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June 22, 2026

The Economic Contribution of Recreational Fishing with Atlantic Menhaden

Prepared for the Theodore Roosevelt Conservation Partnership

Theodore Roosevelt Conservation Partnership

Executive Summary

U.S. recreational anglers spent an estimated 13.9 million days fishing with menhaden in the Atlantic in 2025. Nearly 6.3 million days occurred in the Mid-Atlantic, making it the region where anglers fished with menhaden most. Anglers also spent 2.5 million days fishing with menhaden in New England and 5.1 million days fishing with menhaden in the South Atlantic.

Table E1. 2025 Atlantic Recreational Angler Days Using Menhaden (in thousands of days)

Region	For-Hire	Private Boat	Shore	Region Total
Atlantic Total	**336**	**6,322**	**7,275**	**13,933**
New England	51	975	1,496	**2,522**
Mid-Atlantic	114	3,428	2,735	**6,277**
South Atlantic	171	1,919	3,044	**5,134**

In 2025, anglers spent an estimated $804 million on recreational fishing trips in the Atlantic that involved the use of menhaden and the economic effects of that spending extended well beyond anglers' direct purchases. Atlantic fishing trips involving menhaden generated more than $1.5 billion in total economic output, contributed over $833 million to U.S. Gross Domestic Product (GDP) and supported nearly 7,300 jobs nationwide. Those jobs accounted for nearly $453 million in annual wages. It is important to note that these economic estimates only account for items purchased on fishing trips, not the equipment, gear, boats and countless other items that are essential for recreational fishing. Therefore, these should be viewed as conservative estimates of the economic effects that recreational fishing with menhaden in the Atlantic creates within the U.S.

Table E2. 2025 Economic Contribution of Atlantic Recreational Fishing with Menhaden

Region	Angler Spending ($ Millions)	Output ($ Millions)	Jobs	Income ($ Millions)	Value Added to GDP ($ Millions)
Atlantic Total	**$804**	**$1,564**	**7,270**	**$453**	**$833**
New England	$97	$187	870	$54	$100
Mid-Atlantic	$383	$732	3,110	$201	$382
South Atlantic	$324	$645	3,290	$197	$351

Recreational anglers who used menhaden while fishing were asked to rate the importance of different menhaden products in helping them achieve their saltwater fishing goals, using a scale from 0 (not at all important) to 10 (extremely important). Among anglers who used live or dead Atlantic menhaden as bait, the average importance rating was 7.8 out of 10, with 77% rating menhaden baits as a 7 or higher. Anglers who used chum made from menhaden gave it an

average importance rating of 7.7, with more than 75% assigning a rating of at least 7. Scent attractants made from menhaden received the highest average rating at 8.0 out of 10 and more than 82% of users rated these scent attractants as a 7 or higher in importance. Overall, more than 90% of recreational anglers who used any type of menhaden product considered it to be at least somewhat important for achieving their saltwater fishing objectives. This helps to further illustrate the importance of menhaden to saltwater recreational fishing in the Atlantic.

Table E3. Importance of Menhaden for Achieving Recreational Fishing Goals

Response	Menhaden Bait	Menhaden Chum	Menhaden Scent
Mean Importance (0-10)	7.8	7.7	8.0
Sample Size	**N=209**	**N=149**	**N=78**

The contents of this report help to demonstrate the importance of menhaden for recreational fishing on the Atlantic Coast of the United States. Recreational anglers spend millions of days each year fishing in the Atlantic with menhaden, spending over $800 million on those trips. Not only are menhaden an extremely popular bait and fish attractant, but when asked directly, anglers indicate that menhaden are critical to achieving their saltwater fishing goals. As demonstrated above, the economic effects from recreational fishing with menhaden in the Atlantic are massive. Without access to menhaden for use as baits, chum or scent attractants, some recreational anglers could lose interest in saltwater fishing, putting their future fishing participation at risk.

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Introduction

Atlantic menhaden are a small, filter feeding fish that function as an important forage species in coastal ecosystems and economies along the Atlantic coast. Menhaden support a range of predators including birds, mammals and fish. Many of the fish that rely on menhaden, such as striped bass, bluefish and weakfish, are recreationally and commercially valued species (Atlantic States Marine Fisheries Commission, 2026; Buchheister, Miller, & Houde, 2017; Harrison, Naumenko, & Whitehead, 2021). Menhaden are harvested commercially in the Atlantic, with the bulk of that harvest captured by a "reduction fishery", which reduces whole menhaden into fish meal, fish oil and fish solubles that are used in a variety of products including fertilizers, animal feed and human and animal supplements. In 2023, the reduction fishery comprised about 70% of the coastwide landings of Atlantic menhaden (Atlantic States Marine Fisheries Commission, 2026). Atlantic menhaden are also harvested commercially to be sold as bait both for use in other commercial fisheries (for species such as blue crab and lobster) and by recreational anglers for sportfishing. In 2023, bait and recreational landings accounted for approximately 30% of coastwide Atlantic menhaden landings. However, menhaden harvested by recreational anglers for personal use as bait have represented only about 1% of coastwide landings in recent years (Atlantic States Marine Fisheries Commission, 2026). Recreational anglers primarily use menhaden in three ways: 1) as live or cut bait, 2) as chum (ground fish or fish parts dispersed in the water to attract gamefish) and 3) as scent attractants made from menhaden that can be added to the water or applied to baits and lures to encourage strikes by gamefish.

Menhaden is a species with significant environmental and economic importance, making population health and total allowable catch key policy considerations for fisheries managers, in this case the Atlantic States Marine Fisheries Commission. Therefore, understanding the current economic role that menhaden play in the recreational fishing sector is critical for informed decision-making. This study estimates the annual number of recreational fishing days where anglers used menhaden and the economic contributions generated by angler spending on those fishing trips. The results of this study can help provide key economic estimates to help inform discussions and decisions related to menhaden conservation and supporting healthy recreational fisheries.

Economic Concepts and Definitions

The direct economic benefits of recreational fishing can be estimated by two types of economic measures: economic contributions and economic use value. Economic contributions represent the business and financial activity generated from recreational fishing activity, including expenditures that support jobs, income and economic output (GDP). Economic use values

reflect the welfare benefits received by anglers through participation in recreational fishing. In economic terms, value is measured as the difference between what an individual is willing to pay and what they actually pay for a commodity or activity, known as consumer surplus. While the concept of economic value is insightful, it is more challenging to measure and less definitive than measuring economic contributions. Therefore, only economic contributions are addressed in this report.

There are three types of economic effects that sum up to a total economic contribution: direct, indirect and induced effects. A direct effect is created by the initial purchase made by the consumer. For example, when a person buys a fishing rod for $200 there is a direct effect to the retailer of $200. Indirect effects are secondary effects generated from a direct contribution. For example, the retailer must purchase a replacement rod; a freight company must be paid to deliver the replacement rod; the rod manufacturer must purchase additional graphite, metal, etc. for production; graphite producers must buy inputs and so on. Therefore, the original expenditure of $200 benefits a host of other related industries. Induced effects result from the wages and salaries paid by the directly and indirectly affected industries. The employees of these industries spend their income on various goods and services. These expenditures in turn create a cycle of additional economic effects.

The sum of the direct, indirect and induced effects equals the total economic contribution. As the original retail transaction goes through round after round of indirect and induced effects, the economic contribution of the original purchase is multiplied, benefiting many industries and individuals. Likewise, the reverse is true. If a particular item or industry is removed from the economy, the economic loss is greater than the original lost retail sale. Once the original retail purchase is made, each successive round of spending is smaller than the previous round. When the economic benefits are no longer measurable, the economic contribution ends.

Economic Definitions:

Angler Spending: The number of dollars spent by anglers for fishing-related expenses including meals, lodging, travel, fees and equipment.

Output: Also known as the total multiplier effect, output represents the total cumulative effect in the economy created by successive rounds of spending by retailers, manufacturers and others. These successive rounds of spending generate additional economic benefits with each round. The benefits become smaller and smaller until they can no longer be measured.

GDP (Value Added): The difference between an industry's or establishment's output and the cost of its intermediate inputs; it is a measure of the contribution to GDP.

Jobs: The total number of jobs supported by the many rounds of spending described above. In this report, this figure represents the actual number of jobs, or people employed to some level and not "full time equivalents."

Income: The total wages and salaries paid to employees by all the industries enhanced by the total rounds of spending, plus the profits and dividends earned by business owners. This concept is sometimes referred to as earnings.

Methodology

Three main data sources were used to produce this report:

1) A primary survey of U.S. Atlantic recreational anglers was conducted by Southwick Associates. This survey quantified where people fished, their fishing effort by fishing mode and importantly, the types of bait, chum and scent attractants used for each type of fishing trip. Several additional topics were explored, and the full questionnaire is available in Appendix A.
2) The National Oceanic and Atmospheric Administration's (NOAA) Marine Recreational Information Program (MRIP) provided estimates for annual fishing effort in the Atlantic Ocean of the U.S. (NOAA Fisheries, 2026). Effort is reported as "angler days", which measures the total number of days on which individuals went fishing in an area. Effort estimates are broken out by fishing mode, with separate estimates for fishing from charter or party/headboat (for-hire mode), fishing from a privately owned or rented boat (private boat mode) and fishing from a shore, pier, dock, jetty, or similar (shore mode).
3) NOAA's Fisheries Economics of the United States (FEUS) 2023 report and interactive data tool provided estimates for angler spending on each type of fishing trip and the economic contributions (economic output, value added to GDP, jobs supported and wages paid by those jobs) associated with that spending (NOAA Fisheries, 2023). That report is based on a national survey conducted by NOAA in 2022 to estimate angler expenditures on marine recreational fishing trips (Lovell, Djukanovich, Hilger, & Steinback, 2025). The economic contributions associated with marine recreational angler spending were estimated using input-output models developed by NOAA.

The primary survey of Atlantic anglers conducted by Southwick Associates was used to estimate the proportion of recreational fishing trips on which anglers used menhaden in some form for each fishing mode within each region of the Atlantic. Data from NOAA's MRIP provided estimates for the total number of recreational fishing trips by mode taken within each region of the Atlantic in 2025. These data sources were combined to estimate the number of days that recreational anglers used menhaden within each fishing mode in each region of the Atlantic. As an example, the number of days spent fishing with menhaden in the for-hire mode within the Atlantic's New England region, $Efnm$, can be calculated through the equation:

$$Efnm = Efn\ x\ Pfnm$$

where Efn represents the total for-hire recreational fishing effort in the New England region of the Atlantic, provided by MRIP and $Pfnm$ denotes the proportion of days on which recreational anglers fishing from the for-hire mode in New England used menhaden, estimated through the primary survey conducted by Southwick Associates.

NOAA's FEUS report provided estimates for the average angler's daily spending and the economic multipliers associated with each type of fishing trip within each region of the Atlantic in 2023. The annual spending associated with recreational for-hire fishing trips in New England on which menhaden was used, $Sfnm$, was calculated using the formula:

$$Sfnm = Efnm\ x\ Dfn$$

where $Efnm$ denotes the number of days that recreational anglers used menhaden on for-hire fishing trips in New England and Dfn represents the average angler spending associated with a day of for-hire recreational fishing in New England. This methodology includes an implicit assumption that the daily spending of anglers who use menhaden is similar to other anglers.

The national economic contributions resulting from Atlantic fishing trips involving menhaden were calculated using economic multipliers derived from NOAA's FEUS report. Each dollar that anglers spend on a recreational fishing trip represents a basket of goods that includes fishing tackle, food, travel costs and other items. For every dollar spent on those goods, a certain level of economic output, value added (GPD), jobs and income are supported nationally. As an example, the national economic output associated with for-hire recreational fishing trips in the Atlantic that involve menhaden, Ofm, can be approximated using the formula:

$$Ofm = Sfm\ x\ Mo$$

where Sfm represents the total spending associated with for-hire fishing trips in the Atlantic on which menhaden were used and Mo indicates the amount of national economic output resulting from each dollar spent on a for-hire recreational fishing trip in the U.S, estimated by NOAA through input-output models.

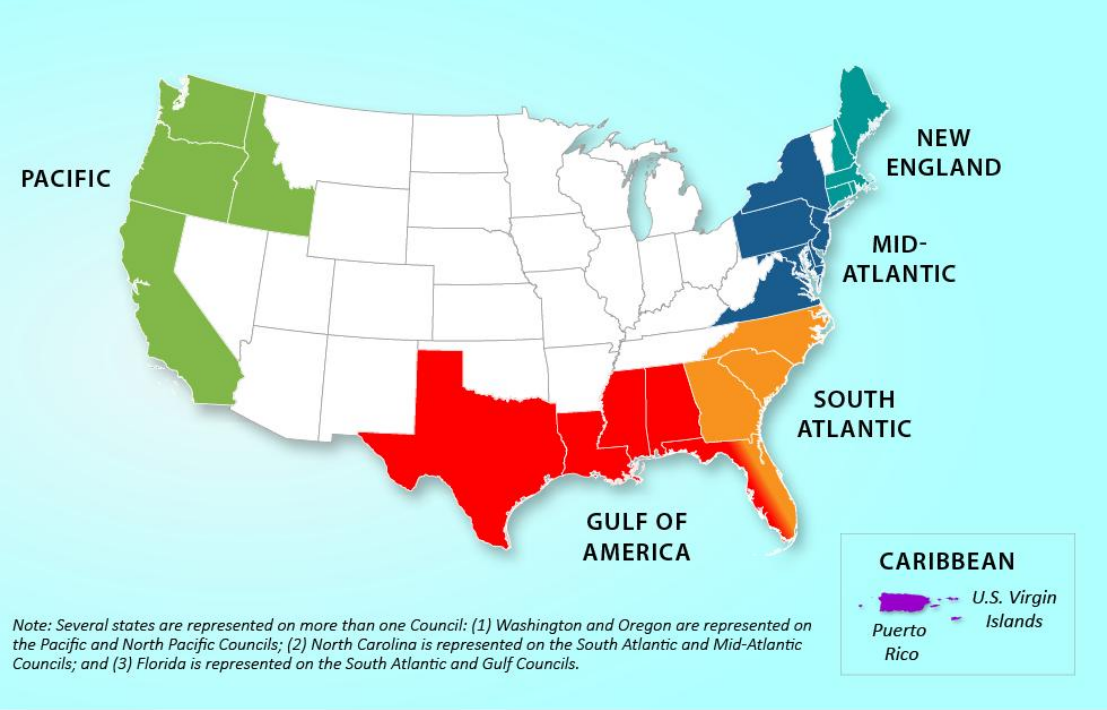
The primary survey of U.S. anglers was conducted online from March 11 – 26, 2026. The audience for this survey was recreational anglers who live in a state that borders the Atlantic Coast.[1] This choice was made to ensure that enough saltwater anglers could be reached in a cost-effective way, since those living along the Atlantic coast are far more likely to engage in saltwater fishing in the Atlantic compared to those living inland or on the Pacific Coast. When projecting the results of this survey to represent all Atlantic Coast anglers, there is an implicit

[1] Anglers who live in Pennsylvania were also included in this survey audience, given the proximity of the Philadelphia metro area to the Atlantic Coast.

assumption that anglers living in states along the Atlantic coast fish in similar ways to anglers who visit from other states to fish in the Atlantic.

To qualify for the full survey, anglers must have gone fishing in the Atlantic at least once during the past year. Anglers were asked to specify which regions of the Atlantic they had fished in. Those regions are defined by U.S Regional Fishery Management Councils and align with the regions used by NOAA Fisheries in the other data sources described above. Figure 1 provides a map showing which states are located within each region.

Figure 1. U.S. Fishing Regions[2]



Survey respondents who went fishing in multiple regions of the Atlantic were asked to specify the region in which they fished most often during the past year and were only asked to report their fishing activity within that region to limit their survey burden. The states belonging to each region were specified within the survey and the map in Figure 1 was also provided for respondents' reference. Quotas were used to ensure that adequate responses were collected within each region of the Atlantic.

All survey respondents belonged to a professionally managed panel and were compensated for their participation in this survey. All responses were investigated by Southwick Associates to ensure quality. Average time per response, straight-lining and patterned responses to the questionnaire were monitored. Questions were included to verify respondents' knowledge of

[2] This image is provided by the U.S. Regional Fisheries Management Council website: https://www.fisherycouncils.org

saltwater fishing. Additional quality-control questions were included to ensure that respondents were reading all survey instructions, questions and answer options. Responses that failed any quality-control measures were removed from the final dataset. Demographics were also monitored throughout the survey fielding to ensure that the final audience was representative of the U.S. recreational fishing community as possible. Appendix B contains demographic results for the full survey audience.

Results

Atlantic Angler Survey

In total, 1,316 completed survey responses were collected from recreational anglers who had gone fishing along the Atlantic Coast of the U.S. within the past year. Results are reported regionally, given the need to combine these survey results with the regional data sources described above. The table below shows the count of saltwater anglers who reported their fishing activity within each region of the Atlantic.

Table 1. Recreational Angler Responses by Region

Atlantic Coast Region	Sample Size
New England	N=409
Mid-Atlantic	N=457
South Atlantic	N=450
Total	**N=1,316**

Anglers were asked to report the fishing mode(s) they engaged in within each region of the Atlantic. Fishing modes include the for-hire mode, the private boat mode and the shore mode. Shore fishing was most common within each region, followed by fishing from a private boat and for-hire fishing. Each region showed similar distribution of fishing effort across modes, although for-hire fishing was slightly more common in the Mid-Atlantic compared to New England or the South Atlantic.

Table 2. Proportion of Anglers Participating in Each Fishing Mode by Region[3]

Fishing Mode	New England	Mid-Atlantic	South Atlantic
For-Hire	24.5%	31.5%	21.1%
Private Boat	55.8%	54.5%	55.3%
Shore	72.4%	72.0%	76.7%
Sample Size	**N=409**	**N=457**	**N=450**

[3] Anglers can participate in multiple fishing modes within a year, so these proportions may sum to over 100%.

Anglers were also asked to report their usage of bait, chum or scent attractants while fishing by each mode. Live or dead baits were the most commonly used form of menhaden across all fishing modes, with more than 80% of anglers reporting using bait during the year. Chum was used by over half of anglers who fished from a boat and more than 60% of anglers who fished from a charter or party boat. Although chum was less relatively popular among anglers who fished from the shore, over 30% of shore anglers reported using chum across all regions of the Atlantic. While scent attractants were less commonly used than baits or chum, scent attractants were used by between 20% and 30% of Atlantic recreational anglers across all fishing modes and regions.

Table 3. Bait, Chum and Scent Usage by Fishing Mode and Region[4]

Response	New England	Mid-Atlantic	South Atlantic
For-Hire			
Live or dead bait	86.0%	88.9%	90.5%
Chum	62.0%	66.0%	72.6%
Scent attractants (excluding chum)	29.0%	25.0%	23.2%
Sample Size	*N=100*	*N=144*	*N=95*
Private Boat			
Live or dead bait	89.5%	89.2%	88.8%
Chum	56.6%	54.6%	56.6%
Scent attractants (excluding chum)	23.7%	30.5%	29.3%
Sample Size	*N=204*	*N=222*	*N=221*
Shore			
Live or dead bait	82.4%	87.8%	87.3%
Chum	31.1%	35.6%	32.2%
Scent attractants (excluding chum)	20.6%	25.2%	24.1%
Sample Size	*N=244*	*N=289*	*N=301*

Anglers who reported using live or dead bait were asked to report which type(s) of bait they used. Bait usage varied substantially by region. For example, nearly 80% of anglers who fished in the South Atlantic reported using shrimp within the past year, compared to just over 35% of anglers who fished in New England. Menhaden served as a relatively popular live or dead bait across the Atlantic, especially in the New England and Mid-Atlantic regions, where they were

[4] Anglers can use multiple methods within a year or even during the same day, so these proportions may sum to over 100%.

used by close to 20% of recreational anglers. Just over 9% of anglers in the South Atlantic reported using live or dead menhaden as bait as well.

Table 4. Live / Dead Bait Types by Region[5]

Live / Dead Bait Type Used	New England	Mid-Atlantic	South Atlantic
Minnows	47.2%	56.2%	52.1%
Herring / shad	37.1%	28.5%	22.0%
Shrimp	35.8%	54.3%	79.3%
Crabs	35.0%	37.6%	28.5%
Eels	26.0%	18.9%	10.5%
Menhaden / pogies / bunker / fatbacks	20.2%	19.6%	9.2%
Pilchards / scaled sardines	16.1%	19.9%	17.6%
Mullet	15.5%	24.4%	37.3%
I'm not sure what bait I used	1.7%	1.9%	0.8%
Other	0.9%	1.6%	1.0%
Sample Size	**N=534**	**N=639**	**N=608**

Anglers who used chum were asked to report what it was made from. It is important to recognize that chum is made both commercially and by anglers at home and it can consist of one or more types of fish as well as non-fish food products such as oats and pet food. There was significant regional variation in the types of chum used by Atlantic anglers. Mackerel was the most popular fish used for chum in the Northeast, while chum made from sardines was most popular in the Mid and South Atlantic regions. Chum made from menhaden was used by over 22% of the anglers who used chum in New England and the Mid-Atlantic and by more than 17% of anglers who used chum in the South Atlantic. Between 6% and 10% of anglers reported that they do not know what the chum they used was made from. Therefore, it is possible that a greater proportion of anglers used chum made from menhaden than is reported below.

[5] Anglers can use multiple bait types within a year, so these proportions may sum to over 100%.

Table 5. Chum Type by Region[6]

Chum Type Used	New England	Mid-Atlantic	South Atlantic
Mackerel	48.4%	42.0%	42.4%
Sardines	32.9%	47.4%	48.6%
Herring	30.0%	27.3%	24.0%
Shellfish	24.7%	29.9%	30.8%
Menhaden / pogies / bunker / fatbacks	22.3%	23.0%	17.4%
Anchovies	21.9%	29.6%	28.7%
Mullet	14.8%	23.8%	36.4%
Pilchards / scaled sardines	13.8%	14.4%	17.4%
I'm not sure what it was made from	9.5%	8.0%	6.2%
Other	0.7%	1.1%	0.6%
Sample Size	**N=283**	**N=348**	**N=321**

Anglers who reported using scent attractants other than chum were also asked what those scent attractants were made from. Like chum, scent attractants are produced commercially but can also be made by anglers at home. Scents made from menhaden were the most popular among anglers across all Atlantic regions, used by more than 40% of recreational anglers who reported using scent products other than chum. Scent attractants made from sardines, herring and pilchards were also popular. As with chum, up to 10% of anglers reported that they did not know what the scent attractants they used were made from. Therefore, it is possible that scents made from menhaden are more popular than reflected in the estimates below.

[6] Anglers can use multiple chum types within a year, so these proportions may sum to over 100%.

Table 6. Scent Type by Region[7]

Scent Type Used	New England	Mid-Atlantic	South Atlantic
Menhaden / pogies / bunker / fatbacks	42.4%	45.1%	49.4%
Sardines	40.3%	42.6%	30.9%
Herring	39.6%	31.3%	41.0%
Pilchards / scaled sardines	38.9%	40.0%	25.8%
Shellfish	29.2%	29.7%	31.5%
Mackerel	25.7%	24.1%	15.7%
Mullet	22.2%	30.8%	36.5%
Anchovies	19.4%	15.4%	21.9%
I'm not sure what it was made from	9.0%	7.7%	10.1%
Other	0.7%	1.0%	0.6%
Sample Size	**N=144**	**N=195**	**N=178**

All anglers were asked to report the total number of days that they went fishing in their region in the Atlantic during the past 12 months. Anglers who used menhaden were also asked to report how many of those days they used any live or dead menhaden as bait, chum made from menhaden and menhaden-based scent attractants. Since all of these products can be used on the same day or even simultaneously, anglers who used menhaden were also asked to report the total number of days on which they used menhaden in any form.

Anglers who fished from a charter or party/headboat reported using menhaden on 15% or more of their for-hire fishing days across all three regions of the Atlantic. New England is the region where anglers spent the most time fishing with menhaden, with anglers reporting menhaden usage on more than 28% of their for-hire fishing days and over 14% of their fishing days spent on a private boat or fishing from shore. Anglers fishing from a private boat in the Mid-Atlantic also reported using menhaden on over 21% of their fishing days.

[7] Anglers can use multiple scent types within a year, so these proportions may sum to over 100%.

Table 7. Proportion of Days That Anglers Used Menhaden[8]

Response	New England	Mid-Atlantic	South Atlantic
For-Hire			
Any type of menhaden	*28.9%*	*15.0%*	*20.5%*
Live or dead menhaden	15.3%	9.9%	7.5%
Chum made from menhaden	9.8%	6.3%	15.4%
Scent attractants (excluding chum) made from menhaden	12.3%	1.5%	1.6%
Sample Size	*N=100*	*N=144*	*N=95*
Private Boat			
Any type of menhaden	*14.2%*	*21.2%*	*8.3%*
Live or dead menhaden	10.1%	15.5%	4.7%
Chum made from menhaden	4.7%	11.2%	4.0%
Scent attractants (excluding chum) made from menhaden	0.6%	0.8%	0.4%
Sample Size	*N=228*	*N=249*	*N=249*
Shore			
Any type of menhaden	*14.1%*	*11.2%*	*5.5%*
Live or dead menhaden	11.4%	9.7%	2.3%
Chum made from menhaden	2.6%	3.3%	2.4%
Scent attractants (excluding chum) made from menhaden	2.2%	2.7%	1.2%
Sample Size	*N=296*	*N=329*	*N=345*

Recreational anglers who fished in the Atlantic with menhaden baits, chum or scents were asked to report how they obtained the menhaden that they used on their most recent fishing trip. While some anglers reported catching menhaden baits and/or making chum or scent products themselves, the majority reported purchasing these menhaden products. In fact, 77%

[8] Anglers can use multiple types of menhaden in a single day, therefore "Any type of menhaden" may be smaller than the sum of bait, chum and scent.

of anglers who fished with live or dead menhaden baits reported that they bought at least some of those menhaden from a bait shop, marina or individual. Meanwhile 37% of anglers who fished with live or dead menhaden reported catching at least some of those menhaden themselves.

Table 8. Acquisition of Menhaden Baits[9]

Response	Percent
Purchased from a bait shop, marina or individual	77.0%
Caught them myself	37.3%
Other	3.8%
Sample Size	**N=209**

Over 73% of Atlantic recreational anglers who used chum made from menhaden reported purchasing at least some of that chum, while 28% reported making at least some menhaden chum on their own.

Table 9. Acquisition of Menhaden Chum[8]

Response	Percent
Purchased from a bait shop, marina or individual	73.8%
Made it myself	28.2%
Other	4.0%
Sample Size	**N=149**

Over 73% of Atlantic recreational anglers that fished using scent attractants made from menhaden reported purchasing those scents. Nearly 35% of recreational anglers reported making menhaden-based scent attractants themselves, meaning some anglers both purchased and made menhaden scent attractants for their most recent fishing trip.

Table 10. Acquisition of Menhaden Scent Attractants[8]

Response	Percent
Purchased from a bait shop, marina or individual	73.1%
Made it myself	34.6%
Other	5.1%
Sample Size	**N=78**

[9] Anglers can both buy and catch/make their own bait, chum or scent attractants for a single trip, therefore these values may sum to over 100%.

Atlantic recreational anglers who purchased menhaden for use on their most recent fishing trip were asked to report their spending on each type of menhaden product. These results are reported as average spending per angler day, i.e., the amount of money that one angler spends per day of fishing. On average, recreational anglers spent just over $23 per day on live or dead menhaden to use as baits. Those who used chum made from menhaden spent nearly $24 per day on menhaden chum, while those who used scent attractants made from menhaden spent just over $25 per day on those scent products.

Table 11. Average Daily Spending by Anglers Who Purchased Menhaden Products

Menhaden Product	Average Daily Spending	Sample Size
Live or Dead Baits	$23.13	**N=161**
Chum	$23.94	**N=110**
Scent	$25.21	**N=57**

Anglers who reported catching menhaden for use as bait or making their own chum or scent attractants from menhaden were asked to report the amount of time they spent catching and/or preparing the menhaden they used on their most recent fishing trip. On average, recreational anglers who caught menhaden to use as live or dead bait spent 2 hours catching those menhaden per fishing day. Those who made chum from menhaden spent just over 1.6 hours per fishing day making that chum and those who made scent attractants from menhaden spent just over 2.6 hours per fishing day preparing those scents. While there is not a direct monetary cost associated with catching menhaden to use as bait or to make into attractants, the amount of time that recreational anglers dedicate to these pursuits helps illustrate the importance of menhaden to their fishing success.

Table 12. Average Daily Effort by Anglers Who Caught or Made Menhaden Products

Menhaden Product	Average Hours per Fishing Day	Sample Size
Live or Dead Baits	2.0	**N=78**
Chum	1.6	**N=42**
Scent	2.6	**N=27**

Recreational anglers who fished with menhaden were asked to rate how important each type of menhaden product is to them for achieving their saltwater fishing goals. Response options ranged from 0 (not important at all) to 10 (extremely important). Anglers who fished with live or dead menhaden baits in the Atlantic rated the importance of those baits at 7.8 out of 10 on

average, with 77% of anglers rating the importance of menhaden baits at 7 or higher. Anglers that fished using chum made from menhaden gave an average importance rating of 7.8 out of 10, with over 75% rating the importance of menhaden chum at 7 or higher. Those who fished with scent attractants made from menhaden reported an average importance of 8.0 out of 10, with over 82% indicating that those scents were a 7 or higher in terms of importance. More than 90% of recreational anglers that used any type of menhaden product reported that they thought that product was at least somewhat important for achieving their saltwater fishing goals.

Table 13. Importance of Menhaden for Achieving Recreational Fishing Goals

Response	Menhaden Bait	Menhaden Chum	Menhaden Scent
0 = Not Important at All	0.0%	0.7%	0.0%
1	0.5%	0.0%	0.0%
2	1.0%	0.7%	0.0%
3	1.4%	1.3%	1.3%
4	3.8%	3.4%	2.6%
5 = Somewhat Important	6.7%	8.7%	9.0%
6	9.6%	10.1%	5.1%
7	15.3%	16.8%	17.9%
8	20.6%	18.1%	16.7%
9	14.8%	15.4%	19.2%
10 = Extremely Important	26.3%	24.8%	28.2%
Mean	7.8	7.7	8.0
Sample Size	**N=209**	**N=149**	**N=78**

Recreational anglers who fished in the Atlantic using menhaden were also asked to report which gamefish species they targeted within the past year while fishing with menhaden. Striped bass were targeted by over 65% of those who fished with live or dead menhaden baits and by over 50% of anglers who used menhaden chum or scent attractants. Bluefish are also a popular target among Atlantic anglers who used menhaden, with more than 50% reportedly targeting bluefish. Speckled trout / weakfish, tuna and flounder / fluke were each targeted by more than a third of recreational anglers that fished using menhaden last year.

Table 14. Gamefish Species Targeted Using Menhaden

Response	Menhaden Bait	Menhaden Chum	Menhaden Scent
Striped bass / rockfish	65.6%	51.0%	59.0%
Bluefish	58.4%	55.7%	55.1%
Speckled trout / weakfish	38.8%	35.6%	37.2%
Tuna	34.0%	43.6%	43.6%
Flounder / fluke	33.0%	35.6%	38.5%
Red drum / redfish / spot tailed bass	26.8%	26.2%	46.2%
Cobia	22.0%	19.5%	29.5%
Sharks	15.8%	21.5%	18.0%
Snapper / grouper	8.6%	9.4%	16.7%
Other species	1.9%	0.0%	1.3%
Sample Size	**N=209**	**N=149**	**N=78**

Atlantic Recreational Fishing Effort

According to NOAA's MRIP, recreational anglers spent over 137 million days fishing in the Atlantic Ocean of the U.S. in 2025. Over 17 million of those days occurred in New England, while over 41 million took place in the Mid-Atlantic and nearly 79 million occurred in the South Atlantic region. Fishing from the shore was the most common fishing mode, with recreational anglers spending more than 89 million days fishing from shore, jetties, piers, etc. along the Atlantic. Anglers also spent more than 46 million days fishing from private boats and over 1.7 million days fishing from charter or party/headboats.

It should be noted that the for-hire effort estimates for the South Atlantic region available through MRIP only include days spent fishing from a charter boat and not days on which anglers fished from party/headboats. The South Atlantic Fisheries Management Council (SAFMC) estimates that recreational anglers spent an average of 230 - 280 thousand days fishing from party/headboats in the South Atlantic from 2017 - 2023 (South Atlantic Fisheries Managment Council, 2026). However, party/headboat trips that occurred in the South Atlantic are not included in this analysis, because the angler expenditure estimates presented in the following section are based on MRIP, which does not survey party/headboat anglers in the South Atlantic region. Therefore, the for-hire estimates presented for the South Atlantic region within this report should be considered conservative.

Table 15. 2025 Total Atlantic Angler Days by Region

Region	2025 Angler Days
New England	**17,618,048**
For-Hire	175,770
Private Boat	6,855,638
Shore	10,586,640
Mid-Atlantic	**41,366,506**
For-Hire	759,517
Private Boat	16,175,075
Shore	24,431,914
South Atlantic	**78,730,943**
For-Hire[10]	834,695
Private Boat	23,023,933
Shore	54,872,315
Atlantic Total	**137,715,497**

The estimated proportion of days that anglers used menhaden (Table 7) can be combined with the overall Atlantic effort estimates (Table 15) to approximate the number of days on which recreational anglers used menhaden while fishing in the Atlantic in 2025 (Table 16). These estimates are broken out by region, fishing mode and by the form of menhaden used (whole baits, chum and scent attractants). Estimates are also provided for the total number of days on which recreational anglers used any type of menhaden while fishing, since anglers can use multiple forms of menhaden in a single day.

In total, U.S. anglers spent more than 13.9 million days fishing with menhaden in the Atlantic in 2025. Over 6.2 million of those days occurred in the Mid-Atlantic, making it the region where recreational anglers fished with menhaden most often. Anglers also spent more than 2.5 million days fishing with menhaden in New England and over 5.1 million days fishing with menhaden in the South Atlantic[11].

[10] Only charter boat fishing days are included in the for-hire estimates for the South Atlantic region available from NOAA's MRIP. Fishing effort that occurs on party / headboats in the South Atlantic region is collected through a separate effort known as the Southeast Region Headboat Survey, which is conducted by the SAMFC.
[11] As mentioned above, the for-hire fishing effort estimates for the South Atlantic are conservative, since those estimates do not include days that anglers spent fishing from party/headboats in the region.

Table 16. 2025 Atlantic Angler Days Using Menhaden (in thousands of days)

Region	Days Using Any Menhaden[12]	Days Using Menhaden Bait	Days Using Menhaden Chum	Days Using Menhaden Scent
New England	**2,522**	**1,925**	**616**	**292**
For-Hire	51	27	17	22
Private Boat	975	689	324	41
Shore	1,496	1,209	275	229
Mid-Atlantic	**6,277**	**4,944**	**2,670**	**804**
For-Hire	114	75	48	12
Private Boat	3,428	2,501	1,817	128
Shore	2,735	2,368	805	665
South Atlantic	**5,135**	**2,393**	**2,349**	**783**
For-Hire	171	62	129	14
Private Boat	1,919	1,088	928	86
Shore	3,044	1,243	1,292	683
Atlantic Total	**13,934**	**9,262**	**5,635**	**1,879**

Economic Contribution of Atlantic Recreational Fishing with Menhaden

The average amount of money spent by anglers per day of recreational fishing is estimated by NOAA each year, with the most recent available estimates being for 2023 (NOAA Fisheries, 2023), (Lovell, Djukanovich, Hilger, & Steinback, 2025). In Table 17, those estimates have been updated for inflation using the consumer price index from the U.S. Bureau of Labor Statistics to reflect daily angler spending in 2025 dollars (U.S. Bureau of Labor Statistics, 2026).

Anglers spend money on a variety of items needed for each day of fishing. Expenses include fishing tackle, food, fuel, bait, ice, transportation and a variety of other items. In cases where anglers take trips with the primary purpose of fishing, overnight lodging and related expenses are also included. Anglers who fished from charter or party/headboats (for-hire mode) spent over $225 per fishing day on average, the most of any of the fishing modes reported here. Their expenses include guide or boat entry fees in addition to the items mentioned above. Those who fished from a private boat spent $47-$73 per fishing day on average, while those who fished from the shore spent $25-$44 per day.

[12] Anglers can use multiple types of menhaden in a single day, therefore values in the “Any type of menhaden” column may be smaller than the sum of the Bait, Chum and Scent columns.

Table 17. Average Daily Spending by Atlantic Recreational Anglers in 2025

Fishing Mode	Daily Angler Spending
New England	
For-Hire	$227.52
Private Boat	$47.38
Shore	$25.95
Mid-Atlantic	
For-Hire	$228.78
Private Boat	$72.85
Shore	$39.07
South Atlantic	
For-Hire[13]	$402.27
Private Boat	$63.25
Shore	$43.99

A simplifying assumption, that anglers who fish using menhaden spend the same amount of money on a day of fishing as the average Atlantic angler, is used here. This assumption enables the total angler spending on Atlantic fishing with menhaden in 2025 to be calculated using the average daily spending reported in Table 17 along with the number of days anglers spent fishing with menhaden in the Atlantic in 2025 reported in Table 16. The angler spending and economic contributions of recreational fishing with menhaden in the Atlantic in 2025 are presented in Table 18.

In 2025, anglers spent nearly $804 million on recreational fishing trips in the Atlantic where they used menhaden in some form. That spending contributed to the U.S. economy in a way that goes far beyond the direct purchases made by anglers. Spending on Atlantic fishing trips that involved menhaden created a total economic output (or multiplier effect) of over $1.6 billion, contributing more than $833 million to the country's Gross Domestic Product (GDP). That spending also supported nearly 7,300 jobs in the U.S., with those jobs paying annual wages of more than $453 million.

[13] This estimate includes only anglers who fished from charter boats and therefore is not directly comparable to the for-hire estimates for New England and the Mid-Atlantic.

Table 18. 2025 Economic Contributions of Atlantic Recreational Fishing with Any Menhaden[14]

Region	Angler Spending ($ Thousands)	Output ($ Thousands)	Jobs	Income ($ Thousands)	Value Added (GDP) ($ Thousands)
New England	**$96,573**	**$187,453**	**870**	**$54,391**	**$100,113**
For-Hire	$11,538	$27,287	210	$10,746	$16,159
Private Boat	$46,211	$86,414	310	$21,354	$43,323
Shore	$38,824	$73,752	350	$22,291	$40,631
Mid-Atlantic	**$382,658**	**$731,628**	**3,110**	**$201,023**	**$382,457**
For-Hire	$26,051	$61,608	480	$24,262	$36,482
Private Boat	$249,725	$466,983	1,650	$115,395	$234,118
Shore	$106,882	$203,037	980	$61,366	$111,857
South Atlantic	**$324,278**	**$644,509**	**3,290**	**$197,220**	**$350,549**
For-Hire	$68,976	$163,124	1,270	$64,239	$96,597
Private Boat	$121,376	$226,973	800	$56,087	$113,791
Shore	$133,926	$254,412	1,220	$76,894	$140,161
Atlantic Total	**$803,509**	**$1,563,590**	**7,270**	**$452,634**	**$833,119**

The results of Table 18 show the economic contribution of all fishing trips on which anglers used menhaden in any form (as live or dead baits, chum or scent attractants). The following tables show the economic contribution of fishing with specific types of menhaden. It is important to recognize that anglers can fish with multiple types of menhaden during a single day and that they can also use other baits as well as lures on days during which they use menhaden. While these fishing trips may not entirely depend on the availability of menhaden, the fact that anglers choose to use menhaden on so many trips helps illustrate the importance of this species as a source of bait, chum and scent attractant that helps anglers to be more successful.

In 2025, anglers spent over $510 million on recreational fishing trips in the Atlantic during which they used live or dead menhaden as baits. That spending supported over $984 million in total economic output, contributing more than $520 million to the U.S. GDP. Angler spending on trips using live or dead menhaden as baits also supported over 4,400 jobs in the U.S., with those jobs paying annual wages of nearly $279 million.

[14] Anglers can use multiple types of menhaden in a single day, therefore values in the "Any Menhaden" table may be smaller than the sum of the Menhaden Bait, Chum and Scent tables.

Table 19. 2025 Economic Contributions of Atlantic Recreational Fishing with Live or Dead Menhaden

Region	Angler Spending ($ Thousands)	Output ($ Thousands)	Jobs	Income ($ Thousands)	Value Added (GDP) ($ Thousands)
New England	**$70,128**	**$135,091**	**620**	**$38,786**	**$71,994**
For-Hire	$6,105	$14,438	110	$5,686	$8,550
Private Boat	$32,651	$61,057	220	$15,088	$30,611
Shore	$31,372	$59,596	290	$18,012	$32,833
Mid-Atlantic	**$291,898**	**$557,095**	**2,380**	**$153,314**	**$291,700**
For-Hire	$17,182	$40,635	320	$16,002	$24,063
Private Boat	$182,191	$340,696	1,210	$84,189	$170,805
Shore	$92,525	$175,764	850	$53,123	$96,832
South Atlantic	**$148,557**	**$291,821**	**1,420**	**$86,527**	**$156,831**
For-Hire	$25,053	$59,248	460	$23,332	$35,085
Private Boat	$68,840	$128,731	460	$31,810	$64,538
Shore	$54,664	$103,842	500	$31,385	$57,208
Atlantic Total	**$510,583**	**$984,007**	**4,420**	**$278,627**	**$520,525**

In 2025, anglers spent over $368 million on recreational fishing trips in the Atlantic during which they used chum made from menhaden. That spending supported nearly $725 million of total economic output and contributed nearly $387 million to the country's GDP. Angler spending on trips where chum made from menhaden was used supported nearly 3,500 jobs in the U.S., with those jobs paying annual wages of more than $212 million.

Table 20. 2025 Economic Contributions of Atlantic Recreational Fishing with Menhaden Chum

Region	Angler Spending ($ Thousands)	Output ($ Thousands)	Jobs	Income ($ Thousands)	Value Added (GDP) ($ Thousands)
New England	**26,404**	**$51,527**	**240**	**$14,841**	**$27,347**
For-Hire	$3,921	$9,272	70	$3,652	$5,491
Private Boat	$15,344	$28,694	100	$7,090	$14,385
Shore	$7,139	$13,561	70	$4,099	$7,471
Mid-Atlantic	**174,762**	**$333,154**	**1,370**	**$89,417**	**$172,337**
For-Hire	$10,947	$25,888	200	$10,195	$15,330
Private Boat	$132,366	$247,524	880	$61,165	$124,094
Shore	$31,449	$59,742	290	$18,057	$32,913
South Atlantic	**167,277**	**$340,098**	**1,860**	**$107,944**	**$186,972**
For-Hire	$51,732	$122,343	950	$48,180	$72,448
Private Boat	$58,695	$109,760	390	$27,123	$55,027
Shore	$56,850	$107,995	520	$32,641	$59,497
Atlantic Total	**$368,443**	**$724,779**	**3,470**	**$212,202**	**$386,656**

During 2025, anglers spent nearly $92 million on recreational fishing trips in the Atlantic during which they used scent attractants made from menhaden. That spending supported nearly $180 million in total economic output, contributing nearly $99 million to the national GDP. Angler spending on trips using scent attractants made from menhaden also supported over 900 jobs in the U.S., with those jobs paying annual wages of more than $55 million.

Table 21. 2025 Economic Contributions of Atlantic Recreational Fishing with Menhaden Scents

Region	Angler Spending ($ Thousands)	Output ($ Thousands)	Jobs	Income ($ Thousands)	Value Added (GDP) ($ Thousands)
New England	**12,841**	**$26,628**	**150**	**$8,913**	**$14,969**
For-Hire	$4,929	$11,657	90	$4,590	$6,903
Private Boat	$1,963	$3,670	10	$907	$1,840
Shore	$5,949	$11,301	50	$3,416	$6,226
Mid-Atlantic	**37,918**	**$72,978**	**350**	**$21,668**	**$39,599**
For-Hire	$2,633	$6,226	50	$2,452	$3,687
Private Boat	$9,305	$17,400	60	$4,300	$8,723
Shore	$25,980	$49,352	240	$14,916	$27,189
South Atlantic	**41,031**	**$80,357**	**410**	**$24,924**	**$44,306**
For-Hire	$5,531	$13,081	100	$5,151	$7,746
Private Boat	$5,435	$10,163	40	$2,511	$5,095
Shore	$30,065	$57,113	270	$17,262	$31,465
Atlantic Total	**$91,790**	**$179,963**	**910**	**$55,505**	**$98,874**

Discussion

This report highlights the current effort, spending, and economic contributions associated with the use of menhaden during recreational fishing trips along the Atlantic Coast of the United States. The annual spending and economic figures reported here may be considered conservative, since they do not include the equipment and durable goods, including big-ticket items such as boats, purchased by anglers that intend to fish primarily in the Atlantic using menhaden. This report does not suggest that these fishing trips and the associated spending would not occur without the availability of menhaden; some of the anglers who currently fish in saltwater using menhaden might instead use different saltwater baits, target different saltwater fish or decide to go freshwater fishing instead.

What is currently unclear is how exactly recreational fishing effort might shift if anglers did not have access to menhaden in the Atlantic for use as bait, chum or scent attractants. Potential shifts in angler behavior are difficult to estimate accurately because they require anglers to report what they would do in a future hypothetical situation. That hypothetical is further complicated in this case by the biological relationship between stocks of menhaden and the predatory gamefish that feed on them. If there were not enough menhaden to support recreational fishing, there would almost certainly be negative impacts on gamefish populations.

While those biological impacts are beyond the scope of the current study, it is clear that recreational anglers currently use menhaden on millions of fishing trips in the Atlantic each year and that they spend hundreds of millions of dollars on those fishing trips. Furthermore, the vast majority of those anglers report that menhaden are very important for achieving their saltwater fishing goals, suggesting that their fishing effort may be negatively impacted if they were to lose access to this important bait source. This is a key consideration for fisheries managers when making policy decisions regarding menhaden abundance and future allocations.

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Appendix A: Atlantic Menhaden Questionnaire

Note: *All survey logic appears in red- this logic shows how the survey functions and will not be seen by the respondent. All answer options will be randomized where appropriate. Circles indicate a single-select questions, while boxes indicate a multiple-select question.*

Demographics

1. What year were you born? _____ [Disqualified if birthyear > 2008]

2. What is your gender?
   - ❍ Male
   - ❍ Female
   - ❍ Non-binary/third gender
   - ❍ Prefer not to answer

3. Which state do you currently live in? [Disqualified if Atlantic coast state is not selected]

4. Which of the following industries do you work in?
   - ❑ Commercial or charter fishing [disqualify]
   - ❑ Healthcare
   - ❑ Construction
   - ❑ Manufacturing
   - ❑ Financial services
   - ❑ Hospitality or food service
   - ❑ Education
   - ❑ Mining or extraction
   - ❑ None of these

Activities

5. Which of the following activities have you participated in during the past 12 months? *Select all that apply:*
   - ❑ Fishing [disqualified if not selected]
   - ❑ Hunting or target shooting
   - ❑ Bicycling
   - ❑ Walking or running outdoors
   - ❑ Golf
   - ❑ Tennis
   - ❑ Softball or baseball
   - ❑ Ultimate frisbee
   - ❑ Motorcycling (on-road, off-road)
   - ❑ Gardening
   - ❑ Wildlife watching (viewing or photographing animals, bird watching)
   - ❑ None of these

Fishing Details

6. Which types of water have you gone fishing in during the past 12 months?
   Select all that apply:
   - ❑ Freshwater
   - ❑ Brackish water (estuaries, marshes, lagoons, etc.)
   - ❑ Saltwater
   - ❑ I'm not sure

   [Disqualified if brackish or saltwater not selected]

7. In which U.S. regions did you go **saltwater fishing** during the past 12 months?
   Select all that apply. Please count any fishing you did in brackish water as saltwater fishing.
   - ❑ New England (Maine, New Hampshire, Massachusetts, Connecticut or Rhode Island)
   - ❑ Mid-Atlantic (New York, New Jersey, Delaware, Maryland or Virginia)
   - ❑ South Atlantic (North Carolina, South Carolina, Georgia, or the east coast of Florida)
   - ❑ Gulf Coast (Texas, Louisiana, Mississippi, Alabama or the west coast of Florida)
   - ❑ Northern Pacific (Alaska, Washington or Oregon)
   - ❑ Southern Pacific (California or Hawaii)
   - ❑ I did not go saltwater fishing in the U.S. [disqualified]

   [Anyone who did not fish in the Atlantic exits survey]

   [Those who fished in multiple Atlantic regions]
8. In which of these regions did you go saltwater fishing **most often** during the past 12 months? *Select only one option. Please count any fishing you did in brackish water as saltwater fishing.*
   - ❍ Pipe selected Atlantic regions

Respondents will only be asked about the region that they went saltwater fishing in most often. New England is used as an example below:

9. Where did you saltwater fish from in New England during the past 12 months?
   Select all that apply:
   - ❑ A party or charter boat
   - ❑ A private boat
   - ❑ Shore, pier, dock, jetty, etc.
   - ❑ I did not go saltwater fishing [disqualified]

Questions 10-14 will be repeated for each of the fishing modes selected above. Private boat is used below as an example.

10. How many days did you go saltwater fishing from a private boat in New England during the past 12 months? ____ days

11. Which of the following did you use while **saltwater fishing** from a private boat in New England during the past 12 months? *Select all that apply:*
    - ❑ Live or dead bait
    - ❑ Chum (ground bait or fish)
    - ❑ Scent attractants (natural or synthetic)
    - ❑ Dough baits or other prepared baits
    - ❑ Natural baits (corn, cheese, etc.)
    - ❑ Artificial lures or flies
    - ❑ Other (please specify): _____
    - ❑ I did not go saltwater fishing [disqualified]

[Those who select live or dead bait]

12. Which of the following types of **live or dead bait** did you use while **saltwater fishing** from a private boat in New England during the past 12 months? *Select all that apply:*
    - ❑ Shrimp
    - ❑ Crabs
    - ❑ Minnows
    - ❑ Mullet
    - ❑ Pilchards / scaled sardines
    - ❑ Herring / shad
    - ❑ Menhaden / pogies / bunker / fatbacks
    - ❑ Eels
    - ❑ Other (please specify): _____
    - ❑ I'm not sure what bait I used [Exclusive]
    - ❑ I did not use live or dead bait [disqualified]

[Those who select chum]

13. You indicated that you used chum while **saltwater fishing** from a private boat in New England during the past 12 months. What was the chum that you used made out of?
Select all that apply:
    - ❑ Menhaden / pogies / bunker / fatbacks
    - ❑ Sardines
    - ❑ Mackerel
    - ❑ Herring
    - ❑ Pilchards / scaled sardines
    - ❑ Anchovies
    - ❑ Mullet
    - ❑ Shellfish
    - ❑ Other (please specify): _____
    - ❑ I'm not sure what it was made from[Exclusive]
    - ❑ I did not use chum [disqualified]

[Those who select scent attractants]

14. You indicated that you used scent attractants while **saltwater fishing** from a private boat in New England during the past 12 months. What were the scent attractants that you used made out of?
Select all that apply:
    - ❑ Menhaden / pogies / bunker / fatbacks
    - ❑ Sardines
    - ❑ Mackerel
    - ❑ Herring
    - ❑ Pilchards / scaled sardines
    - ❑ Anchovies
    - ❑ Mullet
    - ❑ Shellfish
    - ❑ Other (please specify): _____
    - ❑ I'm not sure what they were made from [Exclusive]
    - ❑ I did not use scent attractants [disqualified]

[Anyone who did not fish with menhaden exits survey]

Menhaden Fishing Details

Text: *The remainder of this survey is about the bait fish commonly known menhaden, pogies, bunker or fatbacks. For the rest the questions, these will just be called menhaden.*

This section will be repeated for each of the fishing modes selected in Q9

You reported that you went saltwater fishing from a private boat in New England for a total of [piped days] days in the past 12 months.

15. On how many of those days did you use **menhaden** in any form (live, dead, as chum or scent attractants)?
    Please count each day on which you used any type of menhaden:
    _____ total days using menhaden

    [For those who selected live or dead menhaden]
16. On how many of those days did you use **live or dead** menhaden?
    _____ days using **live or dead** menhaden

    [For those who selected menhaden as chum]
17. On how many of those days did you use **chum** made from menhaden?
    _____ days using **chum** made from menhaden

    [For those who selected menhaden as scent]
18. On how many of those days did you use **scent attractants** made from menhaden?
    _____ days using **scent attractants** made from menhaden

Menhaden Cost & Effort

[Those who used live or dead menhaden]

Text: *Think about your most fishing trip in the [piped] region when you used **live or dead** menhaden as bait.*

19. Where did you fish from on that trip?
    - ❍ [Pipe in options selected in Q9]

20. How long was that trip?
    - ❍ It was a day trip
    - ❍ It was a multi-day trip lasting ___ days
    - ❍ I cannot recall

21. How did you get the menhaden that you used as bait on that trip?
    - ❍ Caught them myself
    - ❍ Purchased from a bait shop, marina or individual
    - ❍ Other (please specify): _____

[Those who caught bait]

22. How much time did you spend catching menhaden to use as bait for your most recent fishing trip? _____ hours

[Those who purchased bait]

23. How much did you spend on the **live or dead** menhaden you used as bait during that trip? $ _____

[Those who used menhaden chum]

Text: *Think about your most fishing trip in the [piped] region when you used **chum made from menhaden**:*

24. Where did you fish from on that trip?
    - ❍ [Pipe in options selected in Q9]
    - ❍ I did not fish *in the [piped] region* using chum made from menhaden [disqualified]

25. How long was that trip?
    - ❍ It was a day trip
    - ❍ It was a multi-day trip lasting ___ days
    - ❍ I cannot recall

26. How did you get the **chum made from menhaden** that you used on that trip?
    - ❍ Made it myself
    - ❍ Purchased it from a bait shop, marina or individual
    - ❍ Other (please specify): _____

[Those who purchased chum]

27. How much did you spend on the chum used during that trip? $ _____

[Those who used menhaden scent]

Text: *Think about your most fishing trip in the [piped] region when you used **scent attractants made from menhaden**:*

28. Where did you fish from on that trip?
    - ❍ [Pipe in options selected in Q9]
    - ❍ I did not fish in the [piped] region using scent attractants made from menhaden [disqualified]

29. How long was that trip?
    - ❍ It was a day trip
    - ❍ It was a multi-day trip lasting ___ days
    - ❍ I cannot recall

30. How did you get the **scent attractants made from menhaden** that you used on that trip?
    - ❍ Made them myself
    - ❍ Purchased them from a bait shop, marina or individual
    - ❍ Other (please specify): _____

    [Those who purchased scents]

31. How much did you spend on the scent attractants used for that trip? $ _____

Importance of Menhaden for Recreational Fishing

This section will be repeated for each type of menhaden used. Live or dead menhaden is used as an example below

32. Which of the following species did you fish for using **live or dead** menhaden as bait during the past 12 months?

    Select all that apply:
    - ❑ Striped bass / rockfish
    - ❑ Bluefish
    - ❑ Tuna
    - ❑ Red drum / redfish / spot tailed bass
    - ❑ Cobia
    - ❑ Speckled trout / weakfish
    - ❑ Flounder / fluke
    - ❑ Snapper / grouper
    - ❑ Sharks
    - ❑ Other species (please specify): _____

33. On a scale of 0-10, how necessary are **live or dead** menhaden for achieving your saltwater fishing goals?

34. How would your fishing activity change if you were not able to use **live or dead** menhaden for saltwater fishing?
    - ❍ I would fish a lot less often
    - ❍ I would fish slightly less often
    - ❍ I would fish about the same amount
    - ❍ I would fish slightly more often
    - ❍ I would fish a lot more often

35. Compared to 5 years ago, is it easier or harder to get **live or dead** menhaden to use as saltwater fishing bait?
    - ❍ A lot harder
    - ❍ A little harder
    - ❍ About the same
    - ❍ A little easier
    - ❍ A lot easier
    - ❍ Not sure / Not applicable

Appendix B: Atlantic Recreational Angler Survey Respondent Demographics

Table 22. Atlantic Recreational Anglers by Age Group

Response	All Atlantic	New England	Mid-Atlantic	South Atlantic
18 to 24	10.2%	8.1%	11.8%	10.4%
25 to 34	20.7%	19.1%	20.4%	22.7%
35 to 44	29.3%	29.3%	25.8%	32.7%
45 to 54	20.1%	23.7%	18.4%	18.4%
55 to 64	12.7%	12.7%	15.3%	10.0%
65 and older	7.1%	7.1%	8.3%	5.8%
Total	**N=1,316**	**N=409**	**N=457**	**N=450**

Table 23. Atlantic Recreational Anglers by Gender

Gender	All Atlantic	New England	Mid-Atlantic	South Atlantic
Male	68.9%	65.5%	72.0%	68.9%
Female	30.5%	34.0%	27.4%	30.7%
Non-binary / third gender	0.5%	0.2%	0.7%	0.4%
Prefer not to answer	0.1%	0.2%	0.0%	0.0%
Total	**N=1,316**	**N=409**	**N=457**	**N=450**

Table 24. Atlantic Recreational Anglers by State of Residence[15]

State of Residence	All Atlantic	New England	Mid-Atlantic	South Atlantic
Connecticut	8.5%	25.9%	0.4%	0.9%
Delaware	0.8%	0.0%	2.2%	0.2%
Florida	12.4%	0.7%	0.2%	35.3%
Georgia	6.4%	0.5%	0.7%	17.6%
Maine	5.5%	17.4%	0.0%	0.2%
Maryland	2.9%	0.0%	7.2%	1.1%
Massachusetts	8.5%	25.9%	0.4%	0.9%
New Hampshire	2.3%	7.1%	0.2%	0.0%
New Jersey	7.4%	1.7%	19.3%	0.7%
New York	13.4%	6.4%	28.2%	4.9%
North Carolina	6.4%	0.0%	0.7%	18.0%
Pennsylvania	14.0%	2.9%	30.4%	7.3%
Rhode Island	3.2%	9.8%	0.2%	0.2%
South Carolina	3.3%	0.0%	0.0%	9.8%
Vermont	0.5%	1.2%	0.0%	0.2%
Virginia	4.3%	0.5%	9.2%	2.7%
Washington, D.C.	0.2%	0.0%	0.7%	0.0%
Total	**N=1,316**	**N=409**	**N=457**	**N=450**

[15] State of residence does not necessarily correspond to the state or region of the Atlantic where the angler went saltwater fishing most often.