

NARRAGANSETT BAY WATERSHED ECONOMY

The ebb and flow of natural capital



Recreational Fishing Overview

Recreational fishing is an economic powerhouse for Rhode Island (RI), Massachusetts (MA), and other coastal states in the U.S. In the Narragansett Bay watershed (NBW), fishing is a popular recreational activity that attracts residents and visitors to the area. Recreational fishing takes place in both saltwater and freshwater, including on the Bay coastline and in some of the 2,600 ponds, lakes, and reservoirs, and 5,400 rivers and streams in the

watershed. Anglers catch fish from the shoreline, bridges, piers, and various types of boats. Many different types of fish are targets for recreational fishing including striped bass, flatfish (flounder, halibut), and bluefish in saltwater, and black bass and trout in freshwater.

More than 221,000 recreational anglers within the NBW spent over two million days fishing in watershed waters in 2011. These anglers spent nearly \$147 million (in 2016 dollars) on expenditures, generating more than \$86 million in salaries and wages, and supporting over 2,000 jobs.¹

History

Ideal waters for recreational fishing within the NBW are part of what make the region a popular summer destination. Recreational fishing has deep historical roots in the area, playing an important role in the watershed for centuries. Types of recreational anglers include weekenders, vacationing families on charter boats, and individuals fishing with droplines from piers dotting the shoreline.²

As the popularity of recreational fishing expanded in the watershed, laws were created and government branches were established to enforce fishing laws. In MA, the earliest fishing laws date back to 1627, when the Colony of New Plymouth created a law that declared fishing to be free. The first Water Bailiff was employed in 1670 and in 1948 a Chief Coastal Warden and Chief Conservation Officer were hired to enforce fishery laws and ensure recreational fishing remained a sustainable activity.³ In RI, Game Wardens were established in 1940, eventually becoming the Environmental Police in 1998. Environmental Officers enforce RI laws and regulations governing the recreational fishing, helping to support a healthy industry in the state.⁴

Today, recreational fishing takes place on freshwater and saltwater throughout the NBW. These locations include the Bay, more than 2,600 ponds, lakes, and reservoirs, and over 5,400 rivers and

streams. Anglers target many different species of fish, and catch from areas such as the shoreline, bridges, piers, and various types of boats.

Data Sources and Limitations

Estimates of participation rates and expenditures of recreational fishing and their economic impact on the NBW economy are provided in the following section. These data are derived from National Survey of Fishing, Hunting, and Wildlife-Associated Recreation conducted by the U.S. Fish and Wildlife Service (USFWS) in 2011.ⁱ This report only focuses on recreational fishing that occurs within RI and MA state borders, disregarding out-of-state fishing by RI and MA residents. Additional data are obtained from the American Sportfishing Association (ASA), which provides estimates of anglers' participation and economic impact, focusing on recreational anglers at least 16 years old.

To estimate the recreational fishing activity within the NBW using published data at the state level, different approaches were taken. For RI, state figures were adjusted by the share of the state's population in the watershed in 2010. This equates to 88.8% of the state population in RI (for maps of the area and population of the NBW, please see the "Geography" section of this report). This approach assumes that participation rates for recreational fishing are the same in both watershed and non-watershed areas. For example, the USFWS estimate of 42,000 freshwater anglers for the state translates into over 37,000 freshwater anglers in the RI portion of the watershed.

In MA, given that so little of the state has direct access to saltwater in the NBW, a different approach was taken. For saltwater angling, only watershed cities and towns with direct access to Narragansett Bay are included: Fall River, Somerset, and Swansea. Their combined population represents 1.9% of the state's population. Reported watershed figures are state numbers adjusted by the share of the state's population in the NBW adjacent towns. Therefore, the USFWS estimate of 323,000 saltwater anglers translates into 6,000 saltwater anglers in the MA portion of the watershed who participated in saltwater recreational fishing. For freshwater angling in MA, the same approach as mentioned above for RI is used. This amounts to 15% of MA's population in the watershed.

Based on these assumptions, the economic impact of recreational fishing is estimated for the NBW for both sources. For additional information on the methodologies used in this report, please reference the "Methodology" section.

Current Status and Trends

Today, recreational fishing draws both in-state and out-of-state visitors to the NBW. Based on previously mentioned assumptions, in 2011, nearly 222,000 anglers were estimated to have participated in recreational fishing in the watershed (Table 1). Of these anglers, 37% fished in freshwater. In total, freshwater anglers took over one million trips and spent over one million days

ⁱ The USFWS survey focuses on individuals that are at least 16 years old.

fishing in the lakes and rivers within the watershed. The remaining 63% of anglers fished in saltwater, taking over one million fishing trips and spending over one million days on the water.⁵

Table 1: Estimated Recreational Fishing Participation in the NBW (2011)

	Number of Anglers (1000s)	Number of Trips (1000s)	Number of Fishing Days (1000s)	Average Number of Fishing Days
Freshwater				
RI	37.3	617.2	656.2	18
MA	44.1	559.8	674.9	15
Watershed	81.4	1,177	1,331.1	16.4
Saltwater				
RI	134.1	986.6	1,269.8	9
MA	6.1	78,185	76.9	13
Watershed	140.2	1,064.8	1,346.8	9.6
Combined				
Watershed Total	221.6	2,241.7	2,677.9	

Source: 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, 2013

In the survey, anglers are identified by their residences. This allows us to determine the proportion of recreational anglers in the NBW that are tourists bringing economic value to the region. Within the watershed, there are over 124,000 individuals who recreationally fish in their own state (Table 2). More than half of the total anglers fishing in the watershed are residents, and there are more residential freshwater anglers than saltwater anglers.

One significant difference between the two states is the share of anglers that are not state residents. In RI, only 41% of the anglers in the state’s water are residents, whereas in MA, residents represent 67% of saltwater anglers (Table 2). Those fishing in RI are far more likely to be non-residents, implying that recreational fishing provides RI’s economy with more tourist spending. This is not surprising given the differing amount of coastal areas within the NBW for each state (much of MA’s coastline is located outside of the NBW, along Cape Cod).ⁱⁱ

Data are also available that allow us to identify characteristics of fishermen (Table 3). Most recreational anglers are from urban areas, are male, and are white. In addition, many anglers are between the ages of 45 and 64, and earn well above average incomes, which may be a reflection of higher than average education levels.⁶

ⁱⁱ Unfortunately, the number of non-residents who are RI or MA residents recreationally fishing across state lines, but still within the watershed, is not known.

Table 2: Estimated Residential Recreational Fishing Participation in the NBW (2011)

	Number of Anglers (1000s)	Number of Trips (1000s)	Number of Fishing Days (1000s)	Average Number of Fishing Days
Freshwater				
RI	30.2	582.5	612.7	20
MA	34.8	516.7	631.7	18
Watershed	65.0	1,099.2	1,244.4	19.1
Saltwater				
RI	55.1	640.2	867.6	16
MA	4.1	69.8	67.5	16
Watershed	59.2	710.1	935.0	15.8
Combined				
Watershed Total	124.2	1,809.3	2,179.4	

Source: 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, 2013

Table 3: Characteristics of Residential Anglers in RI and MA (2011)

	RI	MA
From urban area	85%	89%
Males	73%	78%
Between ages 45-64	44%	32%
White	95%	92%
Those with incomes > \$75,000	43%	52%
4 years or more of college	44%	49%

Source: 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, 2013

Expenditures of recreational anglers (Table 4) indicate that recreational fishing contributes critically to the watershed economy. Recreational fishing necessitates spending by anglers for guides, licenses, access fees, fuel, ice, bait, boating costs, fishing equipment, auxiliary equipment, and specialized clothing. Anglers may also travel far enough to areas where lodging and food become necessary.

Recreational anglers in the NBW spent over \$136 million (in 2016 dollars) on related expenditures (e.g., food, lodging, transportation, and equipment; Table 4). It is important to note that these expenditures are comprised of both long- and short-term expenses—short-term expenditures are those that are typically made repeatedly and have an oft-recurring economic impact (such as buying bait or food) while long-term expenditures are made less often, and therefore are reflect more infrequently in the data (such as purchasing new fishing equipment). RI residents accounted for 83% of total recreational fishing expenditures, and MA residents accounted for the remaining 17%.

As a complement to the USFWS data, a survey by the American Sportfishing Association (ASA) provides additional insight into the economic impact of the recreational fishing industry in the NBW (Table 5). During 2011, more than 221,000 recreational anglers in the NBW spent nearly \$158 million (in 2016 dollars) on retail sales, generating more than \$86 million in salaries and wages. These expenditures supported over 2,200 jobs.⁷

Table 4: Estimated Expenditures of Anglers in the NBW (2011) (in 2016 dollars)

	Expenditures (\$1000s)	Average per Participant
Freshwater		
RI	\$16,157.1	433
MA	\$17,083.2	387
Watershed	\$33,240.3	409
Saltwater		
RI	\$97,012.8	723
MA	\$5,796.0	950
Watershed	\$102,808.8	736
Combined		
Total	\$136,049.1	556

Source: 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, 2013

Table 5: Estimated Economic Impact of Recreational Anglers in the NBW (2011) (in 2016 dollars) (\$1000s)

	Anglers (1000s)	Number Fishing Days (1000s)	Retail Sales	Salaries & Wages	Jobs	Federal Tax Revenues	State & Local Tax Revenues
Freshwater							
RI	37.3	656.0	\$23,964.5	\$11,818.3	313	\$2,809.1	\$2,638.5
MA	44.1	674.9	\$23,596.9	\$13,960.2	319	\$3,393.2	\$2,867.6
Watershed	81.4	1,330.9	\$47,561.4	\$25,778.5	632	\$6,202.3	\$5,506.1
Saltwater							
RI	134.2	1,270.1	\$103,698.2	\$56,308.5	1,483	\$13,280.4	\$12,026.6
MA	6.1	76.9	\$6,517.3	\$4,184.3	93	\$990.6	\$755.8
Watershed	140.3	1,347	\$110,215.5	\$60,492.8	1,576	\$14,271.0	\$12,782.4
Combined							
Total	221.7	2,677.9	\$157,776.9	\$86,271.3	2,208	\$20,473.3	\$18,288.5

Source: Southwick Associates, 2013

To arrive at a total economic impact estimate for recreational fishing within the NBW, results from both sources are considered (Table 6). In total, over 221,000 recreational anglers spent over two million days fishing in the watershed in 2011. These anglers spent nearly \$147 million (in 2016 dollars) on expenditures, generating more than \$86 million in salaries and wages, and supporting over 2,200 jobs.

Table 6: Total Estimated Economic Impact of Recreational Anglers in the NBW (in 2016 dollars)

	Anglers (1000s)	Number of Fishing Days (1000s)	Expenditures (\$1000s)	Salaries & Wages (\$1000s)	Jobs
Total Watershed	221.7	2,677.9	\$146,913	\$86,271.3	2,208

Source: Southwick Associates, 2011; 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation, 2013

Regardless of the study, recreational fishing is an activity that brings significant economic value to the NBW, and this impact is often overlooked. Recreational fishing in the watershed is not only of value to anglers who benefit from the enjoyment of the recreational experience, but it spurs significant economic activity in areas and businesses that serve and support the fishing public.⁸

Anglers travel to fishing sites, pay license fees, buy or rent boats, buy fishing gear and equipment, eat in restaurants, and rent or own lodging when they embark on recreational fishing excursions.⁹ These expenditures help to boost the economies of both RI and MA. In addition, the topography of the Narragansett Bay and the coastline of RI and MA allow for a dominating recreational fishing presence, and demand will most likely grow in coming years.¹⁰

Future Threats and Opportunities

Sea level | Water clarity | Estuarine fish communities | Freshwater fish communities | Water quality for aquatic life | Water quality for recreation

Currently, 85% of estuarine waters studied in the NBW are deemed “acceptable” for recreational use, which includes boating and fishing, while 80% of lakes and ponds and 40% of freshwater streams and rivers are deemed the same. This acceptability of use is determined by fecal coliform levels, which are used as an indicator for water quality for recreational use: fecal pathogens in water can cause illness in humans and can occur due to increased urbanization (more impervious surfaces, overflow of sewers and wastewater, stormwater runoff, etc.).¹¹ This issue may be exacerbated by increased precipitation and warmer water from climate change, which increase the amount of water carried to waterbodies and facilitate bacterial growth.¹² ¹³ Increasing urbanization and climate change threaten to increase fecal bacteria in waterbodies, thereby threatening their potential for recreational use, such as fishing.

Furthermore, recreational fishing will be impacted by potential changes in fish population. The same factors mentioned above, such as climate change and urbanization, will also impact aquatic life, causing issues like nutrient loads, harmful algal blooms, and reducing water clarity and the amount of dissolved oxygen in the water.¹⁴ These problems pose serious risk to the health of fish communities. Additionally, warming water temperatures from climate change will impact the type of species available for recreational fishing: in both freshwater and estuarine water, there has been a decrease in

the population of cool-cold water fish, like brook trout and winter flounder, and an increase in warmer water fish, such as summer flounder and butterfish.^{15 16}

Finally, the infrastructure for fishing itself is under threat from sea level rise. By 2100, sea level in the northeast could rise by nearly 10 feet.¹⁷ Coastal areas used for fishing, such as piers, may be submerged by rising sea levels. Docks used for housing boats for recreational fishing may also be negatively impacted by the rise. However, as stated in the “Ports and Maritime Trade” section, a change in shoreline provides an opportunity for the development of new infrastructure along the new coast.

Overall, recreational fishing is susceptible to changes in water quality, which will affect both the status of waters deemed acceptable for recreational activity as well as the status of fish themselves. Infrastructure for fishing may also be impacted, but changes in the coast may provide new opportunities for fishing areas and warmer waters will also provide the opportunity for fishing of warm-water species not previously present in the area. Adaptation to these coming changes will be imperative for the continued success of recreational fishing in the NBW.

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- ¹ Sources: USFWS et al., 2013; Southwick Associates, 2013.
 - ² Source: Junker, 2013.
 - ³ Source: MEEA, n.d.
 - ⁴ Source: RI Division of Law Enforcement, n.d.
 - ⁵ Source: USFWS et al., 2013
 - ⁶ Source: USFWS et al., 2013.
 - ⁷ Source: Southwick Associates, 2013.
 - ⁸ Source: Colt et al., 2000.
 - ⁹ Source: Georgianna, 2000.
 - ¹⁰ Source: Hall-Arber et al., 2001.
 - ¹¹ Source: NBEP “Water Quality for Recreation,” 2017.
 - ¹² Source: NBEP “Precipitation,” 2017.
 - ¹³ Source: NBEP “Temperature,” 2017.
 - ¹⁴ Source: NBEP “Water Quality for Aquatic Life,” 2017.
 - ¹⁵ Source: NBEP “Estuarine Fishing Communities,” 2017.
 - ¹⁶ Source: NBEP “Freshwater Fishing Communities,” 2017.
 - ¹⁷ Source: NBEP “Sea Level,” 2017.

Appendix

Table A1: Recreational Fishing Participation in MA & RI (2011)

	Number of Anglers (1000s)	Number of Trips (1000s)	Number of Fishing Days (1000s)	Average Number of Fishing Days
RI	175	1,800	2,080	12
MA	532	7,850	8,367	16
Total	707	9,650	10,447	

Source: 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

Table A2: Angler Participation of Sportfishing in MA & RI

	Total Anglers	Non-Resident Anglers	Total Fishing Days	Non-Resident Fishing Days	Freshwater Anglers	Freshwater Fishing Days	Saltwater Anglers	Saltwater Fishing Days
RI	174,882	96,061	2,079,990	500,635	41,983	738,755	151,138	1,430,260
MA	531,707	154,583	8,367,439	778,903	294,264	4,499,001	323,077	4,048,841

Source: Southwick Associates, 2013.

Table A3: Economic Impact of Recreational Anglers in MA & RI (\$2011)

	Retail Sales	Salaries & Wages	Jobs	Federal Tax Revenues	State & Local Tax Revenues
RI Freshwater	\$25,085,633	\$12,371,219	353	\$2,940,532	\$2,761,925
MA Freshwater	\$146,228,713	\$86,510,958	2,127	\$21,027,310	\$17,769,876
RI Saltwater	\$108,549,235	\$58,942,571	1,670	\$13,901,720	\$12,589,140
MA Saltwater	\$318,845,787	\$204,708,079	4,883	\$48,461,966	\$36,975,236

Source: Southwick Associates, 2013.

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