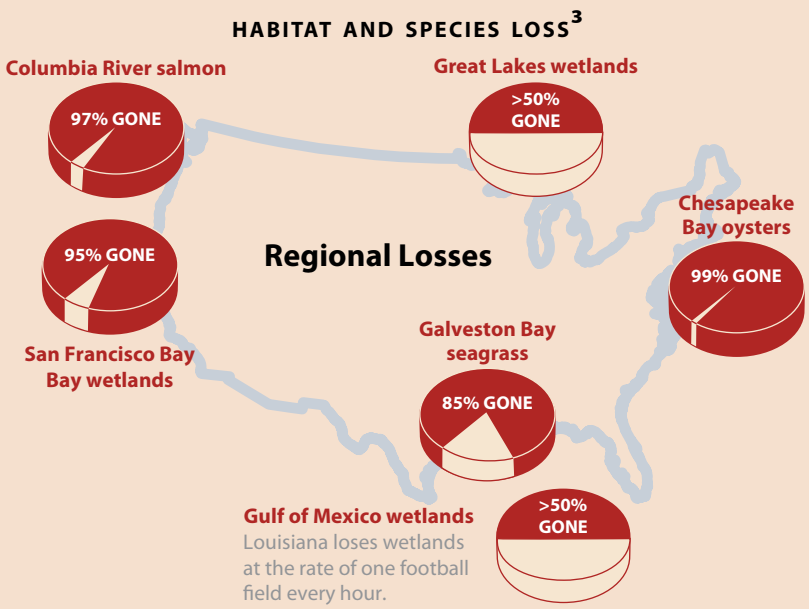
—Eric C. Schwaab, Assistant Administrator for NOAA Fisheries

Habitats keep commercial and recreational fisheries strong

Habitat provides important feeding and breeding grounds for fish. Without the right habitat, fish can't grow or reproduce, and that means fewer—and less healthy—fish. U.S. commercial and recreational saltwater fishing generated more than **$199 billion** in sales and supported **1.7 million jobs** in the nation's economy in 2011.[1] Fishing has also been a culturally defining activity for generations of Americans and provides countless opportunities for outdoor recreation.

If we lose the habitat, we lose the fish

Fish habitat has been declining for decades around the country and the rate of loss is increasing. The U.S. lost 84,100 acres of coastal wetlands between 2004 and 2009, three times higher than 1998 to 2004.[2] Without action to protect and restore habitat now, this trend will continue and worsen due to the combined effects of climate change and sea level rise.



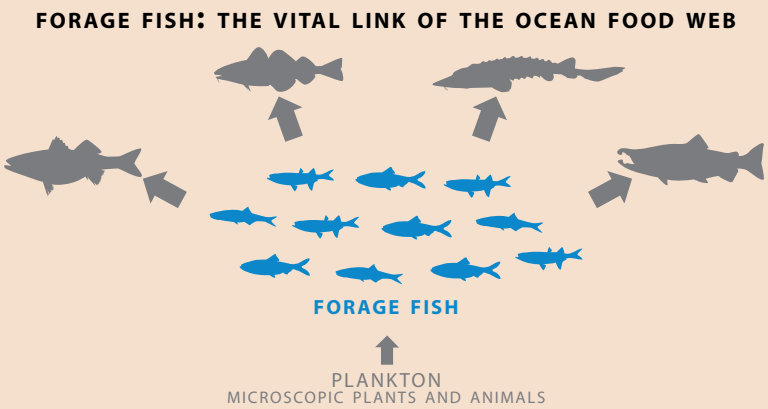
So what can we do? Protect and restore habitat

Investments by private groups and government have led to well-tested and effective methods of habitat conservation and restoration. Win–win solutions with farmers, fishermen, conservationists, and others have improved and expanded habitat that fish need throughout their life cycle, from the upland river to the estuary to the ocean.

More, bigger, and healthier fisheries … it's as simple as that. Habitat conservation and restoration are smart investments not only for our fisheries but for the communities—and economies—that rely on them.

Restore fish passage

Fish, such as sturgeon and salmon, spend an important part of their lives upstream. **Forage fish**, like river herring, are a critical food source for cod and other commercially fished species and also depend on the ability to migrate upstream to reproduce.



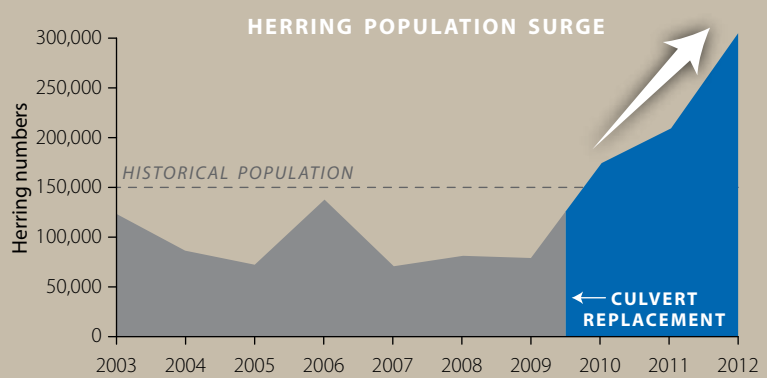
Since the 18th century, rivers have been blocked and diverted to serve a developing industrial nation. The mill by the river is long gone, but the dam or poorly designed culvert remains, still preventing fish from getting to habitat where they can feed and reproduce. By making it easier for fish to travel freely, populations are rebounding to and, in some cases, beyond their historical numbers.

It doesn't take long to see big results

Herring were completely wiped out above the Edwards Dam on the Kennebec River in Maine in 1985. **Now the population is at 3 million** thanks to dam removals in 1999 and 2009 and additional restoration. Shad and sturgeon are on the rebound as well.[4,5,6]

On Massachusetts' Acushnet River, **1,140 percent more herring** were counted four years after two fishways were installed in 2007.[7]

Just two years after the culvert connecting Bride Brook to Long Island Sound was enlarged in 2010, the herring population **more than tripled from 75,000 to 287,000**.[8]



More than 600 fisheries species use estuaries for some part of their life cycle.[9]

Habitat is the common ground where we can all come together to benefit estuaries and the fisheries that depend on them. Working in partnership, we can—and will—ensure a robust future for our fisheries.

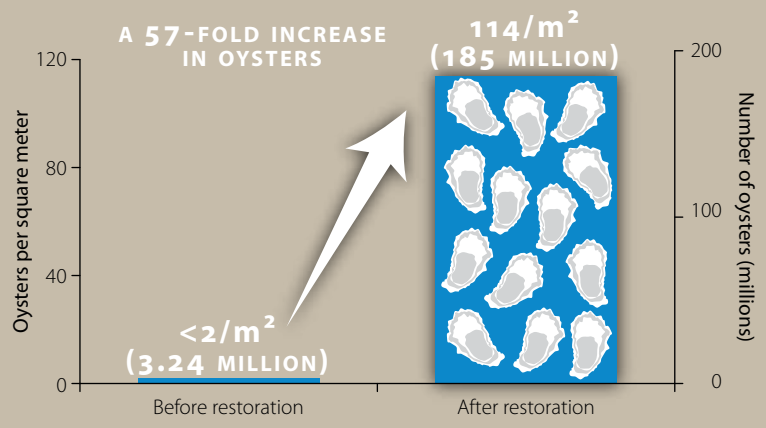
—Jeff Benoit, President and CEO, Restore America's Estuaries

Reef building yields multiple benefits

Over time, shellfish such as oysters and mussels produce three-dimensional structures known as reefs. These reefs are critical not only because they are habitat for shellfish, but also because they provide shelter and feeding grounds for a host of other species, including fish. Many reefs around the country have been destroyed, so **protecting and restoring them is critical to increasing the populations of shellfish and fish**, along with the wide range of other species that rely on them.

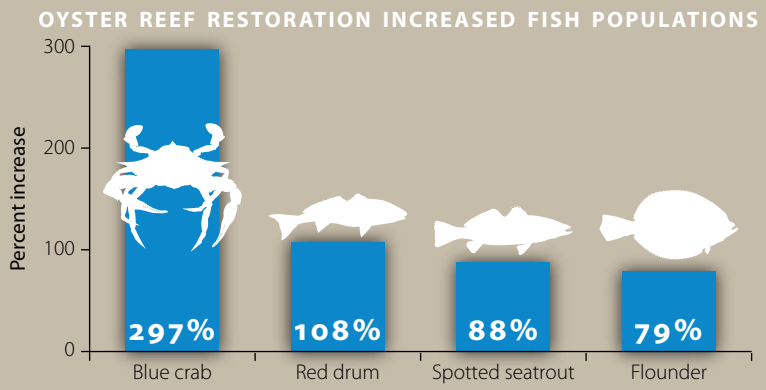
Rebuilding a native population

The Chesapeake Bay once had a thriving and abundant native oyster population that has since been decimated. One restoration project used shell to rebuild the reef structures over a total of 86 acres. Native oysters repopulated these reefs, resulting in a **57-fold increase in the population** to an astonishing 185 million oysters within five years.[10]



Restoring oysters, increasing fish

In Mobile Bay, Alabama, constructing an oyster shell reef increased populations of several economically-important species, such as: **blue crab by 297 percent; red drum by 108 percent; spotted seatrout by 88 percent; and flounder by 79 percent**.[11]



Protect and restore marsh and seagrass

Marshes and seagrasses provide shelter and food for many important fish species. Protecting and restoring these habitats are vital to increasing our nation's fish populations.

If you restore it, they will come (back)

In San Francisco Bay, **30,000 fish from 41 species** have returned to thousands of acres of restored salt marsh that were converted for salt production in the 1950s. These include steelhead trout, Pacific herring, green sturgeon, and Chinook salmon.[12]

In Boston Harbor, eelgrass had been completely wiped out. After replanting and restoring the eelgrass, these areas showed an **increase in both the diversity and number of species** of both fish and their prey. Winter flounder, crab, and lobster were found at the sites, indicating that eelgrass restoration provides new habitat for these and many other species.[13]

Habitat restoration yields long-term benefits to fisheries

In Delaware Bay, **both resident and migratory fish populations increased long-term**, according to a nine-year study of a former salt hay farm. The fish were more abundant and grew larger following the marsh restoration.[14]

Forage fish increase

In Narragansett Bay, Rhode Island, studies showed that a tidal marsh restoration resulted in **increased fish populations**, particularly of forage fish. These smaller fish serve as a food source for important commercial and recreational species such as striped bass, red drum, and blue crab.[15]

America's anglers are one of the nation's most powerful forces for conserving and restoring our nation's fisheries and waters, investing more than $1 billion each year in fisheries management and habitat restoration through the excise tax on fishing equipment and state fishing license sales.

—Mike Nussman, President and CEO, American Sportfishing Association

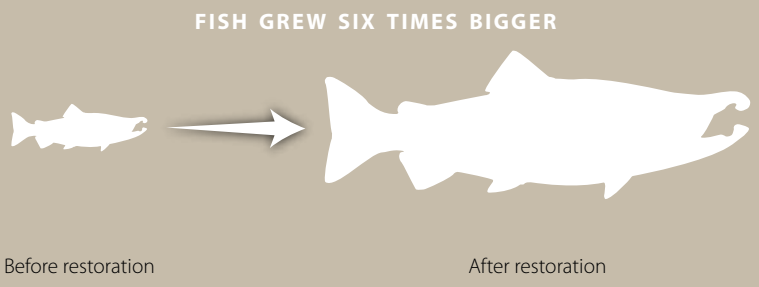
Coasts and estuaries provide vital habitat for over 75 percent of our nation's commercial fish catch and 80–90 percent of the recreational fish catch.[20]

Create sheltered spaces

Many young fish do best when they spend time "off channel" in the calm, sheltered waters of floodplains, marshes, and other wetlands. The longer fish stay, the bigger they grow—and bigger fish are more likely to survive their trip to the ocean and return to spawn. But many sheltered places no longer exist. Dikes, levees, and similar structures now prevent much of the seasonal flooding that sustains these habitats.

Creative engineering can help rebuild habitat

Fish grew six times bigger in off channel ponds created by the Yurok Tribe on Terwer Creek in Northern California. Soon after their completion, they **quickly provided crucial habitat** for three salmon species and other fish. Other studies confirm substantial differences in growth rates between fish that get to "shelter" and those that don't.[16]



Both fish and farmers can benefit

$21 million in economic benefits over 50 years are expected to flow from the modernization of diking and drainage structures in the farmland around Fisher Slough in Washington's Skagit Delta. This effort has restored critical tidal channel habitat and access to upstream areas, resulting in population increases in both fish and their prey. In addition to fisheries benefits, farmers will have **reduced crop damage from flooding and lower maintenance costs**.[17,18]

Habitat improvements recover fish and reduce flooding

The Dry Creek tributary of California's Russian River was historically channelized to the point that the flows had become too fast for fish to successfully thrive. Habitat improvements were made in 2012 in partnership with a local winery so that **calmer areas within the creek were created**, making it a more suitable area for fish to reproduce and rear the next generation. As a result of the project, **fish and their offspring are now using the creek and its improved habitat**. These actions also reduced flooding and erosion, making it an all-around success story for the fish, the watershed, and the property owners.[19]

Ensure the future of America's fisheries by investing in habitat now

Fish are a vital part of America's history and future. They provide food, jobs, and recreational opportunities. When our fisheries improve, so does the economy. For that to happen, the habitat on which they depend has to improve as well.

We must focus on smart protection and restoration in the right places. This is especially important at a time when budgets are shrinking. Governments and private organizations must pool their resources to realize bigger results, more cost-effectively.

We can't manage fisheries without healthy, abundant habitat

The bottom line is this: protecting and restoring habitat for fish also helps re-energize the social and economic connections that make our communities good places to live and work. But don't take our word for it. Just look to the communities around the country investing in habitat restoration and conservation. It's working for them and it can work for your community, too.

And that's good for the fish, for the estuaries, and for generations to come

RESTORE AMERICA'S ESTUARIES

Restore America's Estuaries is a national 501(c)(3) nonprofit organization established as an alliance of eleven community-based conservation organizations working together to protect and restore the vital habitats of our nation's estuaries.

www.estuaries.org

AMERICAN SPORTFISHING ASSOCIATION 1933·2013

The American Sportfishing Association is committed to representing the interests of the sportfishing community and the entire recreational fishing community.

www.asafishing.org

NOAA FISHERIES

NOAA's National Marine Fisheries Service is responsible for the management, conservation, and protection of America's living marine resources.

www.noaa.gov

Endnotes

1. National Marine Fisheries Service. 2012. Fisheries Economics of the United States, 2011. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-F/SPO-118, 175 pp. *http://www.st.nmfs.noaa.gov/Assets/economics/documents/feus/2011/FEUS 2011 National Overview.pdf*
2. Dahl, T.E. 2011. Status and trends of wetlands in the conterminous United States 2004 to 2009. U.S. Department of the Interior; Fish and Wildlife Service, Washington, D.C. 108 pp. *http://www.fws.gov/wetlands/Documents/Status-and-Trends-of-Wetlands-in-the-Conterminous-United-States-2004-to-2009.pdf*
3. Restore America's Estuaries. 2011. Jobs & Dollars – Big Returns from Coastal Habitat Restoration. *http://estuaries.org/images/81103-RAE_17_FINAL_web.pdf*
4. Fahlund, A. River Rebirth: Removing Edwards Dam on Maine's Kennebec River. National Geographic. *http://environment.nationalgeographic.com/environment/freshwater/lessons-from-the-field-edwards-dam-removal-maine*
5. Natural Resources Council of Maine. Edwards Dam and Kennebec Restoration. *http://www.nrcm.org/issue_edwardsdam.asp*
6. Maine Department of Marine Resources. Kennebec River Diadromous Fish Restoration Project. *http://www.maine.gov/dmr/searunfish/kennebec*
7. Sheppard, J.J. and S. Block. 2012. Monitoring changes in diadromous populations resulting from fish passage improvements on the Acushnet River, MA. 9th International Symposium on Ecohydraulics 2012. *http://www.ise2012.boku.ac.at/papers/15962_2.pdf*
8. NOAA Fisheries. 2012. River Restoration Results in Record Fish Runs. *http://www.habitat.noaa.gov/highlights/herringrestoration.html*
9. Lellis-Dibble, K.A., K.E. McGlynn, and T.E. Bigford. 2008. Estuarine fish and shellfish species in U.S. commercial and recreational fisheries: economic value as an incentive to protect and restore estuarine habitat. U.S. Dep. Commerce, NOAA Tech. Memo. NMFSF/SPO-90, 94 pp. *http://spo.nmfs.noaa.gov/tm/TM90.pdf*
10. Schulte, D.M., P.B. Russell, and R.N. Lipcius. 2009. Unprecedented restoration of a native oyster metapopulation. Science 325: 1124–1128. *http://www.harborestuary.org/reports/oyster/Report-Schulte.pdf*
11. Scyphers, S.B., S.P. Powers, K.L. Heck Jr, and D. Byron. 2011. Oyster reefs as natural breakwaters mitigate shoreline loss and facilitiate fisheries. PLoS ONE 6(8): e22396. *http://www.plosone.org/article/info:doi/10.1371/journal.pone.0022396*
12. Hobbs, J.A. and P. Moyle. 2012. Monitoring the Response of Fish Communities to Salt Pond Restoration: Final Report. *http://www.southbayrestoration.org/documents/technical/110712_Final Report_Monitoring the Respons of Fish Assemblages.pdf*
13. Estrella, B.T., A.S. Leschen, and R.K. Kessler. 2009. Eelgrass restoration project (July 1, 2004–October 31, 2007). Massachusetts Division of Marine Fisheries. *http://www.mass.gov/dfwele/dmf/programsandprojects/hubline/hubline_5yr_eelgrass_restoration.pdf*
14. Able, K.W., T.M. Grothues, S.M. Hagan, M.E. Kimball, D.M. Nemerson, and G.L. Taghon. 2008. Long-term response of fishes and other fauna to restoration of former salt hay farms: multiple measures of restoration success. Reviews in Fish Biology and Fisheries 18: 65–97.
15. Ekberg, M.C. and W. Ferguson. 2012. Challenges and lessons learned in restoring a rapidly subsiding salt marsh. Poster presented at Restore America's Estuaries 6th National Conference, October 20-25, Tampa, FL.
16. Pagliuco, R., A. Antonetti, S. Silloway, S. Beesley, M. Hiner, and R. Fiori. 2012. Terwer Creek off-channel pond restoration. Coastal Off-Channel and Tidal Habitat Restoration Symposium.
17. ECONorthwest. 2012. Socioeconomic benefits of the Fisher Slough Restoration Project. *http://www.habitat.noaa.gov/partners/toolkits/restorationjobs/oregon_washington/economic_reports/fisher_slough_benefits_final_2012to1226.pdf*
18. Beamer, E., R. Henderson, and K. Wolf. 2010. Juvenile salmon, estuarine, and freshwater fish utilization of habitat associated with the Fisher Slough Restoration Project, Washington 2009. *http://www.skagitcoop.org/documents/FisherSlough2009Report_Final.pdf*
19. Sonoma County Water Agency. 2013. Russian River Biological Opinion – Dry Creek. *http://www.scwa.ca.gov/drycreek*
20. Feierabend, S.J. and J.M. Zelazny. 1987. Status report on our nation's wetlands. National Wildlife Federation: Washington, D.C.

Photo credits

Cover (background, then clockwise from top left): Peter Clark, Tampa Bay Watch; NOAA; Barbara Reddoch/123rf.com; Jonathan Wilker/Purdue University; NOAA; John Boston (flickr.com/road-hunter); NOAA; NOAA; NOAA. Page 2: Joe Mabel. Page 3: USFWS. Page 4: NOAA. Page 5: NOAA. Page 6: iofoto/123rf.com. Page 7: CK Productions; Michele Cornelius/123rf.com.

***Citation:* Restore America's Estuaries. 2013. More Habitat Means More Fish.**

Science communication, layout, and design in collaboration with University of Maryland Center for Environmental Science Integration and Application Network ***www.ian.umces.edu***

University of Maryland Center for Environmental Science