

Future of the Nation's Fisheries and Aquatic Resources: Challenges We Face in 2017 and Beyond

References

Proven Benefits

There are roughly 60 million anglers in America, who generate US\$115 billion in economic output, providing \$15 billion in state and federal taxes and creating 828,000 jobs

Southwick Associates. 2013. Sportfishing in America: an economic force for conservation. American Sportfishing Association, Alexandria, Virginia. Available: http://asafishing.org/uploads/2011_ASASportfishing_in_America_Report_January_2013.pdf. (June 2016).

Recreational angling resulting from National Fish Hatchery stocking programs has been estimated to annually generate approximately \$554 million in retail sales, \$903 million in industrial output, 8,000 jobs, \$256 million in wages and salaries, \$37 million in federal tax revenues, and \$35 million in local tax revenues.

U.S. Department of the Interior. 2016. Budget justifications and performance information, fiscal year 2017, U.S. Fish and Wildlife Service. Available: www.fws.gov/budget/2016/FY2017_FWS_Greenbook.pdf. (June 2016).

In 2014, domestic commercial catches and supporting seafood industries produced \$54 billion in annual sales and supported 811,000 jobs.

National Marine Fisheries Service. 2016. Commercial and recreational saltwater fishing generated \$214 billion in 2014. National Marine Fisheries Service, press release. Available: www.nmfs.noaa.gov/mediacenter/2016/05_May/26_05_feus_2014_pr.html. (June 2016).

The commercial value of U.S. fisheries from coral reefs is estimated to be more than \$100 million.

National Ocean Service. No date. How do coral reefs benefit the economy? Available: http://oceanservice.noaa.gov/facts/coral_economy.html. (June 2016).

Shellfish and finfish culture operations around the nation are vital to regional economies. Currently, there are 3,093 farms across the nation providing \$1.4 billion in farm-gate (net value) income, creating significant and critical jobs and income for rural inland and coastal communities.

U.S. Department of Agriculture. 2012. 2013 census of agriculture. Available: www.agcensus.usda.gov/Publications/2012/Online_Resources/Aquaculture/aqua_1_001_001.pdf. (June 2016).

In 2011, on-the-ground habitat restoration programs funded through the U.S. Fish and Wildlife Service created more than 3,900 jobs, generating a total economic stimulus of \$327.6 million.

U.S. Fish and Wildlife Service. 2014. U.S. Fish and Wildlife Service habitat restoration

programs create 3,973 new jobs, pump \$327.6 million into local economies. U.S. Fish and Wildlife Service, press release. Available: www.fws.gov/news/ShowNews.cfm?ID=8B1413D2-F6E2-9BFF-9AD5999E719A18EF. (June 2016).

It is estimated that coastal restoration projects alone create more jobs (direct, indirect and induced) per \$1 million invested than both oil and gas and road construction industries combined.

NOAA (National Oceanic and Atmospheric Administration) Habitat Conservation. No date. Coastal economies impacts of habitat conservation. Available: www.habitat.noaa.gov/about habitat/habitatconservationjobs.html. (June 2016).

Areas at Risk

Without adequate planning and built-in resiliency, aquatic systems are vulnerable and can lead to significant financial liabilities. For example, South Carolina's 2015 flood caused estimated damages of roughly \$1 billion to local economies, including fishing.

NOAA (National Oceanic and Atmospheric Administration) National Centers for Environmental Information. 2015. State of the climate: national overview for October 2015. Available: www.ncdc.noaa.gov/sotc/national/201510. (June 2016).

Alaskan waters provided 60% (by volume) of seafood landed in the United States in 2014. Today, these same waters are experiencing rapid acidification, threatening some of the world's most productive fisheries and 70,000 jobs.

Ekstrom, J. A., L. Suatoni, S. R. Cooley, L. H. Pendleton, G. G. Waldbusser, J. E. Cinner, J. Ritter, C. Langdon, R. van Hooidek, D. Gledhill, K. Wellman, M. W. Beck, L. M. Brander, D. Rittschof, C. Doherty, P. E. T. Edwards, and R. Portela. 2015. Vulnerability and adaptation of US shellfisheries to ocean acidification. *Nature Climate Change* 5:207–214.

More than 90% of the American seafood supply (by value) is imported, creating an annual trade deficit of \$11.2 billion.

National Marine Fisheries Service. No date. Aquaculture in the United States. Available: www.nmfs.noaa.gov/aquaculture/aquaculture_in_us.html. (June 2016).

Trout habitat is projected to decline almost 50% in the western United States by 2080 due to climate change impacts.

Wenger, S. J., D. J. Isaak, C. H. Luce, H. M. Neville, K. D. Fausch, J. B. Dunham, D. C. Dauwalter, M. K. Young, M. M. Elsner, B. E. Rieman, A. F. Hamlet, and J. E. Williams. 2011. Flow regime, temperature, and biotic interactions drive differential declines of trout species under climate change. *Proceedings of the National Academy of Sciences of the United States of America* 108:14175–14180.

Poor Conditions

Throughout the Nation, the biological quality of our rivers and streams is in jeopardy. Between 27% and 50% of rivers and streams are in poor condition from chemical and physical habitat stressors, with 13,144 river miles containing fish

that exceed the level of mercury within their tissue that is safe for human consumption.

U.S. Environmental Protection Agency Office of Water and Office of Research and Development. 2013. National rivers and streams assessment 2008–2009: a collaborative survey. U.S. Environmental Protection Agency, EPA/841/R-16/007, Washington, D.C. Available: https://www.epa.gov/sites/production/files/2016-03/documents/nrsa_0809_march_2_final.pdf. (November 2016).

Each year 1.2 trillion gallons of untreated sewage, stormwater, and industrial waste are dumped into U.S. waters.

Chambers, N. B. 2011. Urban green: architecture for the future. Palgrave Macmillan, New York.

There is a \$1.3 billion gap in annual funding needed to effectively implement state wildlife action plans.

Association of Fish and Wildlife Agencies. 2016. The future of America's fish and wildlife: a 21st century vision for investing in and connecting people to nature. Association of Fish and Wildlife Agencies, Washington, D.C. Available: www.fishwildlife.org/files/Blue_Ribbon_Panel_Report2.pdf. (June 2016).

Figures within Main Body Text and Sidebar Examples (Not every section contains referenced material)

Angling and Fisheries Conservation

33.1 million sportspersons...(to end of paragraph)

U.S. Fish and Wildlife Service and U.S. Census Bureau. 2011 national survey of fishing, hunting, and wildlife-associated recreation. U.S. Fish and Wildlife Service and U.S. Census Bureau, FHW/11-NAT, Washington, D.C. Available: www.census.gov/prod/2012pubs/fhw11-nat.pdf. (June 2016).

Southwick Associates. 2013. Sportfishing in America: an economic force for conservation. American Sportfishing Association, Alexandria, Virginia. Available: http://asafishing.org/uploads/2011_ASASportfishing_in_America_Report_January_2013.pdf. (June 2016).

Climate-Related Impacts on Coastal and Marine Systems

At risk are marine fisheries supporting \$214 billion in annual sales and 1.83 million jobs....

National Marine Fisheries Service. 2016. Commercial and recreational saltwater fishing generated \$214 billion in 2014. National Marine Fisheries Service, press release. Available: www.nmfs.noaa.gov/mediacenter/2016/05_May/26_05_feus_2014_pr.html. (June 2016).

The Washington State Shellfish Industry was valued at \$270 million and supports around 3,000 jobs.

Barton, A., G. G. Waldbusser, R. A. Feely, S. B. Weisberg, J. A. Newton, B. Hales, and

K. McLaughlin. 2015. Impacts of coastal acidification on the Pacific Northwest shellfish industry and adaptation strategies implemented in response. *Oceanography* 28:146–159.

Maine’s lobster fishery alone contributes close to \$1.7 billion to the state’s economy.

Gabe, T. M., J. C. McConnon, Jr., and R. Kersbergen. 2011. Maine policy review. Economic contribution of Maine's food industry. Available: <http://digitalcommons.library.umaine.edu/mpr/vol20/iss1/7>. (June 2016).

A 2011 economic valuation of Hawaii’s coral reefs estimated the total value to be close to \$34 billion annually.

National Oceanic and Atmospheric Administration. 2011. U.S. residents say Hawaii’s coral reef ecosystems worth \$33.57 billion per year. Available: www.noaanews.noaa.gov/stories2011/20111021_hawaii_coral.html. (July 2016).

Climate-Related Resiliency for Inland Aquatic Systems

A recent study estimated this project will provide 11,800 jobs and \$300 million in annual retail sales to the local economy while annually supporting 250,000 hours of recreational use.

Martinez, J. E. 2015. Potential economic impacts of Lake Wichita revitalization. Midwest State University, Wichita Falls, Texas. Available: <https://static1.squarespace.com/static/554d08d8e4b0cda5a8af1092/t/563918b5e4b01df68e0212c4/1446582453145/Executive+Summary++Potential+economic+Impact+of+Lake+Wichita++Revitalization.pdf>. (July 2016).

The Need for Advancements in Aquaculture

More than 653 million pounds of seafood valued at \$1.38 billion are produced by the U.S. aquaculture industry annually.

National Marine Fisheries Service. 2016. Fisheries of the United States; Aquaculture. Available: www.st.nmfs.noaa.gov/Assets/commercial/fus/fus14/documents/03_%20Aquaculture2014.pdf. (June 2016).

More than 1.75 billion fish are produced and stocked annually in U.S. waters by state and federal natural resource agencies.

Harrison, S. 2015. AFS responds to an op-ed in the *New York Times* on trout fishing in the northeast US. *Fisheries* 40:8, 349–350.

There are 60 million anglers in the United States and they, along with the fish they catch, contribute \$62 billion to the gross domestic product.

Harrison, S. 2015. AFS responds to an op-ed in the *New York Times* on trout fishing in the northeast US. *Fisheries* 40:8, 349–350.

Fish farmers in Maine are selling anywhere between \$50 million and \$100 million in aquaculture products annually.

Bell, T. 2015. Maine aquaculture industry is snagging investors. The Portland Press Herald, January 15, 2015. Available: www.pressherald.com/2015/01/15/maine-aquaculture-snagging-investors/ (June 2016).

It has been estimated that the return on investment for federal production and stocking of catchable Rainbow Trout is more than 36 to 1.

Caudill, J. 2005. Economic effects of Rainbow Trout production by the National Fish Hatchery System. U.S. Fish and Wildlife Service. Available: www.fws.gov/south-east/fisheries/pdf/rainbowtrout-05.pdf. (July 2016).

Hatcheries contribute more than \$270 million to commercial salmon fisheries, with hatchery-origin fish making up about 40% of the salmon caught in Alaska and 80–90% in the Pacific Northwest

National Marine Fisheries Service. Aquaculture for stock enhancement. Available: www.nmfs.noaa.gov/aquaculture/science/11_stock_enhancement.html. (June 2016).

Imperiled Species

In 2011, for example, 11 separate management populations of steelhead received \$263 million in funding, along with 9 populations of Chinook Salmon receiving \$240.7 million.

Platt, J. R. 2013. How much did the U.S. spend on the Endangered Species Act in 2012? Scientific American Blog Network. November 01, 2013. Accessed June 18, 2016. Available: <http://bit.ly/ESA-Spending-2012>. (June 2016).

Habitat Protection and Restoration

Nebraska established an Aquatic Habitat Stamp in 1997 and has collaborated with 63 different partners to fund \$59 million in aquatic rehabilitation efforts at 90 locations. Iowa dedicates \$2–12 million annually to a lake restoration program.

National Fish Habitat Partnership. 2015. Through a fish's eye: the status of fish habitats in the United States, 2015. Available: <http://assessment.fishhabitat.org/#>. (June 2016).

Hydroconnectivity

According to the National Inventory of Dams, there are 83,035 registered dams across the United States, 44,000 of which are above 25 feet tall.

U.S. Army Corps of Engineers. 2016. CorpsMap: the national inventory of dams (NID) [online database]. U.S. Army Corps of Engineers, Washington, D.C. Available: http://nid.usace.army.mil/cm_apex/f?p=838:5:0::NO. (July 2016).

Invasive Species

According to the U.S. Geological Survey's Nonindigenous Aquatic Species Database, the total number of introduced nonindigenous aquatic species in all categories is 1,158 and the total number of established species is 680.

U.S. Geological Survey. 2015. Nonindigenous aquatic species database [online database]. U.S. Geological Survey, Reston, Virginia. Available: <https://nas.er.usgs.gov/>.

The Great Lakes economy employs 125,000 workers within the region that work on fisheries, water treatment, power generation, and facilities that use surface water.

Rosaen, A. L., E. A. Grover, and C. W. Spencer. 2012. The costs of aquatic invasive species to Great Lakes states. Anderson Economic Group, East Lansing, Michigan. Available: http://bit.ly/greatlakes_AIS_costs. (July 2016).

And, Great Lakes fisheries have been estimated to generate \$7 billion of annual economic activity.

Buck, E. H., H. F. Upton, C. V. Stern and J. E. Nicols. 2010. Asian carp and the Great Lakes region. Congressional Research Service Reports, Paper 12. Available: <http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1011&context=crsdocs>. (July 2016).

Zebra mussels have caused such widespread damage in the Great Lakes ecosystem that raw water users within the area pay roughly \$30 million a year for control and adaptation costs.

Meacham, P., D. Wilkinson, A. Cherry, and D. Britton. 2011. Aquatic nuisance species impacts. Aquatic Nuisance Species (ANS) Task Force. Available: www.anstaskforce.gov/more_impacts.php. (July 2016).

Recent introductions of 15 invasive species could end up costing our country \$134 billion by 2050.

Krantzberg, G., and C. D. Boer. 2006. A valuation of ecological services in the Great Lakes basin ecosystem to sustain healthy communities and a dynamic economy. Prepared for the Ontario Ministry of Natural Resources by the Dofasco Centre for Engineering and Public Policy, McMaster University, Hamilton, Ontario. Available: www.eng.mcmaster.ca/civil/facultypages/krantz2.pdf. (July 2016).

Infographics

Angling and Fisheries Conservation

Economic figures

Southwick Associates. 2013. Sportfishing in America: an economic force for conservation. American Sportfishing Association, Alexandria, Virginia. Available: http://asafishing.org/uploads/2011_ASASportfishing_in_America_Report_January_2013.pdf. (June 2016).

Recreational Boating & Fishing Foundation and Outdoor Foundation. 2016. 2016 special report on fishing. Recreational Boating & Fishing Foundation, Alexandria, Virginia and Outdoor Foundation, Washington, D.C. Available: www.takemefishing.org/get-media/c0ce6131-c281-4e85-80d3-fff7fcc489e7/2016_SpecialReportOnFishing_FINAL.pdf. (August 2016).

Fish hook

Canivent, L. No date. Fish hook used within angling and fisheries conservation. Available: <https://thenounproject.com/search/?q=fish+hook&i=39074>. (August 2016).

The Need for Advancements in Aquaculture

National Marine Fisheries Service. 2016. Aquaculture grows resilient communities. Available: https://coastalscience.noaa.gov/research/scem/marine_aquaculture/. (June 2016).

Medications for Aquaculture Programs

U.S. Fish and Wildlife Service. 2016. AADAP Program. Available: www.fws.gov/fisheries/education/infographics_aadap.jpg. (June 2016).

Habitat Protection and Restoration

National Fish Habitat Partnership. 2016. Infographic captures 10 years of success. Available: www.fishhabitat.org/news/national-fish-habitat-partnership-infographic-captures-10-years-of-success. (June 2016).

Hydroconnectivity

Dams infographic

U.S. Army Corps of Engineers. 2016. CorpsMap: the national inventory of dams (NID) [online database]. U.S. Army Corps of Engineers, Washington, D.C. Available: http://nid.usace.army.mil/cm_apex/f?p=838:5:0::NO. (July 2016).