



**NOAA
FISHERIES**

Marine Recreational Information Program Data User Handbook



U.S. Department of Commerce | National Oceanic and Atmospheric Administration | National Marine Fisheries Service

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This handbook provides an overview of the U.S. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Marine Recreational Information Program (MRIP). The purpose is to help audiences understand the basics of the MRIP, survey statistics, the surveys, and how to access and use data on the MRIP’s site. A series of technical appendixes are also available for those interested in more advanced MRIP issues and applications.

What We Do

Recreational fishing is enjoyed by millions of Americans each year, and for some it is their livelihood. There is no single agency that can effectively safeguard our ocean resources - the effort requires the cooperation and engagement of a broad network of people. That is why MRIP is focused on providing accurate and reliable information needed to guide stock assessments and fisheries management to promote and ensure fisheries sustainability.

MRIP is designed to meet two critical needs:

- Provide timely, scientifically sound estimates of recreational catch and effort that fishery managers, stock assessors, and marine scientists need to ensure the sustainability of ocean resources
- Address regional and stakeholder needs and concerns about recreational fishing catch and effort estimates

Additionally, MRIP works with its partners to educate stakeholders in understanding how we use survey methods to produce reliable estimates of total fishing participants, total fishing effort and total catch for the marine recreational fishery.

MRIP Priorities

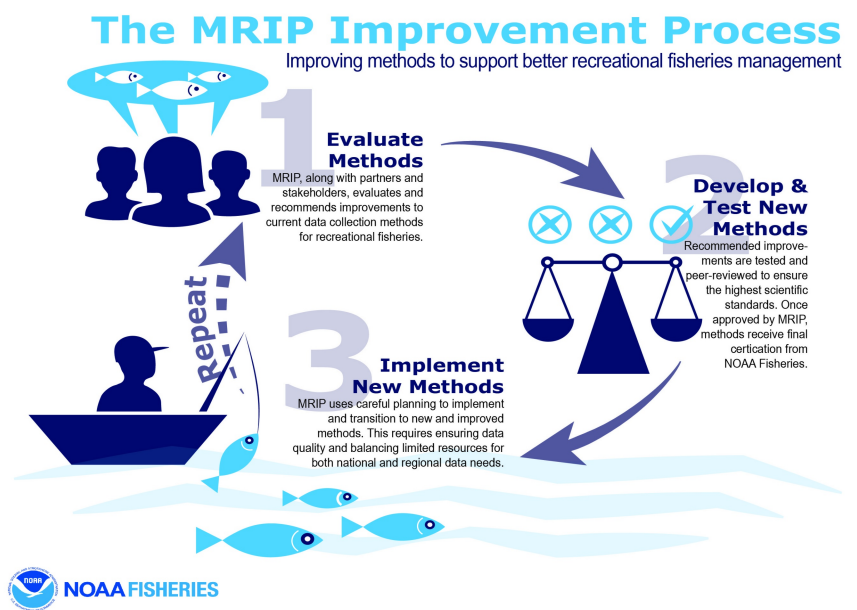
As outlined in the initial **MRIP Implementation Plan** and **subsequent updates**, the MRIP strategy is to improve our survey methods, as needed, to meet the changing needs for successful fisheries management. This includes improving the fundamental design of our surveys, current data collection tools and developing new designs to reduce bias, address gaps in information, and produce more precise, accurate statistics.

NOAA Fisheries, through MRIP, is continuously evaluating and testing survey improvements and implementing these improvements when appropriate. We’ve also designed new surveys and additional survey components will be

added as necessary to provide the appropriate mix of monitoring tools needed to accurately track fishing effort and catch in each region. As results emerge indicating which combinations of methods show the most promise for specific regions, the MRIP Regional Management Teams (the Fisheries Information Networks (FINs) or their equivalents) will select the data collection design best suited to their fisheries, management needs, and other uses. The Regional Teams and MRIP will continue to evaluate the possibilities of broadening the application of those tools, consistent with available funding, to attempt to improve coverage and/or bring more resolution to spatial and temporal monitoring.

Overall Goal

To ensure that we are addressing national and regional needs, our specific priorities shift each year. However, the



overarching priorities for MRIP include:

1. Catalogue and review all of our survey designs to determine their accuracy and effectiveness at meeting the needs of scientists, stock assessors, managers and stakeholders.
2. Through extensive testing, stakeholder collaboration and work with outside specialists and independent consultants, design and implement a series of improvements to ensure our survey methods meet the highest possible standards of accuracy and quality.
3. As we finalize improvements to our fundamental designs, we continue our work to meet customer needs for timeliness, precision, coverage, and special data needs.

In 2004, NOAA Fisheries requested the National Research Council (NRC) conduct a review of all of the surveys operated or funded by NOAA Fisheries throughout the United States and its Territories. The **final report** was released in 2006.

The NRC made several specific recommendations for improvements to the way NOAA Fisheries was collecting data and compiling recreational fishing statistics, and the MRIP team has worked to address each one. Many of the improvements to our survey methods have been guided by the NRC review.

Specific initiatives that have been implemented based on the NRC recommendations include the creation of the **National Saltwater Angler Registry**, the **re-estimation of recreational catch estimates** dating back to 2004, and the overhaul of our **angler intercept survey design** to remove potential sources of bias. Other issues that we are addressing in direct response to the NRC report include evaluating how to most effectively account for the fishing that occurs in the for-hire sector and how to best survey the numbers of shore and private boat fishing trips being made by recreational fishing participants.

Current Priorities

With significant **improvements to our catch surveys** now implemented, current priorities for MRIP include:

- **Transitioning to the new fishing effort survey for shore and private boats.** Results from a series of pilot studies show that a mail survey design is more efficient and accurate than the current telephone survey. The mail survey design utilizes the National Saltwater Angler Registry and is being conducted alongside the current Coastal Household Telephone Survey to continue assess effects the new design may have on both estimates and management processes. **View the Transition Plan.**
- **Facilitating the transition from our previous methods to our new surveys.** New survey designs may produce results that are consistently different from old survey methods. These differences can impact stock assessment and management processes. MRIP has created a **Transition Team** made up of scientists and managers to determine how best to integrate data from new methods into science and decision-making.

Of course, MRIP's greatest priority is to ensure that the needs of our data customers are met. Fisheries science and management are dynamic processes with evolving needs for data. MRIP has the flexibility to address these demands and be responsive to the needs of the millions of Americans whose lives and livelihoods are connected to our sustainable fisheries.

Research

A primary tenet of MRIP is that all of our survey methods undergo extensive testing before being implemented. This research ensures that the surveys we use deliver high quality results, and that any new method yields tangible improvements. We're constantly working to update our methods to keep pace with emerging science and the information needs of our users. We work with scientists, managers, fishermen, and others to make sure our research adds value to MRIP and the individuals that are impacted by the program. Some of the changes to our surveys are highly visible and some are behind the scenes. However, all the changes enhance the quality of recreational fishing data.

Example Projects

1. Implementing an improved catch survey design

MRIP developed, tested, approved, and certified a **new survey design for the Access Point Angler Intercept Survey**

(APAIS) - the survey used for estimating how many fish are caught, kept, and discarded during a given sampling period. The purpose of the study was to overhaul the previous survey design to minimize potential sources of **bias**. Key changes to our catch surveys that resulted from this study include:

- We now sample at all times of the day; we're no longer assuming that catch rates at night are the same as those during daytime.
- The **new design** more strictly adheres to probability sampling protocols. Samplers now follow a rigid schedule when conducting interviewing assignments at specified fishing sites and do not have latitude to change where and when they attempt to intercept and interview fishermen.
- We now have an **online register** of most public fishing sites from Maine to Louisiana. This allows us to make better assignments for our samplers, and is accessible to anyone who's looking for a place to fish.

2. Electronic logbook reporting with validation for headboats operating in the U.S. South Atlantic

Over the past several years, MRIP has funded studies to assess the feasibility and reliability of electronic reporting of catch for for-hire vessels. We continued this trend by supporting the expansion of electronic logbook reporting to all headboats reporting to the Southeast Region Headboat Survey, an undertaking that resulted in 160 headboats in the south Atlantic and Gulf of Mexico with the option of participating in electronic reporting. A previous pilot study conducted in the region showed a high percentage of both participation and species reporting accuracy compared with the paper logbook reporting.

However, before this effort can be extended and implemented for collecting the necessary data for management purposes, pilot studies will continue. Improvements in the software (including an internet-based reporting system); training of headboat captains in reporting, revising the regulatory structure of electronic reporting; and the addition of specific data elements such as precise locations, fishing depth, and target species are being done with the current survey-wide implementation.

3. Using multiple methods to improve effort survey results.

In 2015, MRIP implemented a new survey to estimate the overall number of recreational fishing trips, or "effort", during a given reporting period. This new survey is based on a multi-phase series of studies to design a more effective means of reaching anglers than through random-digit-dial (RDD) household telephone surveys. RDD is a well-established survey protocol, but it also has known limitations, especially as fewer and fewer households can be reached by landline phones. To test alternatives to an RDD design, the MRIP team ran a sequences of tests:

- First, we tested whether information from the National Saltwater Angler Registry could be used to reach every potential angler. We found that there are too many gaps in the Registry (e.g., seniors who are not required to register; people who decide to fish without a license; incorrect entries on license applications; etc.) for it to be our sole source of information.
- Second, we tested RDD and license information together. This gave us better coverage, but response rates were still low as fewer and fewer people answer phone surveys.
- Next, we tested to see whether mail surveys would be more effective than telephone. The results showed that by using a mail survey we can get better information from more people in a timeframe that meets our schedule.
- Finally, we matched up the National Saltwater Angler Registry data with the U.S. Postal Service household database, which includes virtually every household in the country. This allowed us to ensure we were able to reach all potential U.S. anglers, while taking advantage of the sampling efficiency offered by use of the angler registry.

Complete descriptions of all MRIP-funded projects are available [here](#). You can also view our [MRIP Project Tree](#), which categorizes and lists all projects based on survey type and relatedness to other projects.

Implementation

Regional Implementation Approach

MRIP is a compilation of regionally-based data collection programs. Regional programs are important because the data needs for effective management can differ substantially among regions, and oftentimes among various fisheries within

each region. National standards ensure that, regardless of the specific decisions made by each region with respect to data collection priorities and implementation, all recreational fisheries survey and estimation methods will withstand a rigorous independent peer review, and the resultant fisheries statistics will meet a baseline of quality sufficient to ensure the sustainable use of the resource for recreational fishing.

As MRIP evolves from being substantially focused on developing and testing survey improvements to a program increasingly involved with putting new methods to practice in the field, the **Executive Steering Committee (ESC)** has established a hybrid approach to MRIP implementation.

MRIP Regional Implementation Workshop Report

Under this system, NOAA Fisheries (through MRIP) will maintain a central role in developing and certifying survey methods and establishing national standards and best practices, and the regions - through the regional Fishery Information Networks (FINs) or equivalent - will have responsibility for selecting survey methods and managing data collection.

MRIP Implementation Process

Element	ESC	Regions
Assuring surveys adhere to certification methods	Certifications	X
Operational requirements <ul style="list-style-type: none"> • Develop/certify data collection design • Data collection approval • Procurement/Grant management • Survey operations and oversight • Information management • Research and Development • Compliance/Enforcement • Outreach/Communications 	X X ¹ QA/QC Stds Standards X Resources	Choices X X ² X X Input X X
Choosing among methods		X
Choosing among options for coverage-timeliness-precision	Priorities and Policy	X
Get feedback from regions and advise NMFS leadership regarding needs	X	Input
Get feedback from data users	X	Input

¹ For management of grants from MRIP appropriations

² For procurement of Regional Survey service

MRIP Standards and Best Practices

Since 2008, MRIP has made significant changes in the way NOAA Fisheries collects, analyzes, and reports recreational fishing data, as well as the way we communicate about that data with our partners, stakeholders, and the public. Because estimating recreational fishing activity is a very complex statistical, logistical, and mathematical challenge, we have procedures in place to confirm the scientific integrity of our methods at several different points in the process.

To promote nationwide consistency in availability of recreational catch and effort data, MRIP has established a rigorous process for assuring that new survey and estimation methods are scientifically sound before they are "certified" and made available for MRIP partners' use. Further, MRIP incorporates detailed quality assurance and quality control (QA/QC) requirements to minimize errors in our estimates.

MRIP Standards and Best Practices for Recreational Survey Coverage and Basic Data Elements

Project-Level Review Process

MRIP is meticulous in verifying that the new methods we implement are actually solving the issues they are designed to address. To do so, each project goes through a series of steps before its conclusions are considered valid.

First, the project must be approved by the MRIP **Operations Team**. This group of NOAA staff and outside partners reviews each proposed project to ensure that it addresses an MRIP priority and its essential design and methodology are sound. This is an iterative process, where the Operations Team and the project team discuss options and potential

changes before the project is approved and launched. Once the project is underway, monthly status reports to the Operations Team help make sure the work is on track.

At the conclusion of each project, the findings are reviewed by the Operations Team and – in cases where the study will have a major impact on our surveys – sent to independent peer reviewers. Then, after any issues raised by peer reviewers are fully addressed, the results and any recommendations are reviewed by the MRIP **Executive Steering Committee**. For projects that will lead to new survey methods, the ESC recommends final approval and Certification of the new design by the agency leadership. Once approved by the leadership, the new methodology is certified and made available for use.

Data-Level Review Process

Even in the best systems, various types of errors occur. To minimize the potential for error, MRIP uses a variety of best practices for quality assurance (QA) and quality control (QC). QA focuses on preventing invalid data from entering the system. To accomplish this goal, we train interviewers, keep data entry intuitive, automate tasks, and have verification interviews. QC focuses on detecting and correcting errors that make it into our data, and can be used to inform enhancements to our QA processes. MRIP uses statistical software (**SAS**) to systematically identify invalid, outlier and mismatched data before and after we calculate our estimates. At each step of analysis, the MRIP team also manually reviews the data for potential errors. For instance, an unusually high or low catch estimate will be identified and investigated before estimates are published.

In addition, **data** is made publicly available in two forms, “preliminary” and “final.” Publishing the preliminary data allows anyone with specific questions or concerns to raise them for further review, investigation and, if necessary, correction before the numbers become final. We have also worked to ensure that the tools we use to publish the data and the information we share alongside it – such as providing the option for data to be viewed in graph form – help users understand the limitations of our estimates. For instance, we highlight estimates when the **proportional standard error (PSE)** is particularly high, meaning that the estimate is imprecise and potentially inappropriate for certain types of analysis. We also stress that sample sizes decrease as estimation periods or areas decrease, resulting in more imprecise estimates.

Transparency

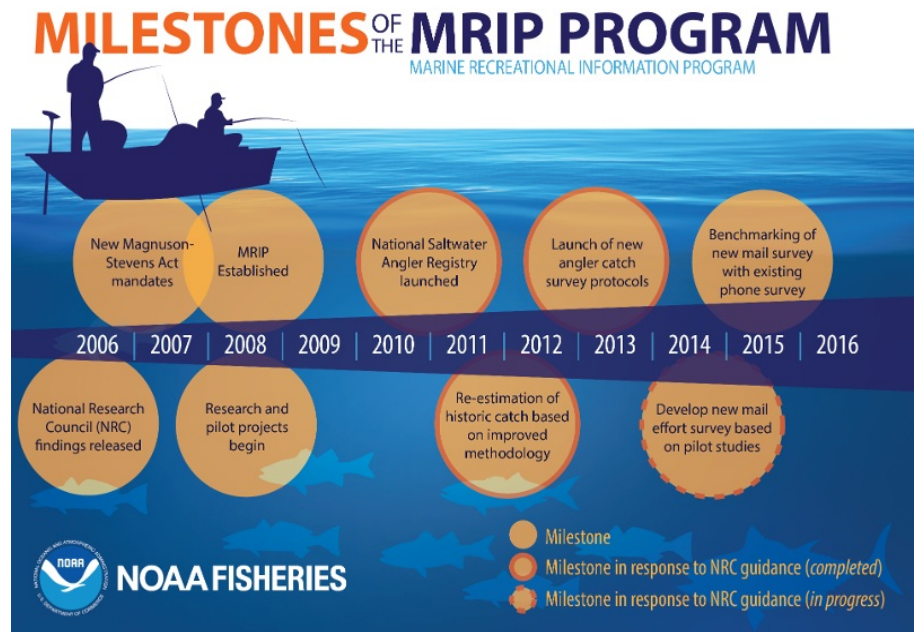
Finally, each step in the MRIP process is conducted in cooperation with, and in the full view of, a wide range of partners, stakeholders, charter boat operators, recreational fishermen, and members of the public. These individuals serve on the MRIP Operations Team and Executive Steering Committee, as well as individual project teams. We also create groups of ad hoc reviewers as appropriate. In the case of the highly complex and technical catch **re-estimation**, we invited a diverse group of stakeholders to serve on an “observer team” that received detailed, plain-language briefings, exercises, and outreach materials designed to fully explain – and solicit feedback on – the process as it unfolded.

Why This Matters

As the NRC noted in its review of our surveys, gold-standard data is only one piece of the picture. For data to serve its purpose as the foundation of sound ocean policies and sustainable stewardship, it must be trusted by the people who use it – and the people who are impacted by it. So ultimately the quality control process is serving two distinct yet interrelated purposes: ensuring that data itself is of the highest possible quality and instilling confidence in that data among the many stakeholders who use it.

Program Evolution

The Magnuson Fishery Conservation and Management Act of 1976 (MFCMA - Public Law 94-265) mandated a national program for management of fishery resources in the Exclusive Economic Zone (EEZ), which ranges from 3 to 200 miles from shore. The MFCMA also requires that fishery management plans for the EEZ consider harvest data for both recreational and commercial fisheries. The Marine Recreational Fishery Statistics Survey (MRFSS) was established as a national program in 1979 to provide a reliable database for estimating the impact of marine recreational fishing on marine resources. In 2008, MRFSS was formally replaced with the improved Marine Recreational Information Program (MRIP).

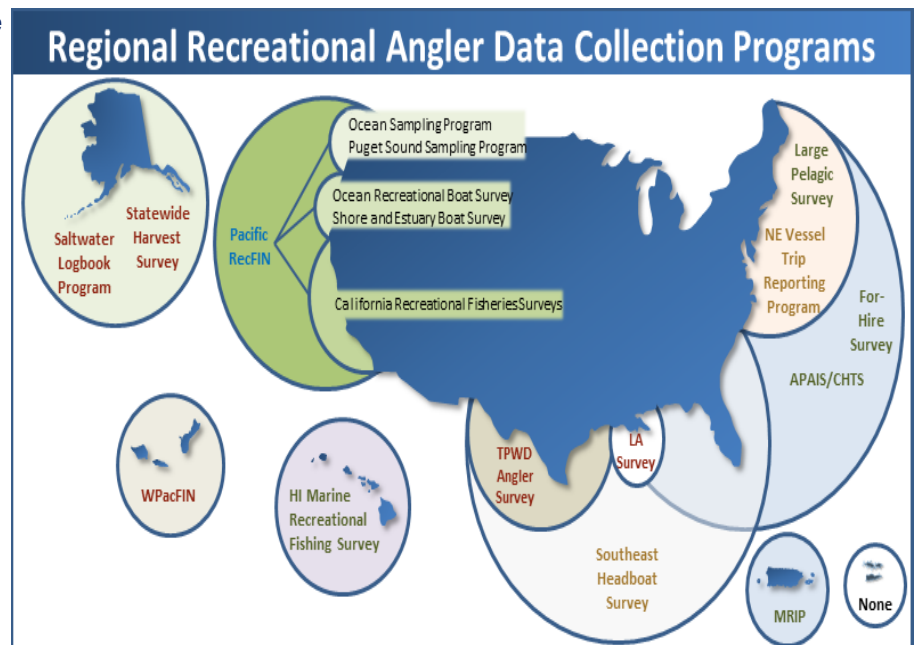


The MRFSS data collection methodology consisted of two independent, but complementary, surveys: a telephone survey of households and an intercept survey of anglers at fishing access sites. Methodological studies conducted in the 1970's showed that a telephone survey could be used to collect reliable data on recreational fishing activity, including number of trips taken, type of access (shore, boat), and dates of the trips, if the recall period was no longer than 2 months.

Information about the fish caught on these fishing trips, such as the species of fish, and the number and size of the fish caught were obtained from anglers intercepted and interviewed at fishing access sites. The data from the two independent surveys were combined to produce estimates of total recreational fishing effort, catch and participation.

The program of surveys has been conducted annually by NOAA Fisheries since then, with survey changes intended to improve the quality and coverage of the surveys over the years. This timeline will describe the major changes to the surveys designs and coverage.

Additionally, the timeline lists other major milestones and events in collecting recreational fishing data.



1979 - 1989

1979 - 1989	
Program	<ul style="list-style-type: none"> • 1979/1981 - The Access-Point-Angler-Intercept-Survey (APAIS) and Coastal Household Telephone Survey (CHTS) were both initiated in 1979 along the Atlantic and Gulf of Mexico coasts, results of the survey and estimates produced using this data are available beginning in 1981. • 1986 - The Large Pelagic Survey (LPS) was initiated from Virginia through Maine.
Coverage	<ul style="list-style-type: none"> • March 1981 - APAIS and CHTS implemented from Massachusetts to Texas and on Pacific Coast. • May 1981 - APAIS implemented in Maine and New Hampshire. • 1982 - Due to the high costs to sample during very low fishing activity, APAIS and CHTS sampling was conducted from March through December each year from Maine to Georgia, but all 12 months from Florida to Texas. • 1985 - Sampling in Jan/Feb (Wave 1) was initiated in Georgia to better evaluate the fishing activity and catches during that period in the Southeast region. • 1986 - Texas discontinued participation in all MRFSS surveys, in lieu of state designed programs. • 1986 - Party Boats (also known as Head Boats) were eliminated from the APAIS in the Southeast Region (NC to LA). • 1986 - LPS implemented from Virginia through Maine. • 1987 - APAIS and CHTS sampling in Wave 6 (Nov/Dec) was eliminated in Maine and New Hampshire due to very low fishing activity, low fishery catches, and high sampling cost. • 1988 - APAIS and CHTS Sampling in Wave 1 (Jan/Feb) was initiated in North Carolina to re-evaluate the fishing activity and catches during that period.

<p>Design & Methods</p>	<ul style="list-style-type: none"> ● 1981 - APAIS sampling was stratified by state, fishing mode (Beach/Bank Shore, Man-made Shore, Private or Rental Boat, or Party or Charter Boat). ● 1981 - APAIS had a 2-month sampling periods, referred to as Waves. ● 1981 - CHTS sampling was stratified by state, county, and two-month reference period (wave). Sampling is without replacement within strata (state/county/wave), as well as among strata within a year. ● 1981 - CHTS had a 2-week sampling period (last week in wave through first week of following wave). ● 1986 - APAIS shore and Beach/bank modes were combined into a single sampling and estimation mode (Shore). ● 1986 - LPS implemented with 3 parts: a dockside mark-recapture survey, a telephone survey, and an access-point intercept survey. Data from the 3 surveys were combined to produce total annual recreational landings of Atlantic bluefin tuna and other associated large pelagic species. ● 1987 - APAIS sampling in West Florida (Monroe - Escambia county) was stratified to increase sample size in Monroe county in Wave 1, and in the western panhandle (Escambia to Bay county) in Waves 3-5. Catch and effort estimates were generated for these regions separate from the rest of West Florida, then aggregated to report the 'state' totals for all of West Florida. ● 1988 - The APAIS inland fishing area response was further detailed to allow identification of fishing in specific and significant estuaries along the Atlantic and Gulf coasts, such as Chesapeake Bay, Long Island Sound, and Tampa Bay. These specific areas are coded in the trip data files but estimates continued to be produced only at the collapsed Inland stratification. Use of post-stratification or domain estimation techniques allow estimates for these specific Inland water bodies to be produced. ● 1988 - For the latter half of 1988, for CHTS in the Southeast region (NC to LA), the 2-month waves were split into single month waves. CHTS sampling, as well as catch and effort estimates, were stratified by month to produce independent one-month estimates, which were then aggregated to report bi-monthly Wave estimates.
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1990 - 1994

<p>Program</p>	<ul style="list-style-type: none"> ● 1990 - Estimation work previously performed by a contractor (1979 - 1989) was moved to NOAA Fisheries. Statisticians were hired to assume responsibility for these tasks.
<p>Coverage</p>	<ul style="list-style-type: none"> ● 1990 - APAIS and CHTS discontinued on Pacific Coast due to funding. ● 1989 - Wave 1 APAIS and CHTS sampling in Georgia discontinued. ● 1991 - Wave 1 APAIS and CHTS sampling in North Carolina was discontinued, when it was determined that the cost/benefit of sampling in Jan/Feb was not justified. ● 1993 - APAIS and CHTS were re-implemented on the Pacific coast.

<p>Design & Methods</p>	<ul style="list-style-type: none"> • 1990 - Changes were implemented to improve quality assurance and quality control for APAIS conduct and processing of APAIS and CHTS data. Regional representatives began supervising the work of APAIS interviewers and ensured proper conduct of APAIS sampling protocols. • 1991 - Questions were added to the APAIS interview to identify anglers interviewed from the same boat and to record how many anglers fished on each boat party. • 1991 - Shore mode APAIS sampling in NC reverted back to separate sampling and estimation of catch and effort for Beach/Bank Shore and Man-made Shore. • 1992 - LPS increased sampling levels to generate seasonal estimates of bluefin tuna by size category (small and medium-sized) for in-season quota management. Estimates of giant bluefin tuna, other tunas, billfishes, swordfish, and sharks were still produced annually at this time.
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1995 - 1999

<p>Program</p>	<ul style="list-style-type: none"> • 1997 - A pilot project, known as the Charter Boat Survey, was initiated to sample charter boat fishing effort via a weekly telephone survey. These efforts were led by NOAA Fisheries in cooperation with GSMFC and the state agencies of FL, AL, MS, and LA. This survey later became known as the Gulf For-Hire Survey (FHS).
<p>Coverage</p>	<ul style="list-style-type: none"> • 1998 - The GulfFIN recreational fishery data collection program was implemented and APAIS conduct was transferred to state agency personnel from FL to LA. • 1996 - Wave 2 APAIS and CHTS sampling in NH and ME was eliminated.
<p>Design & Methods</p>	<ul style="list-style-type: none"> • 1995 - New methods were implemented for estimating fishing effort from CHTS data. The new approach corrects for biases associated with item non-response (missing data). As a result, historical CHTS effort estimates increased approximately 5% in all states. • 1995 - LPS was simplified to consist of only two components - a telephone survey of participating boats and a dockside intercept survey of boats returning from large pelagic fishing trips.

2000 - 2004

<p>Program</p>	<ul style="list-style-type: none"> • 2000 - The Charter Boat Survey (Gulf FHS) became the official method for estimating charter boat fishing effort in the Gulf of Mexico (West Florida to Louisiana). • 2000 - NOAA Fisheries collaborated with ACCSP and SC DNR to test a new For-Hire Survey (FHS) based on the Gulf Charter Boat Survey (Gulf FHS) design and compare it side-by-side with the CHTS and the SC Logbook reporting program as a method for estimating both charter boat and headboat fishing effort. The pilot study also compared APAIS/CHTS, APAIS/FHS, and SC logbook designs for estimating both total harvest and total catch by species. • 2004 - NOAA Fisheries requested the National Academy of Sciences' National Research Council (NRC) conduct an independent scientific review of the government's data collection programs for monitoring the saltwater recreational fisheries of the U.S.

<p>Coverage</p>	<ul style="list-style-type: none"> ● 2000 - Puerto Rico and the U.S. Virgin Islands (USVI) implemented the APAIS and CHTS. USVI discontinued the surveys later the same year. ● 2002 - ACCSP endorsed the implementation of the FHS on the Atlantic coast based on the results of the pilot study. ● 2002 - Gulf FHS extended to include East Florida. ● 2003 - APAIS, CHTS and FHS implemented on Oahu and Hawaii Islands. ● 2003 - The FHS was fully implemented on the Atlantic Coast from Maine to Georgia starting in wave 2. First year outreach with charter boat and headboat captains along the coast helped to ensure successful full-year implementation in 2004.
<p>Design & Methods</p>	<ul style="list-style-type: none"> ● 2002 - Redesigned LPS telephone and intercept survey components were implemented to generate monthly estimates of catches and landings of bluefin tuna by size category, as well as other large pelagic species. ● 2002 - Site clustering introduced for LPS dockside assignments. ● 2003 - With the start of FHS pilot testing on the Atlantic coast, sample sizes in the Party-Charter APAIS sampling stratum were increased and stratified by boat type. This allowed for independent Charter and Party Boat effort and catch estimates. ● 2004 - Collapsed Party-Charter boat mode is completely retired with the implementation of the FHS on the Atlantic Coast. Separate Charter and Party (Head) boat estimates are produced.

2005 - 2009



<p>Program</p>	<ul style="list-style-type: none"> • 2005 - LPS survey management and estimation transferred from Sustainable Fisheries Office HMS Division to Office of Science and Technology Fisheries Statistics Division. With this change, improvements were made to survey design, quality assurance and quality control protocols, and dissemination of information. • 2006 - The NRC released its findings, recommending NOAA Fisheries and partnering state agencies dramatically redesign angler surveys to update data collection methods and analyses and foster positive relations with the recreational angling community and other stakeholders. • 2006 - NOAA Fisheries convenes a Management Framework Workshop of state and federal fisheries agency leaders, managers, and biologists to evaluate current data needs and review the NRC's findings. NOAA Fisheries is tasked with preparing, in cooperation with states and other partners, a blueprint for redesigning angler surveys by 2008. An executive steering committee is formed to shepherd the process. • 2007 - Magnuson-Stevens Fishery Conservation and Management Act (MSRA) was reauthorized. The legislation echoed many of the concerns raised by the NRC in calling for redesigned angler surveys. It included a requirement for NOAA Fisheries to develop a new National Saltwater Angler Registry as a key part of the broader redesign effort. • 2007 - NOAA Fisheries creates a Development Plan for improving recreational fisheries statistics. Teams of experts from NOAA Fisheries, state agencies, regional fisheries councils and commissions, and partner organizations are convened to deal with distinct aspects of the redesign process. This approach promotes a redesign process that is inclusive and transparent. • 2007 - NOAA Fisheries holds a workshop to catalogue research needs and identify priorities for survey redesign. A series of listening sessions are conducted with management and science partners in order to learn more about the regional fisheries unique characteristics and data needs. • 2008 - NOAA Fisheries finalizes a rule, developed by the National Saltwater Angler Registry Team and updated based on public comments, outlining the registry requirements and state exemptions. The Registry is designed to be a national database of recreational fishermen to be used in conducting surveys on recreational fishing catch and effort. • 2008 - In October, the Marine Recreational Information Program (MRIP) was established upon adoption of the Implementation Plan. The Executive Steering Committee (ESC) is supported by three teams: Operations (survey and information management improvements), Registry, and Communications and Education. • 2009 - NOAA Fisheries initiates a process of designating states as exempted states under the National Saltwater Angler Registry by entering into Memorandum of Agreement under which exempted states will provide data to NOAA Fisheries. Project updates are included in the 2009/2010 Implementation Plan Update.
<p>Coverage</p>	<ul style="list-style-type: none"> • 2005 - APAIS and CHTS fully implemented in Hawaii. FHS limited to the Charter fleet on Hawaii and Maui only. • 2006 - Pacific discontinued APAIS and CHTS, in lieu of state designed programs. • 2006 - Hawaii discontinues the FHS.

2010 - 2014



Program

- **2010** - National Saltwater Angler Registry goes into effect on January 1, 2010. NOAA Fisheries begins registering saltwater anglers. By Independence Day, more than half a million anglers have registered.
- **2010** - The Information Management Team is established with the responsibility of improving information management, to allow the Operations Team to focus on survey improvements.
- **2010** - MRIP pilot projects begin field testing methodologies for census and universal logbook reporting, among other innovations. Project updates are included in the 2010/2011 Implementation Plan Update and in the 2011 Report to Congress.
- **2011** - Scientists, managers, and anglers convene for a **Recreational Fisheries Data Timeliness Workshop** aimed at expanding efforts and evaluating options to report out more timely recreational fishing catch and effort estimates. To learn more, watch a **video about the Timeliness Workshop**.
- **2011** - By October, every state and territory in the nation except Hawaii, Puerto Rico and the U.S. Virgin Islands have implemented their own licensing or registration systems and established memoranda of agreements with NOAA Fisheries' National Saltwater Angler Registry to share license data. This means that most U.S. anglers are not required to register at the Federal level with the NSAR.
- **2013** - The ESC Holds an **Implementation Workshop** to discuss strategies for implementing improved data collection designs.
- **2014** - The Transition Team is established to manage the process of transitioning to improved survey methods, initially triggered by the release of the draft report testing a new fishing effort survey design.

Design & Methods

- **2010** - To better track the financial and fishing impacts of the BP/Deepwater Horizon oil spill, NOAA Fisheries expands the telephone survey of for-hire operators in the Gulf of Mexico by increasing the sampling rate from 10% to 40%.
- **2011** - Several high profile pilot studies are completed:
 - Testing a new sampling design for the APAIS in North Carolina.
 - Testing a Logbook Reporting Program in the Gulf of Mexico, which requires participants to provide weekly reports of all fishing activity and includes electronic logbook reporting.
 - Testing measurement error in CHTS and ALDS.
 - Testing a dual-frame mail survey for enhancing mail survey response rates.
 Project updates are included in the 2011/2012 Program Update.
- **2012** - All 2004-2011 catch and effort estimates were produced using improved methods. The new methods address a major concern raised by the NRC's evaluation of MRFSS-that the catch estimation method was not correctly matched with the sampling design used gathering data, leading to potential bias in the estimates.
- **2013 - Redesigned MRIP APAIS** implemented March 2013, on Atlantic & Gulf Coasts, MA to LA (ME and NH included in May per annual schedule). The following changes in design were included:
 - Site-clusters (1-3 sites) sampled per assignment
 - Fixed time of day and duration - 6 hour intervals for sampling specified
 - Fixed date of sample assignment (no re-scheduling)
 - Fixed Mode of assignment – no alternate
 - No maximum number of angler interviews/all eligible anglers counted
- **May-Dec 2013** - Modifications made to sample allocations and distributions to improve APAIS assignment performance metrics (completed, completed with interviews, number interviews per assignment)
- **July 2013** - APAIS maximum cluster size reduced to 2 sites and Friday moved from WeekDay to WeekEnd day stratum – allowed more assignments to be allocated to high activity days and more time spent per site.
- **2014** - Puerto Rico was transitioned from the MRFSS Intercept design to the MRIP APAIS design starting in Wave 1, 2014.
- **2014** - APAIS discontinued in Louisiana.
- **May 2014** - APAIS mixed boat mode sampling replaces separate mode sampling assignments for Charter and Private/Rental Boats – improves efficiency of angler interviewing and increases chances for obtaining charter boat angler interviews.

2015 -

Design & Methods

- **2015** - The **fishing effort mail survey** is conducted alongside the Coastal Household Telephone Survey on the Atlantic and Gulf coasts for benchmarking.
- **2015** - NOAA Fisheries releases and initiates a three year plan for transitioning from the Coastal Household Telephone Survey to the mail-based Fishing Effort Survey.
- **2015** - APAIS re-implemented in Louisiana for benchmarking alongside the Louisiana Creel survey.

Differences between MRIP and MRFSS

Although MRFSS (Marine Recreational Fisheries Statistics Survey) was a successful program for almost two decades, and was kept in place until 2006, there was very little change during this time. Because of this, the methods that had been used were no longer as efficient and accurate at estimating catch and effort. With little changing survey design and budget, MRFSS was unable to keep up with the increasing demand for better precision, accuracy, timeliness, and coverage. Specifically, MRFSS surveys and methods were hindered by undercoverage, inefficient and biased sampling and estimation methods, and other **potential areas of bias**. To learn more about specific issues with MRFSS surveys and methods, you can read the National Research Council Report [here](#).

The Marine Recreational Information Program (MRIP) represents a redesign of the way NOAA Fisheries estimates recreational catch and effort, how we report those numbers, and how we work with our partners and stakeholders to set priorities and implement improvements. MRIP is challenging the way we've done things in the past through rigorous scientific testing and evaluation of our methods.

MRIP provides in-depth, open access to our development process, survey methods, and data so scientists and non-scientists alike can see for themselves what we're doing, why we're doing it, and help guide our course. In collaboration with regional and state partners, improvements to recreational fishing surveys are always being made, tested, and implemented. Below are details of several major improvements made on the Atlantic and Gulf coasts.

Catch Methods

Estimates of recreational catch rates and species composition are produced using information gathered from dockside interviews of anglers who have completed their fishing trips. However, in certain for-hire fisheries, catch is determined by trip reports filed by captains ([Southeast Region Headboat Survey](#)). We have made **significant improvements** to the way these surveys are conducted. Specific changes in our new method include:

- **We are now sampling during all parts of the day.** In our previous methods, we only sampled trips that ended during the day, and did not sample trips that ended at night. This introduced the potential for bias because we assumed that fishing activity was the same during night trips and daytime trips.
- **We have made sampling assignments more stringent.** In previous methods, samplers – the people who conduct the survey – were able to change fishing sites if the assigned site was not busy. This introduced the potential for bias because we were not able to properly account for the probability that any given site would be sampled.

Now, samplers have a set assignment that tells them what sites to visit, in what order, for how long, and what types of fishing activity (like shore or private boat) they should be surveying. Samplers are also supposed to interview all anglers, regardless of whether they caught a lot of fish or none at all. It's important for us to know about zero catch trips, just as much as for trips catching large numbers of fish. If it gets too busy, they sample everyone they can, and count the trips that they can't sample.

- **We have created an online Site Register of public-access fishing sites from Maine to Louisiana.** This **online database** includes everything our samplers and scientists need to know about a fishing site to ensure that the sampling assignments are representative of overall fishing activity. Information includes the location, types of fishing, site amenities, and expected fishing activity during different parts of the year, week and day.

The **Site Register** can also be accessed by the public to search or download. Fishermen can find sites that they might like to try, and we can “crowdsource” updates to the information, such as if major upgrades have been made or a site has become temporarily unavailable due to a storm.

Effort Methods

NOAA Fisheries has traditionally gathered information about recreational fishing effort – the number of fishing trips anglers take – through the Coastal Household Telephone Survey (CHTS), which uses a landline random-digit-dialing (RDD) design. RDD is a well-established survey protocol – whether for monitoring fishing activity, opinion polling, or measuring any number of other activities.

However, there are also known limitations with this method.

- Across the survey industry, response rates to household telephone surveys have dropped significantly over the years. However, some phone surveys, like the **For-Hire Survey** do not have this same issue.
- There is also a shrinking number of households who have a landline phone. Many people are switching to cell phones, which cannot be included in landline RDD telephone surveys.
- Finally, research suggests that people don't necessarily do a great job reporting several weeks' worth of fishing activity in an unexpected telephone interview.

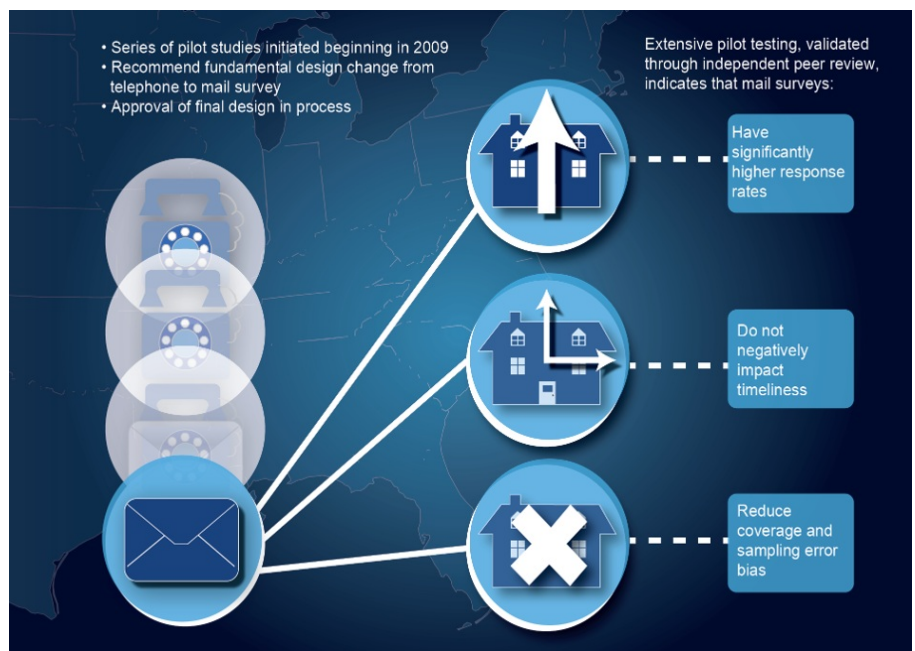
To address these concerns, MRIP conducted a series of studies to figure out the best way to reach as many anglers as possible, ensure high response rates, and improve the quality of information respondents provide. Based on these studies, we found that a mail survey approach meets all three of these needs for surveying shore and private boat anglers.

Mail surveys instead of telephone

surveys: Our research has clearly indicated that mail surveys get a better response rate than telephone surveys, and that the information we receive is more thorough and accurate. We have also found that mail can be as timely and cost-effective as necessary to meet the needs of scientists, stock assessors, and managers.

National Saltwater Angler Registry

(NSAR): In 2011, MRIP launched the Registry, which is a database of recreational fishermen living in the U.S. The information in the NSAR comes mostly from state-based saltwater fishing license and registration programs. Using the NSAR makes our surveys more efficient because we know we are contacting angling households. We also use a U.S. Postal Service database of virtually every household in the United States to make sure we are able to contact anglers not registered.



Learn more about how MRIP is improving surveys of fishing effort [here](#).

Estimation methods

When the NRC conducted its review of MRFSS, one of its findings was that there had been a “mismatch” between the way we were gathering catch information and the way we were using that information to estimate catch. This discrepancy introduced the potential for bias in our estimates. As described in the Re-estimation section, one of the first major initiatives of MRIP was to develop a new way of calculating our estimates based on the catch survey protocols that were in use at the time.

Simultaneously, we worked to develop a new method for sampling fishermen for our catch surveys that is “design-unbiased,” removing the need for corrections. The **new method** was implemented in early 2013.

Re-estimation

In the review of the National Research Council, it was noted that the MRFSS catch estimation method was not correctly matched with the catch survey design, leading to potential bias in the estimates. In 2011, MRIP finalized a new design for

calculating recreational catch. In doing so, MRIP corrected assumptions about how different factors might affect catch rates, and created a mathematical formula to address those issues.

This new method was used to **recalculate previous estimates dating back to 2004**, and served as the basis for new estimates moving forward until the new angler catch survey protocols were implemented in 2013. Those protocols corrected the potential biases resulting from the “mismatch” identified by the NRC.

What was the difference between the old and new numbers?

There were no across-the-board trends either in size or direction of change in the estimates. On a species-by-species basis, some estimates went up, some went down, and some remained about the same. In all cases, the re-estimated numbers are more accurate because we have removed potential sources of bias from the estimation design.

To learn more, you can watch our **Re-estimating Catch video**.

Calibration

When we implement improvements to our survey designs, there is a likelihood that the estimates generated from our previous methods will be different than the estimates resulting from the improvement. In certain cases, such as with the **re-estimation** using updated methods, the opportunity exists to compare one set of estimates vs. another side by side. In other cases, as with the re-design of our **catch surveys**, resources and logistics make it impossible to do complete side-by-side comparisons.

In either case, differing numbers pose a challenge to fisheries scientists and managers. For instance, if we see a marked increase or decrease in catch rates or numbers of fishing trips from one data collection design to another, it is important to determine whether the result of the change is due to an actual change in a fishery, or simply a reflection of the fact that we're doing a better job of monitoring activity.

Depending on numerous factors, stock assessors, fisheries scientists, and managers may find it necessary to use a calibration factor to adjust historical numbers. This is a mathematical approach to treating two different sets of numbers in a comparable way.

In the case of the re-estimation, where estimates dating back to 2004 were adjusted, a workshop was held to determine the best way to address the differences between the new numbers and the old ones. The complete workshop report is available **here**, but in short, the participants agreed that whenever new stock assessments are conducted, it is important to use a calibration factor to adjust catch estimates for years earlier than 2004 to be comparable to the estimates made for 2004 and after using the new estimation method.

Similarly, work is being done to determine if there is a need to apply calibration methods to numbers generated by our new catch estimation methods. If the need exists, a similar process will be followed to determine the most appropriate calibration factors.

2014 APAIS Calibration Workshop summary

2012 APAIS Calibration Workshop summary

Organization

MRIP is a collaboration of fisheries scientists, stock assessors, managers, and stakeholders overseeing the continual evolution, improvement, and implementation of a series of regionally-based data collection programs.

The MRIP Teams and NOAA Fisheries regional Partners work together to ensure that the data collected through MRIP surveys is held to the highest standard.

Teams

MRIP is managed via a Team structure, under the guidance of an Executive Steering Committee (ESC). To assure transparency and to achieve customer and stakeholder support, the ESC and the MRIP Teams are comprised of members from NOAA Fisheries headquarters, its Regions and Fisheries Science Centers, and of state agency and Interstate Marine Fishery Commissions staff. In addition, the Teams are joined by participants from the regional Fishery Management Councils and key stakeholder organizations.

Click on the links below for more information on each MRIP Team.

Executive Steering Committee



[Operations Team](#) [National Saltwater Angler Registry Team](#) [Information Management Team](#)
[Communication and Education Team](#) [Transition Team](#)

MRIP Partners

Regional partners are vital because data needs for effective management can differ substantially in different parts of the country, and even among various fisheries within each region. National standards ensure that regardless of the specific decisions made by each region, all recreational fisheries survey and estimation methods withstand a rigorous independent peer review and the fisheries statistics meet the quality sufficient to ensure the sustainable use of recreational fishing resources.

[Alaska Department of Fish and Game](#)

[Atlantic Coastal Cooperative Statistics Program \(ACCSP\)](#)

[Atlantic States Marine Fisheries Commission \(ASMFC\)](#)

[Gulf States Marine Fisheries Commission RecFIN \(GSMFC RecFIN\)](#)

[Hawai'i Division of Aquatic Resources](#)

[Louisiana Department of Wildlife and Fisheries](#)

[Pacific States Marine Fisheries Commission RecFIN \(PSMFC RecFIN\)](#)

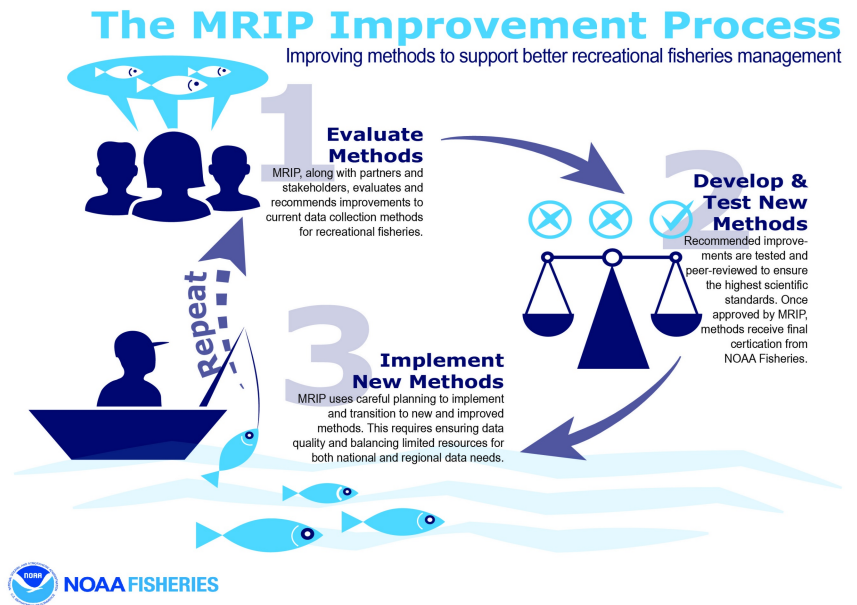
[Puerto Rico Department of Natural and Environmental Resources](#)

[Texas Parks & Wildlife Department](#)

[Western Pacific Fisheries Information Network \(WPacFIN\)](#)

Making Improvements

MRIP is continuously working to improve how we collect, analyze, and report information. Through improvements to current methods and the development of new methods, MRIP supports the monitoring tools needed to accurately track fishing catch and effort in each region. The process used to develop and implement improvements, outlined below, ensures that each recommended change adheres to rigorous national standards, while remaining flexible enough to meet unique regional needs. This is a continuous process and MRIP is working with its partners to ensure the highest quality data for use in fisheries management.



As results of pilot studies emerge, the MRIP Regional Implementation Teams (the Fisheries Information Networks (FINs) and their equivalents) review and select the methods best suited to their fisheries and other needs. The Regional Management Teams will continue to evaluate the possibilities of broadening the application of those methods, consistent with available funding, to attempt to improve coverage and/or bring more resolution to spatial and temporal monitoring.

The Improvement Process

Evaluating Methods

Current methods, even those that have been implemented, can benefit from improvements to make sure that in a changing management environment, the best available science is used. Teams of scientists, statisticians, state partners, fishermen, and other stakeholders evaluate existing programs, making recommendations for new data collection designs and improvements to current designs.

Developing and Testing Improved Methods

Recommendations for new methods and improvements to current methods are tested and peer-reviewed through the **MRIP process** to ensure the results meet the highest possible scientific standards. Methods are approved by MRIP, before they are approved for implementation by the Assistant Administrator for NOAA Fisheries.

Implementing Improved Methods

Implementation of new and improved methods requires careful planning and difficult decisions on how to commit limited resources. MRIP works closely with regional partners to evaluate regional fisheries needs and examine tradeoffs among precision, timeliness, coverage, and more. Further, certain types of data collection options (e.g., for-hire trip reporting of catch and effort or a census of private boat landings of a species) require regulatory and enforcement components for implementation that must be considered. MRIP's role in the implementation of improved methods is to ensure that the result balances regional data collection needs and overall data quality for managing the Nation's fisheries.

Recent Improvements

To ensure our overall estimates are as accurate as possible, data used in each step of the process has to be accurate as well. Recent milestones we have achieved to improve our survey and estimation methods include:

- **Re-estimation of historical catch estimates** - One of the first things we did was to improve our catch survey method. When the NRC conducted its review, they found that the old sampling method for estimating catch was not correctly matched with the catch survey design. With the **new design**, we removed potential bias by properly weighting past survey data. By addressing this fundamental challenge, MRIP was able to **re-estimate historical catch estimates** to be more accurate and precise.
- **New angler intercept survey protocols** - Among the most visible of these initiatives was the 2013 implementation of the new **Access Point Angler Intercept Survey (APAIS)** – the “dockside” catch surveys we conduct at the end of fishing trips to measure recreational catch on the Atlantic and Gulf coasts. The new protocols remove sources of potential bias from our sampling process, which addresses one of the chief concerns raised by the **National Research Council in its 2006 review** of our survey methods.
- **Online Site Register** - Key to the process of using our new survey protocols was the development of an online, searchable **Site Register** of publicly-accessible recreational fishing access points from Maine to Louisiana. Developed collaboratively with our state partners, the Site Register is a tool to manage the numerous interconnected details required to select an efficient and statistically sound sample. The register is continuously updated using information from field staff, our state partners, and public users.
- **Improved effort surveys** - In 2015, MRIP launched a new method for estimating the number of trips taken by recreational fishermen. The new survey method moves away from household telephone surveys, which are becoming less effective as fewer homes use landline phones. In addition, the new survey uses license and registration information provided by anglers through the **National Saltwater Angler Registry**.
- **Expanded regional efforts** - Recognizing that the management needs from region to region, and even from fishery to fishery, can vary dramatically, MRIP is testing survey design improvements that have been developed based on previous studies in the Pacific Coast, Western Pacific, and Caribbean.

Certification

To promote nationwide consistency in availability of recreational catch and effort data, MRIP has established a rigorous certification process for assuring that survey and estimation methods are scientifically sound. Once certified, the method is available for potential funding and use by MRIP partners.

In general, MRIP only supports (funding, staff, etc.) projects applying methods that have been MRIP certified. MRIP may support use of methods that are not certified, if a plan to certify those survey methods is in place and is being followed.

What does MRIP certify:

- New or replacement survey and estimation methods
- Modifications, or recommended improvements to existing methods
- Existing methods, for approval only

To be certified, methods must:

- Adhere to applicable **MRIP standards and best practices**
- Be peer reviewed and supported by the results of the review
- Be approved by the **MRIP Operations Team**
- Be approved by the **MRIP Executive Steering Committee**
- Be approved for implementation by the NMFS leadership

Certified Methods

- **Access Point Angler Intercept Survey**
 - **Project Report**
 - **Fact Sheet**
 - **FAQs**
- **Fishing Effort Survey**
 - **Project Report**
 - **Survey Fact Sheet**
 - **Transition Plan**
 - **Transition Plan Fact Sheet**

MRIP follows the requirements of the **Information Quality Act** (Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554)) which ensures the quality, objectivity, utility, and integrity of disseminated information.

Effort Survey Improvements

In its 2006 review of NOAA Fisheries' methods for gathering, estimating, and reporting recreational fishing activity, the independent National Research Council (NRC) recommended fundamental changes to how we conduct our surveys, and how we engage with our partners and stakeholders. Over the past several years, we have been working on ways to improve our effort estimates on the Atlantic and Gulf Coasts. This is the information about how many people are fishing, and how often and where they fish.

Checkpoint Report December 2015

Transition Plan for the Fishing Effort Survey

Transition Plan Fact Sheet

Fishing Effort Survey Pilot Project Report

Highlights

- NOAA Fisheries has released a **report** on a new, more accurate, method of surveying recreational anglers about their fishing trips (effort)
- The pilot study testing the new survey resulted in higher estimates of fishing trips
- The new survey will not be used for management purposes until we can more fully explain the differences between the old and the new estimates and explore calibration between the new estimates and the historical data series
- A **Transition Team** with representatives from NOAA Fisheries, Fishery Management Councils, Marine Fisheries Commissions, and state partners was formed and developed a **process and plan** from moving from the Coastal Household Telephone Survey (CHTS) to the new mail-based Fishing Effort Survey (FES).

Key Results

- In the four states covered in the pilot study, mail survey estimates of total effort were 2-6 times higher than Coastal Household Telephone Survey (CHTS) estimates
- More people respond to mail surveys than they do to phone surveys.
- Estimates using mail surveys can be completed in a timely fashion.
- Although licenses and registrations cannot be our only source of contact information, using them increases survey efficiency and lowers costs.

Pilot Studies At-a-Glance

GOALS

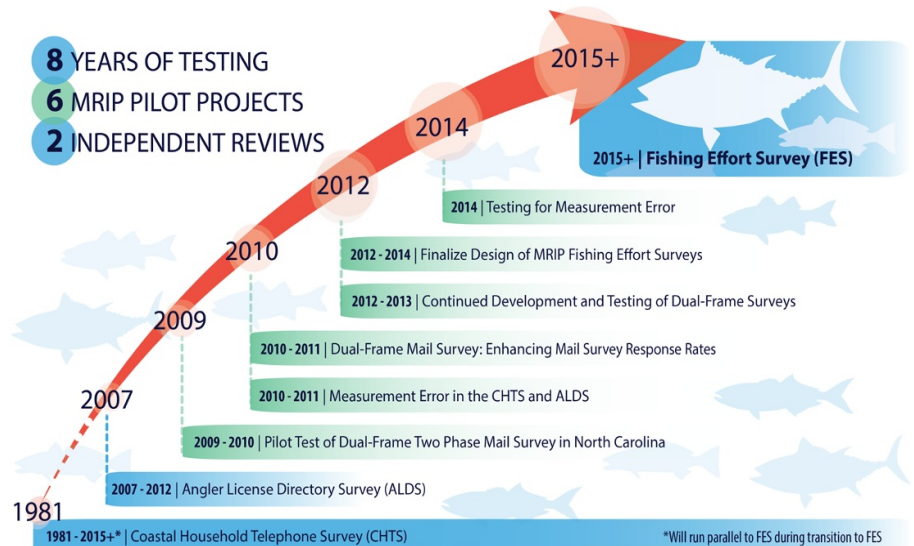
- Identify a better method than random digit dialing (RDD) to reach anglers.
- Determine the best way to use license and registration information in our surveys.
- Establish the most effective methods for maximizing angler response.

WHAT WE TESTED

For Shore and Private Fishing Only

- Telephone survey using license information only, in place of RDD.
- Telephone survey using RDD and license info together.
- Mixed-mode telephone and mail survey.
- Mail-only survey using license info and U.S. Postal Service database.

MRIP | Marine Recreational Information Program EVOLUTION OF THE EFFORT SURVEY



Why is MRIP making changes to the effort survey?

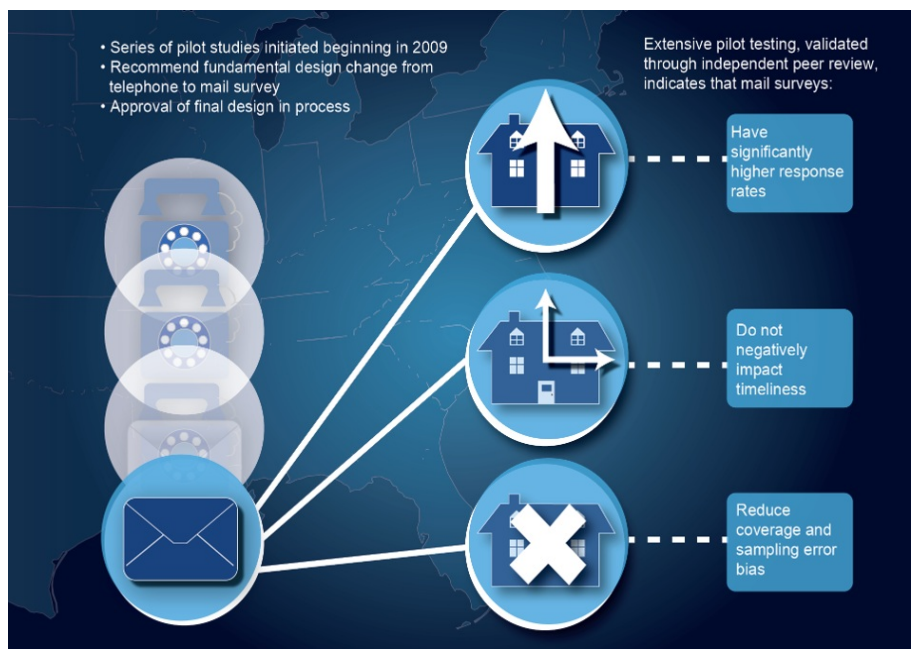
NOAA Fisheries surveys households in coastal states to estimate recreational fishing effort. This information is coupled with our complementary surveys of angler catch rates to come up with an overall picture of recreational fishing activity.

On the Atlantic and Gulf coasts, NOAA has traditionally estimated effort through the Coastal Household Telephone Survey (CHTS). The CHTS uses a method called random-digit dialing (RDD) targeting households in coastal counties. RDD has for years been widely accepted as an effective survey method, and focusing on the coastline has been the best way to find saltwater anglers. However, there are also several well-known shortcomings with this approach:

RDD is inefficient at identifying anglers. Many calls go to households where no anglers live, and we do not contact anglers who live inland.

With more people abandoning landlines for **cell phones**, which are not included in our telephone survey, a growing number of potential anglers has become unreachable. Currently, only 6 in 10 U.S. households have a landline phone, down from nearly 100 percent as recently as 1998*.

Response rates, or the number of people who actually pick up the phone and answer the questions, are declining for all telephone surveys. This is true whether for fishing effort, public opinion polls, or attitudes about a commercial product or



service.

In addition, our research suggests that people may not do as well remembering all their fishing activity when asked over the phone.

All of these issues can result in bias, or factors that can skew our survey results. These include **undercoverage** (not reaching all anglers); **nonresponse** (people not answering the survey); and **measurement error** (inaccurate answers by respondents). Over the past several years MRIP has conducted a series of pilot studies to determine the best way to redesign our effort survey to reduce these potential biases.

*Blumberg, SJ and Luke, JV. Wireless substitution: Early release of estimates from the National Health Interview Survey, July-December 2012. National Center for Health Statistics. June 2013. www.cdc.gov/nchs/nhis.htm

The Transition Process

As with any changes to angler surveys, we are unable to accurately predict what differences we will see in effort estimates based on our improved methodology. However, we know that we'll be doing a better job of contacting more anglers. This will include anglers who are not covered in the existing survey, which we expect will have an impact on the numbers.

From the results of our extensive series of pilot studies, we also know that our new survey will likely show increases – and in some cases potentially significant increases – in overall fishing effort. Because of the complex relationship between effort estimates and other data that go into determining fishery health, higher effort estimates alone do not necessarily mean that overfishing has or is occurring. In addition, we can't know how the results we've seen from our pilot study conducted over a limited amount of time and geography will play out on a larger scale. It will take further work before we can determine exactly how the new numbers compare with those from our current survey, and how they fit into the stock assessment – and ultimately management – processes.

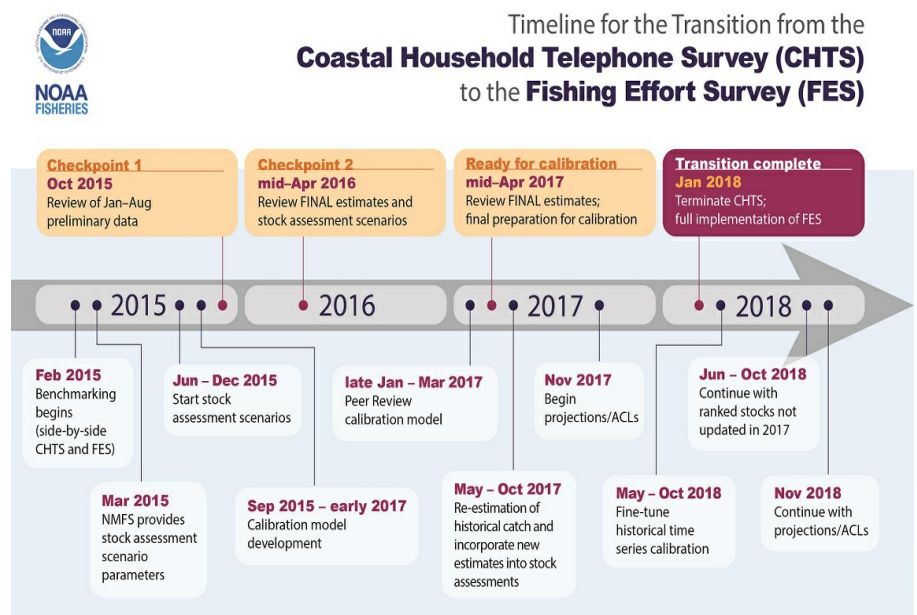
To develop a transparent, inclusive means of converting to the new methods, MRIP created a cross-disciplinary **Transition Team** consisting of managers, stock assessors, scientists and state partners. The charge of the team was to produce a comprehensive strategy to transition from the current Coastal Household Telephone Survey (CHTS) to the new mail-based Fishing Effort Survey (FES). After in-depth discussions, the team developed a **three-year plan** to ensure that potentially significant impacts to the science and management processes are well thought out and accounted for, to the best of our ability, before transitioning to this new methodology for estimating effort.

1. **Benchmarking (2015-2017):** The new survey design will be conducted side-by-side with the current design for three years to allow measurement and evaluation of consistent differences in the statistical estimates produced.

2. **Development of a calibration model (2016-2017):** Consistent differences between new design and legacy design estimates will be evaluated to determine possible sources of bias in the legacy design that can explain those differences.

3. **Re-estimation of historical catches (2017):** Once a calibration model has been approved, the model will be used to generate a corrected time series of recreational catch statistics.

4. **Incorporation of revised statistics into stock assessments (2017-2018):** The revised catch statistics will be incorporated into stock assessments as soon as possible to provide the most accurate assessments of stock status



and provide new ACLs for use in fisheries management.

5. **Incorporation of revised statistics and new ACLs into management actions (2018):** Once both revised catch statistics and new assessment results become available, management actions should begin to use both for decision making as soon as possible.
6. **Discontinuation of the CHTS and full implementation of the FES (2018):** After the three year benchmarking period, NOAA Fisheries will discontinue the use of the CHTS and all future estimates will be based on the new mail-based FES.

Implications

Stock Assessments and Recreational Effort

One might assume that higher effort numbers would automatically mean that there are fewer fish out there to catch. However, this is not necessarily the case. Here's why:

Our studies indicate that the increase in effort estimates is due to the fact that we are doing a better job of capturing fishing activity, not a sudden rise in fishing. However, it will take multiple years of side-by-side comparison to fully understand the differences.

Once we identify the factors that are making the numbers different, we can look back at historical estimates, calibrate the variance, and determine to the extent possible whether past fishing activity was higher than estimated.

Because the number of fish being caught is an indicator of fishery health, if effort rates were actually *higher* in the past than we estimated, then it is possible we were *underestimating* the number of fish in the population to begin with.

Survey Details

Using license and registration information to survey fishermen

In the CHTS, we survey anglers by randomly dialing phone numbers of people who live in coastal counties in the states where we conduct the survey. We make a lot of phone calls to homes where there are no fishermen, and we do not call people who fish but don't live on the coast. The FES is much more efficient because we use address information from state recreational saltwater fishing license and registration databases, via the National Saltwater Angler Registry, to target known anglers. So if you're someone who lives in Montana but spends the summer fishing in North Carolina, there's a chance that your name could be selected from the license database to receive a mail survey.

However, not all fishermen are required to register in some states (e.g., seniors and youths), and we still need a way to survey those individuals. In addition to the license and registration frame, we're also distributing our survey to addresses from the U.S. Postal Service. By using this dual frame approach, we're able to both target known fishermen by using license information, and ensure that there is a chance we can reach virtually every person who fishes whether they are licensed or not.

Look and feel

The new FES isn't just a fishing survey. It's been designed as a "Weather and Outdoor Activity Survey" because it's important to get information from fisherman and non-fishermen alike; and we found that both groups were more likely to answer and return a more general survey. This is important because maximizing the number of responses we get will minimize the risk of **nonresponse bias**. Nonresponse bias in the CHTS is one of the major concerns driving the shift to the FES.

Incentive

To further help reduce the risk of nonresponse bias, the mail survey includes a \$2 prepaid incentive. Why \$2? We tested \$1, \$2, \$5, and a control group receiving no incentive. As you might expect, the greater the incentive, the greater the

response rate. So, in reality, the incentive is not just a cost, it's also an investment in getting better data. That's because every time someone responds to the survey right away, it saves us the later cost of following up by mail or phone. Based on the results of our study, \$2 was the most cost-effective amount for an incentive, which we weighed against the costs of following up (including staff time, paper, postage, etc.) and the number of returned surveys. Factoring all costs of getting a returned survey, including the \$2 incentive actually decreases the overall cost.

Making it easier for individuals to respond

Although mail or a landline call generally reaches a household, our effort estimates are based on **individual** angler trips. With the phone survey, the phone is passed to each person who went fishing during the survey period, assuming they are home, or the person who answers the phone responds to the survey for everyone. Using the mail survey enables us to include a separate column for each person to answer questions about their fishing - plus, having something in hand may allow for all anglers in the household to more easily respond. Our research also suggests that in responding to our phone survey, people may under-report fishing activity because it is more difficult to recall information when they're asked to drop what they're doing when the phone rings to answer questions. We don't think this is an issue in the mail survey because people can complete the survey at their convenience, allowing more time to consider their answers to survey questions.

Learn more

To learn more, check out the [peer-reviewed report](#) of the last phase of the effort study.

Fishing Effort Survey Pilot Study

[Stakeholder Guide for the Fishing Effort Survey](#) 

[Fishing Effort Survey Pilot Project Report](#) 

[Stakeholder Webinar Presentation Powerpoint](#) 

Transition Plan

[FES Checkpoint Report 2015](#) 

[Transition Plan Fact Sheet](#) 

[Transition Plan for the Fishing Effort Survey](#) 

- **Fishing Effort Survey**

The following FAQs address questions that have been asked about the specifics of the mail survey.

- **Why is MRIP making changes to the way fishing effort is estimated?**

On the Atlantic and Gulf coasts, NOAA has traditionally estimated shore and private boat fishing effort through the Coastal Household Telephone Survey (CHTS). The CHTS uses a method called random digit dialing (RDD) to target households in coastal counties with landline telephones. RDD has been widely accepted as an effective survey method for many years, and focusing on the coastline has been a good way to find saltwater anglers. However, there are several well-known potential problems with this approach that could result in biased or skewed estimates.

- *Non-coverage:* With more people abandoning landlines for cell phones, which are not included in landline RDD telephone surveys, a growing number of potential anglers are now unreachable. Currently, only 60 percent of U.S. households have a landline phone, down from nearly 100 percent as recently as 1998.
- *Nonresponse:* Response rates, or the percentage of households who pick up the phone and answer survey questions, are declining for many U.S. telephone surveys. This is true whether surveying fishing effort, public opinion, or attitudes about a commercial product or service.
- *Measurement:* Our research indicates that many telephone survey respondents cannot accurately recall

past fishing trips.

- In addition, the CHTS is inefficient for collecting fishing information as many calls go to households with no anglers.

Testing of the mail-based Fishing Effort Survey (FES) suggests that the mail survey design produces more accurate estimates than the CHTS. The new method achieves much higher response rates than the CHTS, minimizing the risk of nonresponse bias, and the FES sample comes from all valid postal addresses within coastal states, essentially eliminating the risk for non-coverage bias. In addition, the mail survey provides respondents with more time than the CHTS to think about survey questions and provide an accurate response.

- **Effort estimates from the new FES pilot study were reported to be 2-6 times higher than from the CHTS. Were the changes mostly related to mode, state, or wave?**

The FES pilot study was conducted over a 16 month period in Massachusetts, New York, North Carolina, and Florida. Differences between FES and CHTS effort estimates were variable among states and waves. However, FES estimates were consistently greater than CHTS estimates; differences ranged from a factor of 2.1 for boat fishing in North Carolina to 6.4 for shore fishing in Florida.

- **Do these higher numbers mean that overfishing is or has been occurring?**

No. The higher effort numbers will result in a proportionately higher estimate of total catch. However, this catch increase is a result of the change in survey methodology, and not in an actual increase in the number of fish harvested.

There is a complex relationship between estimates of fishing catch and the way scientists determine the abundance and health of fish stocks. Individual fishery stock assessments must be updated with the revised catch estimates before we can state with certainty how the new estimates will affect stock status. The FES Transition Plan calls for conducting the FES and CHTS side by side for three years, in order to develop a quantitative comparison of the effort estimates derived from the two survey methods, and to develop a calibration model that will enable scientists to estimate what the past estimates of catch would have been had the FES been implemented in prior years. Once that calibration is complete, NOAA Fisheries will begin to update fishery stock assessments for key Atlantic and Gulf coast stocks beginning in 2017.

- **When will the Fishing Effort Survey be considered "best scientific information available?"**

Catch estimates based on the Fishing Effort Survey will not be considered best available science until historical catch estimates have been adjusted to account for the fishing effort estimates that would have been obtained if the FES had been used in place of the CHTS in prior years and these adjusted effort and catch statistics have been incorporated into stock assessments and the setting of new Annual Catch Limits (ACLs).

It is very important that we measure, understand, and explain differences between the CHTS and FES and how those differences may have changed over time, so that we can develop appropriate models to appropriately correct historical catch statistics. CHTS estimates do not reflect the actual amount of fishing effort that has occurred in the past due to sources of survey error that have been addressed in the FES design, such as degradation of random digit dialing (RDD) telephone survey effectiveness over the years. Once historical estimates have been corrected, they can be incorporated into stock assessments and new ACLs can be established. At that point, estimates based on the new survey design will become the "best available" for monitoring catch relative to an ACL, and the CHTS will no longer need to be continued. While we understand that the CHTS design has its limitations, its continued use for management purposes during the transition is necessary for maintaining a consistent time series. This does not affect the sustainability of our stocks as effort data are only one piece of information used to determine how well a stock is doing. Once we can compare the CHTS and FES estimates in the same 'currency,' we will better be able to manage all of our fisheries.

Research studies will continue in parallel with this transition process to better understand and explain differences between the current estimates produced by the new FES and the CHTS.

- **How soon will FES estimates be available for management use?**

We will not use estimates from the mail survey until we can make accurate comparisons to past estimates and determine how to apply them to stock assessments and annual catch limits. A Transition Team of federal/state/council/commission staff has completed a transition plan to switch from the CHTS to the FES in the most efficient manner to minimize impacts to the stock assessment and management processes. The process is as follows:

1. **Benchmarking (2015-2017):** The new survey design will be conducted side-by-side with the current design for three years to allow measurement and evaluation of consistent differences in the statistical estimates produced.
 2. **Development of a calibration model (2016-2017):** Consistent differences between new design and legacy design estimates will be evaluated to determine possible sources of bias in the legacy design that can explain those differences.
 3. **Re-estimation of historical catches (2017):** Once a calibration model has been approved, the model will be used to generate a corrected time series of recreational catch statistics.
 4. **Incorporation of revised statistics into stock assessments (2017-2018):** The revised catch statistics will be incorporated into stock assessments as soon as possible to provide the most accurate assessments of stock status and provide new ACLs for use in fisheries management.
 5. **Incorporation of revised statistics and new ACLs into management actions (2018):** Once both revised catch statistics and new assessment results become available, management actions should begin to use both for decision making as soon as possible.
 6. **Discontinuation of the CHTS and full implementation of the FES (2018):** After the three year benchmarking period, NOAA Fisheries will discontinue the use of the CHTS and all future estimates will be based on the new mail-based FES.
- **Does the mail survey account for unlicensed anglers - those that are required to be licensed or registered but are not and those that fish legally because they don't need a license (e.g., under age 16, etc.)? Did all states participating in the pilot study require fishing licenses?**

Yes. Even though some anglers may not require a license, all potential anglers can be sampled from the lists of residential addresses that are used as a sample frames for the mail survey. All states that participated in the pilot study do require licenses or registrations.

- **How will the National Saltwater Angler Registry (NSAR) be used in the new survey?**

All Atlantic and Gulf coast states are providing data from their recreational saltwater licenses and registrations to the NSAR database. The NSAR database is matched to samples of residential addresses that are selected from a comprehensive list of all addresses maintained by the U.S. Postal Service. This matching divides the samples into two sampling groups – addresses with licensed anglers and addresses without licensed anglers. Being able to identify these groups allows us to target sampling towards households with licensed anglers. In other words, it allows us to sample households with licensed anglers, which are more likely to report fishing, at a higher rate than households without licensed anglers. This is effectively the same as sampling directly from the NSAR database, but also provides coverage of anglers who fish without a license and are not included on NSAR.

- **Are FES respondents who fished more likely to respond to the mail survey than those who did not fish, and how is that potential bias treated?**

FES pilot study results clearly demonstrate that households with licensed anglers are much more likely to respond to the survey and report fishing activity than households without licensed anglers. Consequently, fishing households are over-represented in FES samples - there is a higher percentage of fishing households in the sample than in the population as a whole. This would result in biased estimates if not accounted for, but we account for the disparity during our weighting and estimation process.

- **How did you arrive at using a cash incentive? Isn't including an incentive cost-prohibitive?**

In the FES testing we experimented with cash incentives of \$1, \$2, and \$5, as well as a non-incentive control group. The goal of the incentive testing was to identify an optimum level of incentive that maximizes overall

response while controlling costs and minimizing the potential for nonresponse bias. All three incentive amounts significantly increased the number of completed surveys, and the additional costs of the \$1 and \$2 incentives were more than offset by the gains in the number of completed surveys. In other words, including a \$1 or \$2 incentive actually decreased overall data collection costs.

- **Could the estimated increase in fishing effort among shore anglers in the FES over the telephone survey be due to socio-economic differences in response rates, due to the monetary incentive in the mail survey?**

We examined the impacts of incentives on both response rates and reported fishing activity, overall and by fishing mode. While incentives had a significant impact on response rates, we did not observe any differences in reported fishing activity among incentive treatments. This suggests that the additional respondents were no more or less likely to fish, overall or in a particular fishing mode, than those who would have responded without an incentive. Consequently, we do not believe that incentives contribute to the observed differences between CHTS and FES estimates for either shore or private boat fishing.

As discussed in detail in the [pilot study report](#), our working hypothesis is that a greater contributor to the difference between private boat fishing and shore fishing is recall error – or the ability to accurately recall all fishing trips. Simply put, we believe that the extra costs and logistics involved in a private boat trip make it more memorable than a day of fishing on the beach or at the pier. With the phone survey, people are asked to drop whatever they're doing and think back over their fishing activities from the past two months. The mail survey enables people to take more time to think about their activity, or possibly even consult their calendar - potentially increasing recall of fishing activities.

- **When conducting the mailing survey, what percentage of mailings goes to the random USPS database addresses vs. the angler registry database addresses?**

The distribution of mailings between licensed and unlicensed households varies by state and sampling period (two-month “wave”). Overall, we use a sample from a comprehensive USPS database of addresses and compare that to the list of addresses from the license and registry database, and match the addresses found. This matching divides the samples into two sampling groups – addresses with licensed anglers and addresses without licensed anglers. Being able to identify these groups allows us to target sampling towards households with licensed anglers. Therefore, we sample the licensed anglers at a higher rate, in all states and two-month waves. We do this because we know those people are more likely to fish which ensures that estimates are based upon data provided by a large, representative sample of anglers. The goal of the sampling design and sample distribution is to maximize the precision of effort estimates for each state and wave.

- **Does the survey account for anglers in for-hire vessels?**

No. The new mail survey only asks about fishing trips made from shore and or on a private or rental boat.

Effort data for charter boats in the Atlantic and Gulf fisheries, and for head boats in the Greater Atlantic Region, are derived from a separate weekly telephone survey of for-hire vessel operators, the [For-Hire Survey](#). Both catch and effort data for head boats in the Southeast Region are derived from the [Southeast Head Boat Survey](#), a trip-reporting program operated by NOAA's Southeast Fisheries Science Center.

- **Will the mail survey allow for going to a monthly data reporting system versus the current 2-month waves?**

Yes, the FES design can collect data and produce estimates for 1-month reference waves. We will begin testing the impacts of 1-month reference periods on data quality beginning in July, 2015.

- **Will the mail survey differentiate effort between state and federally managed species that could potentially be used to develop a database of "offshore" anglers?**

No, the current mail survey questionnaire does not differentiate between fishing locations (state vs. federal waters) or targeted species. The mail survey questionnaire was designed to collect the minimum amount of information needed to estimate total shore and private boat fishing effort within a state during a two-month

reference period. However, mail survey estimates can be combined with estimates from the [Access-Point Angler Intercept Survey](#) to estimate effort at finer levels of resolution, including effort by area fished and effort targeting a particular species or species group. Utilizing FES samples would not be a recommended approach to develop a comprehensive database of offshore anglers, regardless of the nature of information collected in the survey.

- **Does MRIP account for potential changes that may occur within the U.S. Postal Service?**

The MRIP process is a continuous cycle of assessment, evaluation, and improvement. We will continue to monitor the effectiveness of mail surveys, as well as be responsive to changing technologies and the opportunities they present, to ensure the methods we use are providing optimal results.

- **Is a mail survey really the best way to survey anglers today?**

We are extremely confident that the FES design is a superior alternative to the CHTS, as well as other designs that have been considered and evaluated. The FES sample frame, which is maintained by the U.S. Postal Service, provides nearly complete coverage of the entire U.S. population, nearly eliminating the risk of non-coverage error, and when combined with the National Saltwater Angler Registry, provides an efficient mechanism for sampling saltwater anglers. In addition, testing of the FES design resulted in response rates that were 3 times higher than the current telephone survey, minimizing potential errors associated with low response rates. Finally, we believe that the nature of mail surveys, which gives respondents more time than telephone surveys to consider their responses, results in more accurate responses to survey questions.

- **How can NOAA be confident the results from new mail survey are more accurate?**

Sound, scientific methods deliver sound, reliable results. As with all MRIP improvements, the new mail survey is the result of extensive testing. NOAA's own statisticians worked with some of the nation's leading survey design experts to develop and test these methods in the field. Those results were peer-reviewed by independent experts who endorsed the mail survey as a much better approach than the current telephone survey design.

- **Has MRIP explored using internet surveys?**

Yes. MRIP has and will consider additional response options, including Internet surveys. Approximately 25 percent of U.S. households do not have Internet access, and research suggests that providing an Internet response option may actually decrease response rates. It's possible that in the future internet surveys may become more efficient and provide additional options for surveying anglers.

- **Transition Plan**

The following FAQs address questions that have been asked about the transition from the Coastal Household Telephone Survey to the mail-based Fishing Effort Survey.

- **How many members serve on the Transition Team, and how long will the Team be in place?**

The Transition Team was formed to develop and recommend a standardized process for transitioning from historical estimates to estimates derived from improved sampling and estimation designs, and to develop Transition Plans for the implementation of new methods as required per the process. The cross-disciplinary Team currently includes 34 members and participants representing a range of state and federal agencies, including staff from regional fishery management councils and commissions. The Team is a permanent group within MRIP as the need for efficient and timely planning of implementing new survey designs will be ongoing. Visit the [MRIP website](#) to learn more about the Transition Team and all MRIP Teams. The site will also be updated with details of Team meetings, as well as a library of pertinent documents.

- **Who developed the Transition Plan?**

An Atlantic and Gulf coast subgroup of the full Transition Team met weekly from December 2014 to April 2015 to develop the most appropriate way to shift to the new mail survey while minimizing impacts on management and assessment activities. The Transition Team is comprised of experts from NOAA Fisheries, Regional Fishery

Management Councils, Interstate Marine Fisheries Commissions, and state agencies.

○ **What are the advantages of a 3 year approach versus trying to start the Fishing Effort Survey sooner?**

The 3 year approach developed by the Transition Team was determined based on in-depth discussion about how to effectively manage the task of incorporating new estimates that are expected to be significantly different from the current estimates. Overall, the Team determined it was more important to 'get it right the first time,' rather than trying to move faster without fully understanding the full impact of the new effort estimates. By doing this, the best available scientific information will be used for better management of fisheries to ensure sustainable, healthy stocks.

Additionally, taking our time to make sure that we get it right will allow for:

- A more stable calibration as there could be interannual variability;
- More time to prepare for stock assessment and management processes that will need to be accelerated to complete the incorporation of revised historical catch statistics within the desired time frame, potentially allowing for more updates to occur in 2017;
- A longer time to prepare for the potential ramifications due to the higher estimates produced from the Fishing Effort Survey; and
- More information to be determined through research studies to help explain the differences in effort estimates produced by the two surveys.

○ **What steps need to take place to incorporate the new survey into the management process?**

There are several steps that must be taken before estimates based on any new design can be used effectively in the management process.

1) Benchmarking (2015-2017): The new survey design will be conducted side-by-side with the current design for three years to allow measurement and evaluation of consistent differences in the statistical estimates produced.

2) Development of a calibration model (2016-2017): Consistent differences between new design and legacy design estimates will be evaluated to determine possible sources of bias in the legacy design that can explain those differences.

3) Re-estimation of historical catches (2017): Once a calibration model has been approved, the model will be used to generate a corrected time series of recreational catch statistics.

4) Incorporation of revised statistics into stock assessments (2017-2018): The revised catch statistics will be incorporated into stock assessments as soon as possible to provide the most accurate assessments of stock status and provide new annual catch limits (ACLs) for use in fisheries management.

5) Incorporation of revised statistics and new ACLs into management actions (2018): Once both revised catch statistics and new assessment results become available, management actions should begin to use both for decision making as soon as possible. plum brownie biscuit tiramisu marzipan. Ice cream I love sweet bear claw I love sweet cake tart. Danish marshmallow I love wypas pastry.

● **Effects and Implications**

The following FAQs address questions that have been asked about potential implications of both the pilot study results and the transition to the new survey method.

○ **How might the new effort estimates from the mail survey affect stock assessments, catch limits, or regulations like quota allocations based on historical effort?**

There will be no immediate impacts. We will not know the specific effects of data collected by mail survey for several years, and affects will vary depending on factors such the magnitude of change and how large the recreational fishery is for a particular stock. We would not use estimates from the mail survey until we can make accurate comparisons to past estimates and determine how to apply them to stock assessments and use in management decisions.

- **Do the higher estimates mean anglers were overfishing their quotas?**

Higher rates of fishing activity do not necessarily equate to overfishing nor does it mean we have underestimated fishery abundance. Recreational fishing data is often just one input into a stock assessment. The relationship between recreational effort estimates and stock assessments is complex and varies by fishery. We will continue to use multiple sources of data to monitor fish stocks for signs of overfishing. Maintaining the collective gains we've made in ending overfishing and supporting long-term sustainability remain foremost in our minds.

- **Why will you continue to use the phone survey if the results are so different? Is it still the best available source of data?**

We will continue using the long-term, consistently derived estimates of fishing effort generated from the existing phone survey until it is replaced by another source of information that can be integrated into our science and management activities. Only when the calibration of the two methods is fully completed and stocks have been re-assessed using the calibrated FES effort estimates will these estimates from the mail survey be considered best scientific information available.

- **Effects and Implications - Regional**

The following FAQs address questions that have been asked about potential implications of both the pilot study results and the transition to the new survey method at a regional level.

- **Why are some MRIP estimates so much higher than some state estimates of the same fisheries? For example, the MRIP effort estimates are four times higher than the Alabama state estimates in 2014.**

Surveys currently being tested in the Gulf States are not measuring the same things as the coast-wide MRIP survey. Alabama, Mississippi, Florida, and Texas are testing survey methods that focus on accurately measuring the catch for a smaller number of specific species (e.g. red snapper), while the MRIP methods focus on measuring the catch of all species coast-wide.

Additionally, the 2014 Alabama and Mississippi estimates are the preliminary results of pilot projects and may not be consistent with either MRIP results or with each other. Both states have refined their red snapper survey designs in response to recommendations from MRIP's expert consultant team and are implementing a second year of pilot testing in 2015. Before such results are available for use by NOAA Fisheries, they will need to be fully documented and evaluated, including by an independent peer review. Once the project results have been fully compiled and evaluated, NOAA Fisheries and the states will be able to determine which designs should be accepted and made available for future use in management and stock assessment. If one of these designs is accepted, it would then need to undergo a benchmarking and calibration effort similar to what is being done for the mail survey design. Any new designs must be calibrated with the historical time series before it can be considered best scientific information available and used in management decisions.

- **Why can't the agency just use data collected by the state? For example, why doesn't NOAA use Louisiana's new data collection program (LA creel).**

Some states have implemented alternative survey designs tailored to better meet a specific need. NOAA will only accept that data if two basic requirements are met: 1) the survey design must be fully-tested, documented, peer-reviewed, and approved through the MRIP certification process and 2) the new survey must undergo a benchmarking and calibration effort similar to what is being done for the effort survey so that a consistent long-term series of data are available for stock assessments. These requirements help ensure we have a consistent, comparable set of national level information on recreational fishing that meets the requirements for best scientific information available. NOAA Fisheries is actively communicating with the Gulf States about the requirements and process for approving or "certifying" new survey designs. In 2015, the LA Creel survey and the MRIP surveys are being conducted side-by-side in a benchmarking effort, and an independent review of the LA Creel design is being conducted with MRIP support.

- **If you can't use the data collected by Louisiana, why can you use the data collected by Texas?**

Texas' survey has been consistently implemented for over 35 years. In the early 1980's, NOAA Fisheries and Texas entered into an agreement whereby Texas agreed to provide catch data produced via the data collection program for which they provided full documentation. Because Texas has provided a consistent time series of catch data, that data can continue to be used in stock assessments.

Data produced using newly-implemented alternative survey designs (such as the Louisiana data), to replace legacy MRIP data, would require benchmarking to document differences in results so that a consistent time series of estimates is available for assessment. Nonetheless, it is difficult to relate the estimates for Texas to the numbers generated for other Gulf States. Some sort of benchmarking of Texas' estimates against MRIP would be desirable to provide a calibration that could be used to provide comparability.

- **How are effort data collected in the West Coast, Puerto Rico, and Pacific Islands? Will the new survey be used beyond the Atlantic and Gulf Coasts?**

The Atlantic and Gulf of Mexico coasts, Hawaii and Puerto Rico all use a similar phone survey design for estimating fishing effort. The new mail survey methodology was designed as an alternative to the current phone survey used along the Atlantic and Gulf of Mexico coasts. The mail survey could, with modifications, be adapted to the unique data collection challenges in Hawaii and Puerto Rico. Hawaii is testing site-based methods (e.g. creel surveys) similar to those being used currently along the Pacific Coast.

California, Oregon, and Washington each administer their own catch and effort surveys. They primarily use site-based methods to estimate fishing effort, although California and Washington also use license-frame telephone surveys. All three states are in the process of improving their current designs and pilot testing new designs based on feedback received from the National Research Council and reviews by MRIP consultants.

Consideration could be given toward moving from telephone to a mail survey approach in those states in the future.

- **MRIP General**

The following FAQs address questions that have been asked about MRIP and progress made throughout the years.

- **Has MRIP really made progress?**

We've addressed many of the concerns identified in the 2006 National Research Council's (NRC) independent review of NOAA's recreational fisheries surveys. We've collaborated with state partners to create a National Saltwater Angler Registry, which is an integral component of an improved recreational fishing effort survey, developed a more accurate method for estimating catch rate from historical onsite survey data, and implemented a more accurate catch survey design. We will continue to make improvements to our catch and effort surveys to ensure we're meeting the needs of our stakeholders and managing the Nation's fishery resources sustainably.

MRIP has also requested a new NRC review of the program and its progress. We anticipate that the review will start in 2016.

- **When will all of the MRIP changes stop?**

We are constantly evaluating the methods NOAA Fisheries uses to ensure they are providing the most accurate estimates of recreational catch and effort. MRIP will include an ongoing research program to ensure that data collection designs remain consistent with best practices and advancements in survey science and technology. We are sensitive to the disruption that new methods create, and we are working to carefully transition from historical to improved, more accurate methods.

- **Why have I never been surveyed under MRIP? I have been recreational fishing and never asked how many fish I caught.**

Although we interview tens of thousands of fishermen each year, there are many more people fishing than we can possibly talk to. By its very nature, random sampling means that some people get interviewed, and some people don't.

By our estimation there were about 9 million people participating in saltwater recreational fishing along the

Atlantic and Gulf of Mexico coasts in 2013. In these regions, we contacted more than 200,000 households with our phone surveys and conducted 86,000 dockside/shoreside interviews.

- **How do you use data submitted by constituents in your MRIP estimates? Are you using iSnapper data in MRIP estimates? Why or why not?**

All MRIP surveys rely on information provided by anglers. Catch and effort data are collected from samples of anglers who are selected from survey sampling designs that ensure representative, unbiased samples.

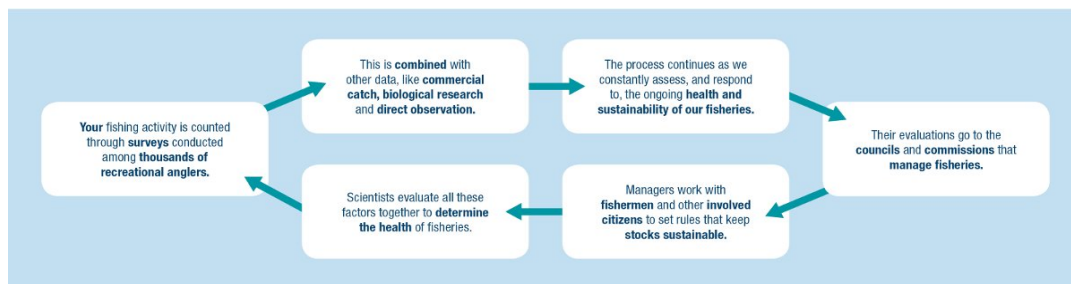
With the increased availability of tablets and smartphones, many private and public organizations are developing applications (apps) that provide opportunities for individual angler diaries or trip reporting. NOAA grant funds have supported the development of these types of tools, including iSnapper.

These types of tools potentially provide new opportunities for recreational fisheries data collection and analysis. However, the information is not collected through a survey design that ensures the data collected is representative of all fishing activity. For example, an angler may choose to volunteer information only after particularly successful trips, but not when zero fish were caught. Consequently, the data cannot be used to estimate population totals, such as total fishing effort or catch.

MRIP is evaluating how best to utilize the data collected with these tools. For more information on the utility of social media, mobile technologies, and non-probability sampling, please visit the website for the [American Association for Public Opinion Research](#).

Fisheries Management

Fisheries management decisions, like size and catch limits and the length of open seasons, are based on a continuous cycle of collecting data, assessing fishery health, setting catch targets, and making effective regulations to keep those targets from being exceeded. Our goal is to ensure fisheries remain productive – now and for generations to come.



Catch Limits

Catch limits are scientifically established targets to prevent overfishing and allow a stock to rebuild or maintain a healthy status. An annual catch limit, sometimes referred to as an ACL, is the amount of fish that can be caught by fishermen over a period of one year. [Regional Fishery Management Councils](#) use NOAA Fisheries data and stock assessments to set ACLs each year.

To learn more about ACLs and accountability measures, visit the [NOAA Fisheries Office of Sustainable Fisheries website](#) and/or the [training presentation for the Regional Fishery Management Councils](#).

Economic Assessments

Along with collecting data on fishing catch and effort, a very important aspect of the recreational fishing sector is determining the economic impacts. The [NOAA Fisheries Economics Program](#) is tasked with evaluating the benefits and costs of alternative management actions, prioritizing management needs, and facilitating policy design that sustainably maximizes societal benefits from ocean and coastal resources.

Regulations

Fishing regulations are put in place by fisheries managers to adhere to the scientifically established catch limits. States, **Fishery Management Councils**, and **Interstate Marine Fisheries Commissions** are responsible for working with NOAA Fisheries, recreational fishermen, and other stakeholders to set regulations.

Federal and State fishing regulations may vary, therefore you should always check prior to going fishing to ensure you are following all necessary regulations to keep our fish populations healthy and sustainable.

Stock Assessments

Stock assessments tell us about the health of a fish population. Scientists conduct regular assessments to examine the effects of fishing and other factors to describe the past and current status of a fish stock, answer questions about the size of a fish stock, and make predictions about how a fish stock will respond to current and future management measures. Stock assessments support sustainable fisheries by providing fisheries managers and scientists with the information necessary to make sound decisions on catch limits and other fishing regulations.

To learn more about stock assessments, watch **The ABC's of Stock Assessments** or click [here](#) to be directed to NOAA Fisheries Stock Assessments website.

Surveys

MRIP collects information from recreational anglers about how often they're going fishing (effort) and what they're catching per trip (catch rate) using a system of surveys. Many of our surveys are conducted year-round and involve interviews with thousands of anglers. Information from our surveys is combined with other sources of data like commercial catch, biological research, and direct observation of what's happening in the fishery to inform management decisions.

Since it's impossible to count every angler or observe every fishing trip, we rely upon statistical sampling to estimate the number of trips recreational fishermen are taking and what they are catching. This method – similar to what's used in opinion polling or TV ratings – gives us an estimate about the number of trips recreational fishermen are taking and what they're catching on those trips.

How We Sample Anglers

Most current angler surveys separately sample anglers for catch rate and effort information in order to ensure the most complete and accurate results possible. All gathered information is combined to produce estimates of total catch. For more on how we estimate total catch, see **Estimation Methods**.

In practice, MRIP uses several different surveys depending on the mode of fishing or region.

How We Count Your Catch

In this video, you will hear directly from scientists, samplers and fishermen themselves about the changes made, how they're working in the field, and why they matter to the people whose lives and livelihoods are connected to sustainable recreational fishing.

Atlantic and Gulf

On the Atlantic and Gulf coasts, the survey program is made up of two parts:

1. **In-Person Intercepts** – MRIP uses in-person surveys of anglers who have completed their fishing trip to generate estimates of angler catch rate. On the Atlantic and Gulf coasts, NOAA Fisheries contractors and state agency employees work together, serving as in-field samplers to conduct angler surveys through the **Access Point Angler Intercept Survey (APAIS)**. For large pelagic and highly migratory species, the **Large Pelagics Intercept Survey (LPIS)** also interviews anglers at the dock. Samplers may work at marinas, boat ramps, and shore fishing sites to interview anglers about their trips and count, weigh, and measure their catch. From that information, gathered over

time and in various locations, the average catch rate is estimated.

2. **Telephone Interviews** – Although specific methods vary from region to region, NOAA Fisheries generally uses **telephone surveys** to either generate effort estimates or validate other surveys. On the Atlantic and Gulf coasts, MRIP currently uses the **Coastal Household Telephone Survey (CHTS)** to identify and randomly contact fishing households in coastal communities through a practice known as “random digit dialing.” The **For-Hire Survey (FHS)** randomly selects charter and headboat operators to interview as well, separate from the CHTS, and the **Large Pelagics Telephone Survey (LPTS)** contacts captains who hold Highly Migratory Species permits. When an individual angler is contacted and agrees to participate in an interview, he or she is asked the number of trips taken the preceding two months (a period known as a “wave”). Similarly, charter boat and headboat captains provide information about the number of trips and anglers their boats took over a one week sampling period. From this information, the total number of trips is estimated.

Our method of using telephone interviews to estimate fishing trips for shore and private boat fishing modes is transitioning to a new mail survey known as the **Fishing Effort Survey (FES)**. Our research has shown this move will yield better response rates, reach a broader spectrum of anglers more efficiently, and result in a more accurate accounting of fishing activity than the current CHTS.

This is our general approach to surveying anglers from Maine to Louisiana.

Puerto Rico and Hawaii

Puerto Rico

In Puerto Rico, the standard approach utilized on the Atlantic and Gulf coasts is used to develop estimates for shore and boat fishing, including charter boats.

Hawai'i

In Hawai'i, the standard approach utilized on the Atlantic and Gulf coasts is used for the shore and private boat modes; charter boats are required to report their catch and effort through a state-managed logbook/trip reporting system.

Pacific

The Pacific States Marine Fisheries Commission established the **Pacific Coast Recreational Fisheries information Network**, or **RecFIN**, to integrate federal and state recreational fisheries data. As part of RecFIN, the states of Washington, Oregon, and California each operate a number of angler survey programs that include intercept, phone, and mail components.

Alaska and Texas

Alaska

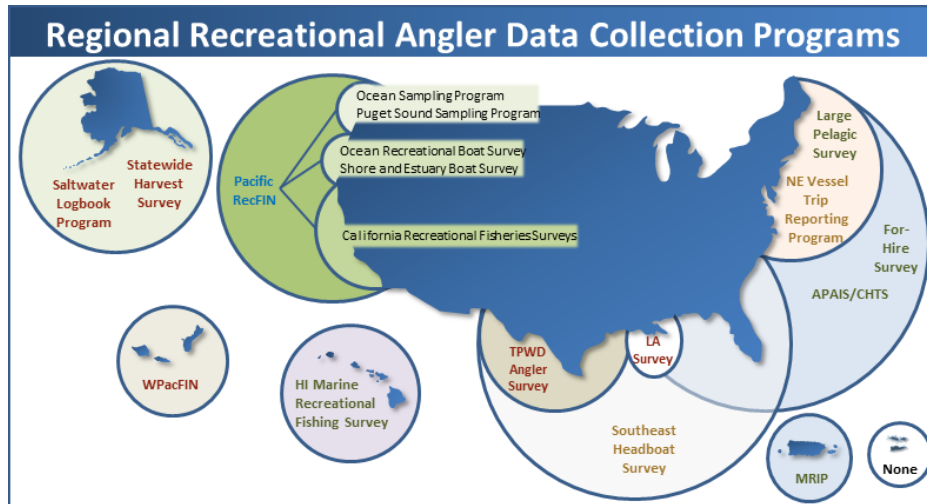
The State of Alaska Department of Fish and Game conducts an annual **sport fishing mail survey** to gather information about private boat and shore fishing. They also administer a census logbook program for their for-hire fisheries.

Texas

The **Texas Parks and Wildlife Department** has conducted its own survey of marine recreational fisheries since 1974.

Coverage

MRIP is a collection of regional surveys, all working together to produce recreational fisheries statistics. Some of these surveys are conducted by state natural resource agencies, such as the surveys in Alaska, Louisiana, and Texas; and some are conducted through the Fisheries Information Networks, or FINS, with funding support from NOAA Fisheries. Regardless of who is conducting the surveys, they all play a part in providing recreational fishing data necessary to maintain the health of the Nation's fisheries.



On the Atlantic (ME-East FL) and Gulf coasts (LA-West FL), the **Access Point Angler Intercept Survey (APAIS)** and **Coastal Household Telephone Survey (CHTS)** collect recreational catch rate and effort data, respectively. These two surveys are also implemented in Puerto Rico and Hawaii. In the South Atlantic and Gulf sub-regions (NC- LA), party boat catch rate data are collected through a separate survey (Southeast Region Headboat Survey), therefore estimates for these sub-regions only include charter boats in the for-hire sector.

The **For-Hire Survey** was developed to resolve undercoverage of charter and party boat angler effort by the Coastal Household Telephone Survey (CHTS) on the Atlantic and Gulf coasts. The **Southeast Region Headboat Survey** samples and monitors the recreational headboat fishery in the south Atlantic and Gulf of Mexico, and the **Large Pelagics Survey** samples anglers and boat captains who fish for large pelagics/**Highly Migratory Species** along the Atlantic coast.

With a few exceptions (e.g. North Carolina) the **Access Point Angler Intercept Survey** and the **Coastal Household Telephone Survey** do not collect data during Jan/Feb (wave 1) on the Atlantic coast north of Florida. The surveys are also not conducted in Maine or New Hampshire during Nov/Dec (wave 6).

Marine recreational fishing in **Texas**, **Alaska**, and along the **Pacific Coast** (as part of the Pacific Coast Recreational Fisheries Information Network (RecFIN) in California, Washington and Oregon) is monitored by state natural resource agencies. West Pacific U.S. territories are not currently included in the national survey program, but pilot studies have and are being conducted to develop appropriate survey methods.

For more details about the changes in MRIP coverage, please see **Program Evolution**.

Survey Details

Estimating recreational fishing catch and effort for the entire United States cannot be done with a one-size-fits-all survey. NOAA Fisheries uses a suite of different surveys to capture recreational catch and effort from people who fish from the shore; private boat; for hire boats, including charter boats, headboats or party boats, and guide boats; as well as for people who target highly migratory species (HMS).

Access-Point Angler Intercept Survey

On the Atlantic and Gulf of Mexico coasts, the Access-Point Angler Intercept Survey (APAIS) is conducted at public marine fishing access points (boat ramps, piers, beaches, jettys, bridges, marinas, etc.) to collect individual catch data and

information including:

- species identification
- total number of each species caught
- length and weight measurements of individual fishes
- angler-specific fishing trip information
- angler-specific fishing behavior

Interviews are conducted in person by trained field staff, and the sites and dates are selected by a proportional random selection process such that those sites that have the most activity will be sampled most often. The sampling schedule is independently determined by fishing mode (shore fishers, charter boat fishers, or private or rental boat fishers) and target sample sizes are based on historic distributions of fishing trips (effort) and available funds.

From these angler-interviews a catch per trip (catch rate) estimate is made for each type of fish encountered, either observed or reported. These **weighted** cpue estimates are combined with the weighted effort estimates by sampling stratum to produce the catch and harvest estimates. Questions are also asked that provide the information to adjust for non-coastal residents' effort, fishing activity by anglers living in households without traditional landline telephone service, and charter boat anglers fishing from boats that are not in the FHS sample frame for the wave.

For more information about the APAIS, please download the survey documents below.

- [APAIS Statement of Work](#)
- [APAIS Appendices](#)
- [APAIS Forms](#)
- [APAIS Fact Sheet](#)
- [APAIS FAQ](#)

Coastal Household Telephone Survey

On the Atlantic and Gulf of Mexico coasts, the Coastal Household Telephone Survey (CHTS) collects fishing effort data from shore and private boat anglers. Since the majority of shore and private boat fishing trips are taken by individuals who live in coastal areas, the CHTS is limited to households located in coastal counties. Correction factors derived from the catch survey (APAIS) are used to account for trips taken by non-coastal resident and out-of-state anglers, as well as anglers who live in households without telephones.

Data collection occurs during a two-week period at the end of each two-month sample period (or "wave"). This regional annual schedule shown below has been maintained since the survey inception in 1979 although not all states, or commonwealths, have been surveyed in all years (see [Coverage](#) and [Program Evolution](#) for details).

Region	Schedule
Gulf of Mexico, Atlantic Coast of Florida, Hawaii, Puerto Rico	January - December (Waves 1-6)
Atlantic Coast North of Florida (excluding Maine & New Hampshire)	March - December (Waves 2-6)
Maine, New Hampshire	May - October (Waves 3-5)
Pacific Coast	Survey not conducted
Texas, Alaska	Survey not conducted

The CHTS utilizes a computer-assisted, random digit dialing (RDD) approach to contact full-time residential households. Contacted households are screened to determine if any household members participated in marine recreational fishing during the previous two months, and each active angler is asked to recall the number of saltwater fishing trips that were taken during the wave, as well as provide details about each trip. Institutional housing, businesses, wireless phones, and pay phones are excluded from the survey. Within each state, sample is allocated among coastal counties in proportion to

household populations.

Data from the CHTS are used to estimate the average number of trips per household for each coastal county. These estimates are then expanded by the county household population to estimate total trips. County estimates are summed and then expanded by APAIS adjustment factors to produce state-level effort estimates. All estimates are computed by fishing mode, then all mode-level estimates are aggregated to obtain the total statewide estimates.

For more information about the CHTS, please download the survey documents below.

- [CHTS Statement of Work](#)
- [CHTS Appendices](#)
- [CHTS CATI Instrument](#)

MRIP is always working to improve our survey methods, ensuring the most accurate data is available for use. To learn more about how MRIP is improving the effort survey, click [here](#).

For-Hire Survey

On the Atlantic and Gulf of Mexico coasts, the For-Hire Survey (FHS) was developed to resolve undercoverage of charter and party boat angler effort by the Coastal Household Telephone Survey (CHTS), which we've traditionally used to measure effort. The CHTS does not capture the majority of for-hire angling effort in most states because most anglers who take trips on charter and head (or Party) boats do not live in coastal counties. The FHS was implemented for Gulf Coast states in 2000 (charter boat only), and all Atlantic Coast states from Maine through Georgia in January 2005. It overlaps other charter and headboat monitoring programs, including the Northeast (Maine-Virginia) Vessel Trip Reporting Program (VTR), the Southeast Regional Headboat Survey (SRHS), various state logbook programs, and the ongoing CHTS.

The sampling unit for the FHS is not the household but the individual for-hire vessel. The sample frame is constructed from a comprehensive directory of for-hire boats for all states, from Maine through Georgia. The vessel directory consists of a vessel identifier (vessel name or registration number), the contact information for an identified vessel representative, as well as a variety of accessory information, such as eligibility and activity. Sampling is stratified by vessel type (head boat and charter boat), state, and week, within each two-month sampling wave.

Data collection is conducted on a weekly basis. Respondents are asked to report vessel fishing activity for the prior week, and then asked to profile each for-hire fishing trip. Information obtained for each trip includes area fished, number of anglers who fished, hours of actual fishing activity, method of fishing, and target species, if any. Advance notice of selection is mailed to each selected vessel representative and alternative reporting modes are provided for the Atlantic Coast respondents, including an interactive website, a fax number, and a phone contact for respondent-initiated interviewing. Effort estimates are produced from the average number of angler-trips per vessel-type per week and the number of vessels per vessel-type in the sampling frame. Adjustment factors for active for-hire fishing boats that are not in the sample frame (new to fleet, no contact information known, etc.) are produced from APAIS questions and applied to the raw effort estimate.

Vessel Trip Report (VTR) data: Data reported in the VTRs for NOAA Fisheries-permitted vessels are obtained from Northeast Fisheries Science Center. The VTR data are not used for preliminary wave-by-wave estimates, but they are included at the end of the year when the VTR data are most complete. For all federally-permitted charter boats and headboats, the total trips reported in the VTRs are used to produce an unadjusted number of angler trips. These boats are treated as a separate "VTR boats" stratum within each for-hire boat mode. All FHS data obtained for those vessels are removed, and FHS estimates of the numbers of angler trips on non-VTR boats are re-run for each wave using the remaining FHS data. The resulting FHS estimates represent a second "non-VTR boats" stratum for each mode.

For more information about the FHS, please download the survey documents below.

- [FHS LPTS Statement of Work](#)
- [FHS LPTS Appendices](#)

Large Pelagics Survey

On the Atlantic Coast from Maine to Virginia, NOAA Fisheries uses the Large Pelagics Survey (LPS) to measure the total

recreational catch of large pelagics fish including tunas, billfish, and sharks. The LPS includes different survey components, each of which gathers the specific pieces of data needed to form the complete picture of recreational fishing activity.

Large Pelagics Intercept Survey (LPIS) – Dockside interviews with randomly selected anglers and for-hire captains returning from fishing trips targeting large pelagics. This approach is used to measure average catch per trip, average size of kept fish, and number of fish released alive. We also ask how many people fished, how long they fished for, what they were targeting, what fishing method was used, and other trip details.

Large Pelagics Telephone Survey (LPTS) – Telephone interviews with randomly selected recreational anglers and for-hire captains who hold Highly Migratory Species (HMS) permits. This approach is used to determine fishing effort, or the total number of trips taken for large pelagic species during a given period of time.

Additional biological information is gathered through the Large Pelagics Biological Survey. This supplemental dockside survey is used primarily for recreational bluefin tuna, targeting both private and for-hire boats. The survey collects length, weight, and body part samples that are used by scientists in studies of fish populations and stock assessments.

MRIP is making improvements to the LPS surveys to ensure they are free from potential sources of error or bias, and that our estimates are as accurate as they can possibly be. For the LPS, areas we're looking into include characteristics of large pelagic trips that return to private access sites, new ways to more accurately represent tournament activity, and improvements to our survey design to better match our catch estimation methods.

For more information about the LPIS and LPTS, please download the survey documents below.

- [FHS LPTS Statement of Work](#)
- [FHS LPTS Appendices](#)
- [LPIS Statement of Work](#)
- [LPIS Procedure Manual](#)
- [LPIS Intercept Form](#)
- [LPIS To Whom Letter](#)

Highly Migratory Species

NOAA Fisheries has a rule in place that requires mandatory reporting of all recreationally landed billfish, swordfish, and bluefin tuna. In all but two states these species are reported by [Highly Migratory Species \(HMS\)](#) anglers and captains either online or by phone.

The states of Maryland and North Carolina currently conduct recreational HMS catch card census programs with funding and technical support from NOAA Fisheries. All billfish, swordfish, and bluefin tuna landed recreationally in these states must have a landings tag attached prior to removal from the vessel (or from the water in the case of trailered vessels). Captains or operators of permitted vessels are required to complete a catch card for each individual billfish, swordfish and bluefin tuna landed in exchange for a landings tag. Catch cards are available at designated reporting stations located in bait and tackle shops, marinas and other locations where billfish and bluefin tuna are landed. Data collected from HMS catch card census programs are used to track in-season landings and monitor and manage these highly valued recreational fisheries.

Understanding Estimation

One of the goals of MRIP is to be transparent about the methods we use to count angler catch, why we use them, and how they work. In this section, we break down all of the concepts and methods that go into designing our surveys to estimate total recreational catch.

Census vs. Sampling

Surveys can gather information through different methods of observation. However, most surveys employ a questionnaire

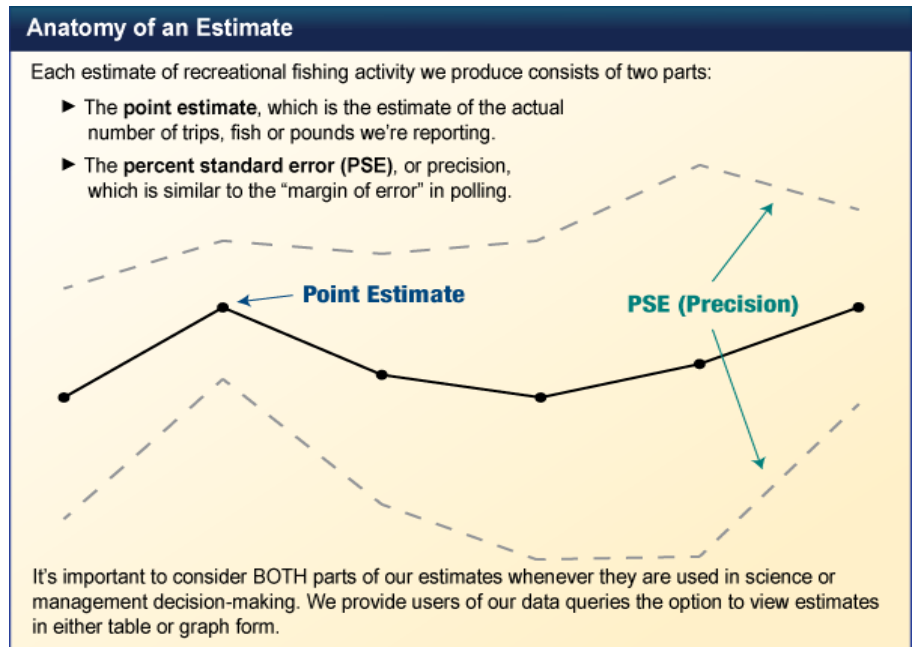
to measure specific characteristics of the population. There are two main ways to gather this information.

A **census survey** collects complete information from all participants in the population. General criteria of a census survey include:

- Establish and maintain a complete list of the primary sampling unit (PSU) components.
- All members of the PSU in the fishery must be included
- Validation (used to correct for missing and misreported data)
- Enforceable and enforced

A **sample survey** uses a representative group of a given population to determine characteristics of the entire population. General requirements of a sample survey include:

- The sample must be representative of the entire population.
- The data collected from the representative sample is expanded to produce an estimate of the total population.
- The estimate has two parts: Point estimate and **margin of error**.
- Assumptions should be tested to identify and measure potential bias if possible.



Sample surveys are used when it is not possible or practical to conduct a census to count each individual of an entire population. Everyday examples of sample surveys include political polling, health statistics, and television ratings. Sample surveys are a proven, effective method for gathering accurate information if they are properly designed and the sample design is accounted for in the estimation methods.

View the [estimation methods page](#) for an introduction to some of the key elements of sample survey designs, and how they fit into MRIP.

Introduction to Survey Statistics

We can use what we learn from samples of a population – in this case fishermen and fisheries – to understand the characteristics of the whole population through sample surveys. Sampling and estimation can be extremely complex. However, we experience results from sampling in our everyday lives in things such as political polling, health statistics, and television ratings.

Part of the goal of MRIP is to make science as clear and transparent as possible. Below, we outline the fundamental mathematical concepts behind survey statistics including sample sizes, weighting, percent standard error (PSE), and the two main sources of error that can occur during a sample survey: sampling error and non-sampling error. More information is available on our [materials and resources](#) page. We also answer questions from our constituents through our online e-newsletter. If you would like to be added to our distribution list, please contact Leah Sharpe at leah.sharpe@noaa.gov.

Survey Statistics Overview

Survey Design

There are many factors that must be considered when designing a complex survey. Elements of the design can impact the

efficacy, budget and precision of the statistical output. To ensure that all factors are balanced, there are several adjustments that can be made to the survey design including the elements stratification, clustering, and sample size.

Sample Selection

Once the survey design is complete, a sample must be selected that adheres to your design. Ultimately, the goal of sample selection is to obtain a sample representative of the entire population of interest. Having a representative sample will reduce the error, specifically the sampling error, inherent in all estimates derived from sample data.

Data Collection

After selecting your sample, it's time to field your survey and begin collecting data.

Estimation

Once a survey has been fielded and the data has been cleaned and analyzed, the next step is to create statistically valid estimates. The estimation process must take into account the survey design in order to ensure that all units in the sample are represented properly in the final point estimate. To do this, weighting is introduced and each point estimate has an associated measure of precision called the percent standard error (PSE) to help gain a better understanding of what we don't know from the sample.

For more information about the process used in developing statistics from surveys, please continue exploring this page.

Sampling

A sample survey uses data from a subset of a population - the sample- to estimate characteristics of the whole population.

There are two broad categories of sampling; probability sampling and non-probability sampling. MRIP surveys utilize probability or random samples to estimate population values. In probability sampling, each member of the target population has a known, non-zero probability of being included in the sample. Generally, samples are randomly selected from a comprehensive list of population members commonly referred to as the sample frame. Different probability sampling techniques, such as simple random sampling, stratification, and cluster sampling, may be used to improve the efficiency and precision of a sampling design. Each of these sampling techniques, if implemented properly, will result in unbiased samples that are representative of the target population.

In non-probability sampling, the relationship between the sample and the target population is unknown. Consequently, it is not possible to know if a sample is unbiased. Examples of non-probability samples include convenience samples, quota samples and volunteer or opt-in samples in which the sample members self-select into the survey. Generally, non-probability samples are not used to estimate population values.

Error

All surveys include some amount of error. Survey errors are classified into one of two types; sampling error and non-sampling error. Collectively, sampling and non-sampling errors determine the accuracy of a survey estimate. Properly designed surveys attempt to minimize both types of errors through careful planning, testing and analysis. The evaluation of survey errors should be an ongoing process throughout the life cycle of any survey.

Sampling Error

A sample does not include all members of a population. Consequently, an estimate based on a sample is likely to differ from the *actual* population value that would result from a complete census of the population. Sampling error is inherent in all sample statistics and is a result of random variation among samples. The size of sampling error depends upon the sample size, the sample design and the natural variability within the population. As a general rule, increasing the sample size reduces the sampling error.

The most commonly reported measure of sampling error is the "standard error", which is a measure of the spread of

independent sample estimates around a true population value. In MRIP, sampling error is reported as percent standard error or PSE which expresses the standard error as a percentage of an estimate. The lower the PSE the greater the confidence that the estimate is close to the true population value.

Non-sampling Error

Non-sampling error includes any type of error that can impact an estimate other than sampling error. Non-sampling error that results in a systematic difference between a survey estimate and the “true” population value is commonly referred to as bias. Non-sampling error can arise from insufficient coverage of the target population, inaccurate response or measurement, nonresponse or data processing errors.

- **Coverage error:** Coverage error occurs when members of the target population are omitted, duplicated or wrongly included on the sample frame. Omissions from the sample frame, or undercoverage, will result in biased estimates if those who are excluded have different characteristics from those who are included. Overcoverage resulting from duplication or the inclusion of out-of-scope units can result in bias and sampling inefficiencies.
- **Measurement or response error:** Measurement error occurs when respondents provide incorrect responses to survey questions. Measurement error can result from poorly worded or ambiguous survey questions, faulty recollection of activities or events (recall error), inconsistent delivery of survey questions by interviewers (interviewer error), or intentional misreporting.
- **Nonresponse error:** Nonresponse error occurs when individual sample members are unwilling or unable to participate in the survey. This will result in bias if nonrespondents have different characteristics than respondents.
- **Data processing error:** Data processing errors can occur during preparation of the survey data. Examples include data entry errors, coding errors and data editing errors.

Sample Sizes

The “sample size” is the number of units you measure in a sample survey. For example, if you have a bag of 100 black and white marbles, and you pull out 10 at random to estimate the number of each color in the bag, your sample size is 10. With MRIP, we sample angler-trips from the entire population of saltwater recreational anglers.

In survey statistics, there are two very important things to understand about sample sizes. The first is that the more samples you draw, the more **precise** your estimate will be. The second is, that it **does not matter** how large the population is you’re sampling from when it comes to determining precision. Although this often strikes many people as counterintuitive, your sample size of 10 marbles will give you the same level of precision whether the bag contains 100,000 marbles, 1 million, or 100 million. That’s because as long as the **population size** is larger than the **sample size** (i.e., that you’re using a survey instead of a census), precision is calculated by looking at the difference between the value (or measurement) result of each sample and the point estimate calculated from that sample. The actual formula for calculating precision is more involved than that (see PSE tab), but the major takeaway is that the way it works is what enables a public opinion pollster to predict the votes of millions of people from a sample size of just hundreds of voters.

Obviously, increasing sample sizes comes with tradeoffs; the more you invest in sampling, the less you have for other science and management activities. In MRIP, as we develop, test, and certify improvements to our surveys to make sure they are free of the potential for bias, we are working with our partners and stakeholders to determine the level of sampling necessary to provide the level of precision necessary to meet their science and management needs depending on the location, species, time of year, amount of fishing activity, etc.

Weighting

“Weighting” is the statistical method in a sample to make sure each sample unit (fishing trip, measured fish, etc.) is

properly represented when calculating a final estimate.

For instance, picking up on the example above, if we had a bag of 100 assorted black and white marbles and drew a random sample of 10, we could say that each marble represents 10/100th of what's in the bag. In statistical terms, each sample has an equal "weight" of 10. Each sampled marble represents 10 marbles, itself plus 9 others not sampled from the bag.

However, let's say we had two bags of 100 marbles. If we drew 10 from Bag 1, and 20 from Bag 2, we could not simply add up the results of all 30 marbles to make an estimate. That's because the marbles from Bag 1 carry a weight of 10, but the marbles from Bag 2 each represent 20/100th of the bag, for a weight of 5. So it's twice as likely that one of our samples comes from Bag 2 vs. Bag 1, and if we treat them equally, we're making an assumption that the contents of the two bags are the same. And as discussed above, any time we make untested assumptions, we're likely to miss identifying bias.

In sampling, each one of these bags is called a "stratum" (i.e. subgroup). To get an accurate estimate, you must weight of each strata to account for potential differences among groups.

Along with making sure our estimates are accurate, weighting has another purpose in MRIP. As long as our design is free of bias, and we know what weight to apply to each sample unit, we can choose to spend more time sampling specific places, times of day, or species that might be important to scientists or managers without skewing our results.

MRIP Guide to Weighting

One of the goals of MRIP is to be completely transparent about the methods we use to estimate recreational catch, why we use them, and how they work. In this presentation, we look at the process of **weighting** data to produce accurate estimates — and to help make the most of our limited sampling resources.

Chapter Links

To jump ahead to a different chapter of the Guide to Weighting video, click one of the below links.

- [Part 1: The Basics](#)
- [Part 2: Adding Variables](#)
- [Part 3: Making the Most of Sampling Resources](#)
- [Part 4: Probability Proportional to Size in Action](#)
- [Part 5: A Day on the Docks](#)

PSE

All survey estimates include some amount of statistical error and uncertainty. Being able to decipher this error is critical to understanding a catch estimate.

Every MRIP estimate is made up of two parts: The point estimate and the percent standard error (PSE). The point estimate is the estimated fishing effort, or the number of fish caught at a given place over a specified period of time. When using **MRIP queries** to examine the data, you will see a number on a table or a point on a graph that indicates the "point estimate." Even though it is a specific number, it's important to remember that this number is an estimate. It is impossible to have 100% certainty with any type of sample survey. To indicate how confident we are about a point estimate, we use the PSE.

The PSE is similar to the "margin of error" that is frequently used in public opinion surveys. It is the measure of how precise an estimate is. The lower the PSE, the greater the precision. Accurately calculating PSEs is important because a full

understanding of what we don't know – and how we can better fill gaps in our knowledge – is an essential component in making prudent, sustainable fisheries management decisions.

We know that the more data we collect, the higher our precision will be. However, there are trade-offs associated with increasing the number of anglers we sample. In an effort to increase the precision of our data, MRIP has funded several different projects that will study ways to increase precision and balance it with other trade-offs like data timeliness and accuracy. To learn more about these efforts, visit our [Projects](#) page.

Estimation Methods

Generally speaking, to estimate total catch, you need to estimate both the number of angler trips (effort) and the catch per angler trip (catch rate):

Catch Rate is the estimated mean catch per angler trip. An **angler trip** is an individual fishing trip taken by a single angler; it can be for any amount of time, whether it is half an hour or an entire day. Catch rates are estimated using data about catch from interviews of fishermen as they complete fishing trips. From these interviews, we can estimate (per trip):

- What species are being caught
- How many fish are being caught
- How many fish are kept
- How many fish are discarded, and the condition of the discarded fish
- Size and weight of fish caught

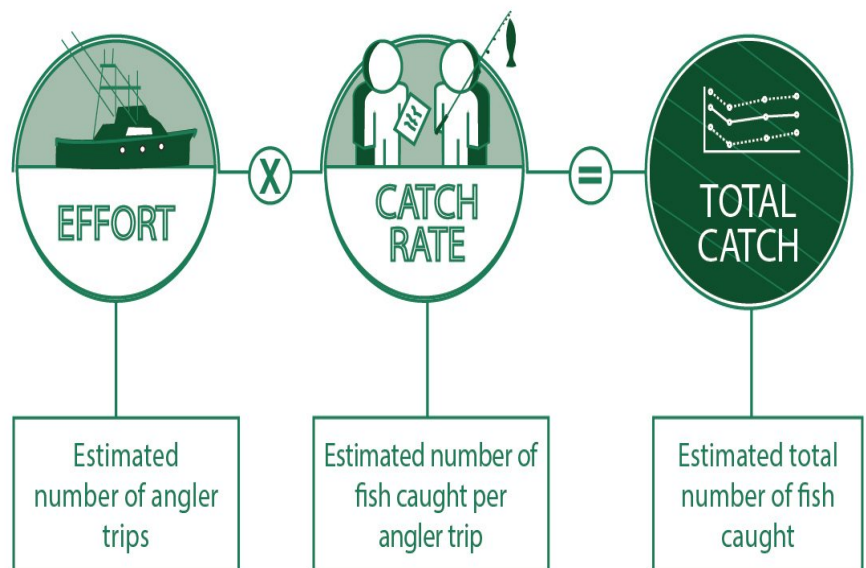
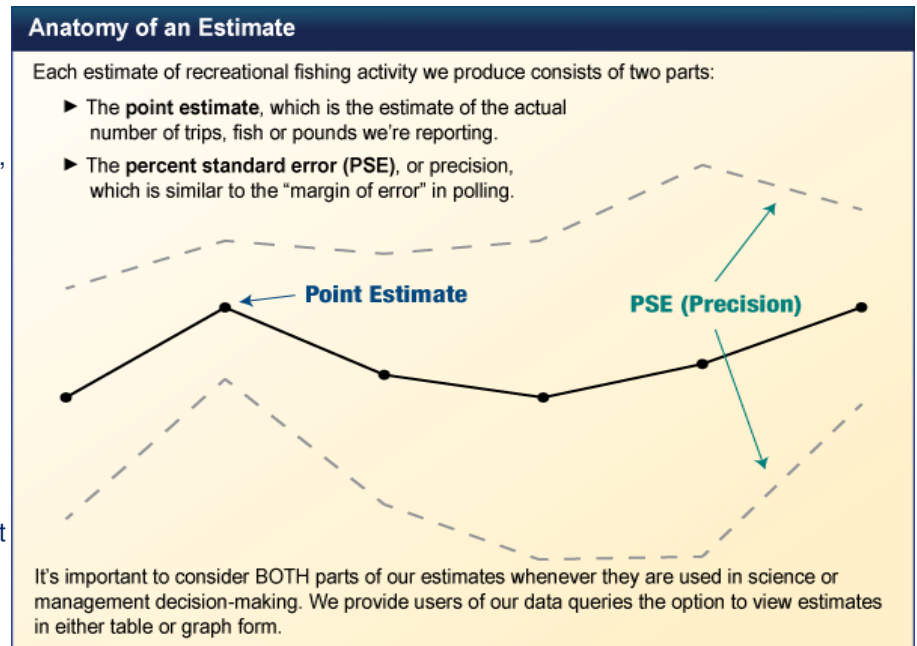
Fishing Effort, refers to the estimated number of angler fishing trips taken. Currently, fishing effort is estimated by conducting telephone surveys of coastal households and for-hire boat captains, as well as on-site survey methods in some regions. From these interviews, we can estimate:

- How many people are fishing
- Where people are fishing
- How often people go fishing

MRIP has been working with our partners to make one of our effort surveys better. You can learn more about how we're doing this [here](#).

On the Atlantic and Gulf coasts, MRIP uses three main **surveys** to gather the information needed to generate these estimates. For a more detailed description of these estimation methods, please review the information provided below. To understand methods and surveys used in other regions, see [Coverage](#) for links to the various state and regional survey programs.

Basic Estimation Methods



The MRIP catch and effort estimates are produced using information from three complementary surveys.

- The **Coastal Household Telephone Survey (CHTS)** of private households is used to monitor the number of fishing days for shore and private boat fishermen. The CHTS collects fishing activity data that can be used to estimate the total number of shore and private mode angler trips (effort).
- The **For-Hire Survey (FHS)** is a telephone survey of for-hire boat operators that is used to monitor the number of day trips made by fishermen using charter boats and head/party boats. The FHS collects fishing activity data that can be used to estimate the total number of charter/head boat angler trips (effort). Additionally, the **Southeast Region Headboat Survey** samples and monitors the recreational headboat fishery in the south Atlantic and Gulf of Mexico.
- The **Access Point Angler Intercept Survey (APAIS)** is a survey at fishing/marina sites that monitors the catch rates of fishing participants in the shore, private boat, and charter boat modes. The APAIS collects data that are used to estimate catch by species per angler fishing trip. The APAIS interviews are completed on-site and in-person by trained interviewers. In the Northeast, catch rate for head boats is determined from the observations of at-sea samplers who monitor catch aboard sampled head boat trips.

We calculate effort through the two telephone surveys and average trip catch rates through the on-site APAIS interviews. The effort estimate can be used to expand the mean catch rate to get an estimate of the total number of fish caught.

Effort x Catch Rate = Total Catch

For example, if 5 people made 3 trips each (15 angler trips total) and averaged one black sea bass and two cod per trip, we would estimate their total catch to be:

15 angler trips x 1 black sea bass per trip = 15 black sea bass

15 angler trips x 2 cod per trip = 30 cod

We produce estimates for every species, every type of fishing (mode), and three different catch types. 1) Type A catch estimates are based on fish brought back to the dock and observed and identified by trained interviewers. 2) Type B1 catch estimates are based on reported fish that were used for bait, released dead, or filleted (i.e. they are killed but identification is by individual anglers and not samplers). 3) Type B2 catch estimates are based on reported fish that were released alive (again, identification is by individual anglers).

This is the most fundamental approach to estimating total catch. However, it is usually necessary to make adjustments to the effort estimates produced by the CHTS and FHS. For example, the CHTS only samples coastal households and therefore does not reach people in inland states. We use information from the on-site APAIS survey, where we ask what state a person is from, to adjust the estimates accordingly. A similar adjustment is made for the FHS charter angler trip estimate to account for angler fishing trips on charter boats not included in that survey (it's voluntary).

Example: Basic Estimation with Effort Adjustment

The following table is an example of the various components from the complementary surveys that are used to generate catch estimates for private boat mode in Massachusetts. Use the numbers in the table below to follow these steps to estimate catch estimates:

1. Start with the original estimated private boat mode effort for Massachusetts from the CHTS for two-month sample intervals Waves 3 (May-June), 4 (July-August), and 5 (September-October) for the years 2011, 2012, and 2013.
2. Calculate the coverage adjustment factor (Adjustment on the table, accounts for people not able to be surveyed) for that wave, and multiply it by the original effort to get an adjusted effort estimate.
3. Calculate the weighted mean catch per angler trip (Catch Per Effort on the table) from the APAIS survey (for private boat mode, in this case)
4. Multiply the adjusted effort estimate of angler trips by the catch per trip estimate to obtain the catch estimate.

**Massachusetts Private Boat Mode
Example***

Year	2011	2011	2011	2012	2012	2012	2013	2013	2013
Wave	3	4	5	3	4	5	3	4	5
Original Effort	237,114	392,138	301,444	359,247	562,259	133,695	333,813	503,932	365,785
Adjustment	1.3688	1.3162	1.3104	1.3794	1.3646	1.3634	1.4499	1.3306	1.1763
Adjusted Effort	324,558	516,118	395,008	495,548	767,233	182,279	484,010	670,539	430,270
A Catch Per Effort	0.0070	0.0024	0	0.0226	0	0.0122	0.0739	0.0153	0.1212
B1 Catch Per Effort	0.2315	0.0687	0.0511	0.5350	0.0101	0.3058	0.0616	0.0569	0.0443
B2 Catch Per Effort	0.4513	0.1671	0.1164	0.8452	0.2625	0.6488	0.3519	0.8898	0.5697
A Catch Estimate	2,270	1,228	0	11,214	0	2,232	35,769	10,275	52,139
B1 Catch Estimate	75,127	35,477	20,201	265,101	7,774	55,745	29,816	38,185	19,065
B2 Catch Estimate	146,481	86,245	45,988	418,828	201,393	118,257	170,333	596,664	245,145

*Note: Due to rounding error, if you calculate the estimates above, you won't get exactly the same numbers shown.

Weighting Estimation

In the basic estimation example, we indicate that we obtain a weighted estimate of the mean catch per angler trip from the APAIS data. Per standard survey design methodology, survey weights account for the fact that some people and sites are more likely to have interviews than others. If we did not try to account for this, our estimates would be less accurate. For basic weighting, if a given sample unit had a 1/10 chance of being selected, the assigned weight would be the inverse of that probability, or $10/1 = 10$. In the APAIS, there are multiple stages of sample selection that require weighting. An example is provided below to clarify how this is done. The following numbers are for illustrative purposes only, and do not represent actual numbers used in our survey estimates.

Primary Stage Weights

The first sampling unit for the APAIS is a specific fishing site and time interval. The probability of selection for a given site-

time combination depends on how active the fishing site is expected to be during the time interval, as predicted from historical information. For example, let's say that we have three types of fishing sites and their expected activity during an assigned time interval for interviewing:

L for low activity, expected to have about 10 angler trips

M for medium activity, expected to have about 40 angler trips

H for high activity, expected to have about 100 angler trips

Let's say for a given area we have 40 L-sites, 20 M-sites, and 8 H-sites. Based on the known activity levels, the probability of selection for each site is:

$$\text{probability of selection for a given site-time combination} = \frac{\text{activity level (L, M, or H)}}{(L \cdot \text{L-sites} + M \cdot \text{M-sites} + H \cdot \text{H-sites})}$$

L-sites: each site has a 1/200 chance of being selected ($10 / (10 \cdot 40 + 40 \cdot 20 + 100 \cdot 8) = 1/200$)

M-sites: each site has a 1/50 chance of being selected ($40 / (10 \cdot 40 + 40 \cdot 20 + 100 \cdot 8) = 1/50$)

H-sites: each site has a 1/20 chance of being selected ($100 / (10 \cdot 40 + 40 \cdot 20 + 100 \cdot 8) = 1/20$)

Now, let's say we take a small sample of 5 site-days and end up selecting 1 L-site, 2 M-sites, and 2 H-sites. The site weights are the inverse of the selection probabilities, so in this example the primary stage weights for L-sites would be 200, M-site weights would be 50, and H-site weights would be 20.

Secondary Stage Weights

When visiting an assigned site in an assigned time interval, each APAIS interviewer tries to interview as many anglers who have completed fishing for the day as he/she can while keeping track of how many total trips were completed at the site. For the lower activity sites, it may be easy to interview every angler trip, while at the higher activity sites, people may be leaving at the same time and the interviewer may not be able to interview every angler. For each assignment, we calculate a second stage selection probability, and also create a weight for each interview that is based on the inverse of that probability.

Working with our example:

At the L-site, there were 10 trips as expected and all 10 were interviewed, so the probability is 10/10, or 1 and the weight is also 1.

At the M-sites, there were 40 trips but only 32 were interviewed, so the probability is $32/40 = 4/5$, and the weight is $5/4 = 1.25$.

At the H-sites, there were 100 trips but only 40 were interviewed, so the probability of selection is $40/100 = 2/5$, and the weight is $5/2 = 2.5$.

Combining Weights

The overall weights assigned to each trip can then be calculated by multiplying the site-time-selection (primary stage) weight by the trip-selection (secondary stage) weight. The overall weights assigned to each trip in our example are:

L-sites: $200 \cdot 1 = 200$

M-sites: $50 \cdot 1.25 = 62.5$

H-sites: $20 \cdot 2.5 = 50$

Calculating Catch per Unit Effort

To calculate the weighted catch per unit effort for a particular species, we sum the product of the number of fish caught by the respective trip weight and then divide by the total sum of the weights themselves. This produces a weighted average that correctly reflects the sample design. To continue with our example, let's say that we're interested in species X. At the L-site that was selected, a total of 6 fish of species X were caught among the 10 interviewed trips. Across the selected M-sites, a total of 30 fish of species X were caught among the 64 total interviewed trips. Across the selected H-sites, a total of 34 fish of species X were caught among the 80 total interviewed trips.

Combining the information above, we can calculate the weighted catch estimate for species X by multiplying the number of

fish caught at each site by the appropriate weight and summing them. In this case, the weighted catch estimates are:

L-sites: $6 \times 200 = 1,200$

M-sites: $30 \times 62.5 = 1,875$

H-sites: $34 \times 50 = 1,700$

Sum: $1,200 + 1,875 + 1,700 = 4,775$

To calculate the weighted catch per unit effort, we need to divide this by the total sum of the weights. We can calculate that by multiplying the combined weights by the total number of interviewed trips for a particular site. In this example, the sum of the weights would be $10 \times 200 + 64 \times 62.5 + 80 \times 50 = 10,000$. Therefore, the weighted mean catch per angler trip would be $4,775 / 10,000 = 0.4775$.

The "unweighted" mean catch per angler trip could be calculated by taking the total number of fish caught and dividing by the total number of interviewed trips, or $70 / 154 = 0.4545$. However, this is a biased estimate of the actual catch per unit effort because it doesn't reflect the sampling design. This may not look like a large numerical difference from the weighted estimate, but the difference could be much larger for other examples.

Example: Weighted Estimation

The table below shows the weighted estimation example described in the previous tab. Each of the steps in calculating weighted estimates is demonstrated below.

Numerical Weighting Example					
Site Type	L	M	H	Total	Notes
Number of Sites	40	20	8	68	
Expected Trips per Site	10	40	100		
Total Expected Trips	400	800	800	2000	
Probability of Selection	1/200	1/50	1/20		
Site Weight	200	50	20		(Inverse of probability of selection)
# of Trips at Each Site	10	40	100		
# of Interviewed Trips/Site	10	32	40		(Average trips interviewed per site)
Probability of Selection	10/10	32/40	40/100		(# interviewed trips/total trips)
Interview Weight	1	1.25	2.5		(Inverse of probability of selection)
Overall Trip Weight	200	62.5	50		(Site weight*interview weight)

Total Trips Across Sites	10	80	200	290	
Total Interviewed Trips	10	64	80	154	
Total # of Species X Caught	6	30	34	70	
Weighted Catch Species X	1,200	1,875	1,700	4,775	
Sum of Weights	2,000	4,000	4,000	10,000	(Sum of interviewed trips*weights)
Weighted Catch per Effort				0.4775	(Weighted Catch/Sum of Weights)
Unweighted Catch	6	30	34	70	
Trips Interviewed	10	64	80	154	
Unweighted Catch per Effort				0.4545	(Total Catch/Trips Interviewed)

Data and Documentation

MRIP collects data throughout the year and generates estimates of catch and effort every 2-month period, which we call a 'wave.' Preliminary estimate and survey data are posted every 2 months. Final estimate and survey data are posted each spring for the previous year. A variety of tools are available to help improve access to, and understanding of available data.

- **Using the Data:** A primer for using our data and selecting the appropriate data and tools for your purposes.
- **Queries:** Menu driven tool for common analyses. Results can also be output to your screen or downloaded to a CSV file (readable by Excel and other programs).
- **Downloads:** Datasets are available in SAS and CSV format, and SAS template programs are available for download.
- **Site Register:** An online database and mapping tool describing public recreational fishing sites on the Atlantic and Gulf Coasts.
- **Access to Metadata:** Descriptions of MRIP data structure and content can be viewed, printed, and downloaded through the NOAA Fisheries metadata catalog.
- **Glossary:** Describes options and terms used in our queries.

Using the Data

The sharing of MRIP data allows outside partners and stakeholders to utilize the data in valuable ways and to look at the information MRIP uses to produce recreational fishing estimates. Before getting started with MRIP data, take some time to learn more about what is available for use including **how** and **why** the data are collected, how to use our data queries and some limitations on how the data can be used.

Data User FAQ

Where can I access information about available estimate and survey data?

Information about available datasets can be found in the following:

- [Glossary](#)
- [MRIP Read Me](#)

Variable descriptions and formats can be found in the following files:

- Survey Data Variables: [MRIP_Survey_Variables](#)
- Estimate Data Variables: [MRIP_Estimates_Variables](#)

Survey Data: Why are there non-integer catch counts?

There are two ways that we end up with non-integer catch counts: 1) grouped catch and 2) incomplete shore mode trips.

In our standard estimation, type A grouped catches require a different sample weight from type B1 or B2 catches, which are always for individual angler-trips. However, we did not want folks to have to worry about two different sample weights when using the public-use datasets. In particular, having two sample weights complicates calculating combined (A+B1) landings. To avoid this situation and use only one sample weight, the claim counts (A) are multiplied by an adjustment for the records with grouped catch.

For shore mode assignments, we allow samplers to intercept incomplete trips under specific conditions. In these cases, anglers are asked to estimate the amount of additional time that they will continue fishing. This additional fishing time is used to expand the catch counts recorded during the interview.

Survey Data: What is the difference between PRT_CODE and LEADER?

The PRT_CODE and LEADER codes often have the same values, but they provide different information. The PRT_CODE is the ID_CODE of the party leader. A fishing party includes everyone that fished on the same boat trip. Within a party, there may be multiple groups with separate grouped catches. These groups each have distinct LEADER codes. Headboat trips generally have multiple groups with grouped catch (and therefore multiple leader codes) within the same fishing party (PRT_CODE). In the majority of private/rental (PR) and Charter (CH) trips, there is only one group in the party so PRT_CODE will equal LEADER.

Survey Data: How is grouped catch recorded?

If A catch is grouped, it will only be reported under the leader's ID_CODE. B1, B2, and all A catch that is not grouped, are

reported separately by individual ID_CODE. We are working on a modified catch public-use dataset that will eliminate the grouped catch. That will greatly simplify a number of analyses.

Limitations

1. Revisions

All preliminary estimates will likely be revised before being posted as final. The direction and magnitude of such revisions are unpredictable.

2. PSE

The percent standard error, or PSE, is a measure of precision presented with all estimates. Estimates should be viewed with increasing caution as PSEs increase beyond 25.

Large PSEs – those above 50 – indicate high variability around the estimate and therefore low precision. Estimates with large PSEs should be viewed cautiously.

3. Granularity

During the year, we produce preliminary estimates by sampling wave, mode of fishing, and state. These estimates – particularly at lower levels of aggregation – may be imprecise due to small sample sizes. **For this reason, MRIP estimates are best viewed in aggregate - annually and at the state or regional level.**

4. The Time Series

When comparing catch estimates across an extended time series, note differences in sampling coverage through the years. Some estimates may not be comparable over long time series. For more information about changes in our sampling and coverage, see [Program Evolution](#).

5. Fish Weight estimates:

USE CAUTION WITH WEIGHT DATA

Fish weight estimates are minimums and may not reflect the actual total fish weight landed or harvested.

Fish weight Estimates Prior to 2004

Weight estimates were calculated by multiplying the estimated number harvested in a cell (year/wave/state/mode/area/species) by the mean weight of the measured fish in that cell. Sometimes we have an estimate of harvest but no mean weight, either because

- The harvest is all reported by the anglers (B1), or
- The interviewers couldn't weigh any fish (fish too big, already gutted and gilled, etc.).

If a cell is missing a mean weight, and if we have at least two fish measured in the state (all fishing areas and modes combined),

- We substitute the mean for the whole state for that wave
- We need two measured fish to get a variance estimate

After state substitution, if the mean weight is still missing,

- We use the mean from the whole subregion for that wave
- The "two fish rule" still applies

Fish weight Estimates 2004 to present

As part of the **MRIP re-estimation project**, all estimates of landings by weight (lb or kg) were recalculated using the same design-based estimation methodology used to recalculate the estimates of catch in numbers of fish.

During the **MRIP re-estimation project**, a new method was developed to handle missing weights as well. The new method uses a mix of hot and cold deck imputation as well as length-weight modeling to impute or fill in missing length or weight values by species at the individual angler-trip level.

For individual fish records where lengths are present, missing weights are imputed using length-weight modeling of the form $Weight = a * Length^b$. In most cases, models are fit by species and two-month wave in the current year. Should a model fail to converge, models are fit by species using the most recent 10 years of data.

For intercepted angler-trips with landings but no corresponding length and weight measurements, paired length and weight observations are imputed from complete cases using hot and cold deck imputation. Up to five rounds of imputation are conducted in an attempt to fill in missing values. The rounds begin with imputation cells that correspond to the most detailed MRIP estimation cells but are aggregated to higher levels in subsequent rounds to bring in more length-weight data:

- Round 1: current year, wave, subregion, state, mode, area fished, species
- Round 2: current year, half-year, subregion, state, mode, species
- Round 3: current + most recent prior year, wave, subregion, state, mode, area fished, species
- Round 4: current + most recent prior year, subregion, state, mode, species
- Round 5: current + most recent prior year, subregion, species

For All Years

If fish weights are STILL missing after all the imputation methods have been applied, we give up and leave a missing fish weight estimate. At that point,

- It is up to the user to determine whether to substitute, and
- What substitution is most appropriate to use (a mean from the preceding and following waves, the whole year, same wave over years, whole Atlantic & Gulf coast, some complicated regression model, whatever).
- We don't make those decisions because the information needs and sensitivity of the data vary among species.

The phenomenon of missing fish weights is more widespread with rarely caught species and with large fish (i.e. tunas). The existence and/or extent of missing weights for your query is provided in the column labeled "Landings (no.) without Size Information" in the weight estimates query output. This column provides the number of landed (A+B1) fish that are not included in the weight estimate column (labeled "Harvest (A+B1) Total Weight (lb or kg)"). If the "Landings (no.) without Size Information" column contains a 0 value, then all landed fish are included in the weight estimate.

Please review the **Glossary** for other important tips on using MRIP data.

Common Analyses

The **MRIP queries** were developed to address our most common survey data and estimate requests. For further customization, SAS template programs and public-use survey data sets are available to data customers through the download query and on the **downloads** page.

For more information on available template programs and survey data, please review the **MRIP Read Me**.

Run a Data Query

Welcome to the Saltwater Recreational Data and Statistics query page. NOAA Fisheries maintains a searchable database of recreational saltwater fishing catch, effort, and participation data and statistics. Different types of queries are available to best meet your needs.

The queries are developed from common analyses, and may answer most of your questions. Users can select desired criteria (e.g. years, states, species) and view results in tables or graphically. Results of the query can also be downloaded

to a CSV file (readable by Excel and other programs).

Be sure to check out our [data user FAQ and query video tutorial](#) for information on data and query use and examples of common queries.

Additional data and information are available on our [Data Downloads](#) page.

Data Release Schedule - General

We have launched a *NEW* email subscription service for notification of updates to MRIP estimates, data, template programs and queries. To subscribe, please click [here](#).

Preliminary estimates of catch, effort, and participation are available approximately 45 days following the end of a sampling wave.

For details on updates to available data and estimates, please see our [Estimate Updates](#) page.

Preliminary		
Sampling Wave	Sampling Dates	Sampling Date Available (approx)
1	Jan-Feb	April 15
2	Mar-Apr	Jun 15
3	May-Jun	Aug 15
4	Jul-Aug	Oct 15
5	Sept-Oct	Dec 15
6	Nov-Dec	Feb 15

Final estimates are generally posted by April 15 of the following year. Please note changes may occur between preliminary and final estimates due to quality control checks or changes in U.S. Census data that may impact our calculations.

Data Release Schedule – Specialized Surveys

Preliminary monthly LPS catch and effort estimates are available one month after the end of each one month sampling wave from June through October. Final LPS estimates, along with HMS Catch Card estimates, are available in early January.

Learn more about [our surveys](#) and how we're making improvements to them.

Downloads

We have launched a *NEW* email subscription service for notification of updates to MRIP estimates, data, template programs and queries. To subscribe, please click [here](#).

To review and analyze data we provide access to download the survey (data collected in the field that are used to produce estimates) data, estimates (calculated), and SAS (Statistical Analysis Software) template programs.

Survey and estimate datasets are posted for download following the production of estimates and initial quality control procedures.

Survey Data

MRFSS Survey Data (SAS, CSV)

INTERCEPT: Includes survey data collected by the shore-based angler intercept surveys. The list of sites used for the

APAIS survey, along with detailed descriptive information about each site, is available in the [Site Register](#).

- I1: Angler information
- I2: Unavailable catch
- I3: Available catch
- I4: Grouped-catch followers
- I6: Boat-party followers
- I9: At-sea Discards

TELEPHONE: Includes survey data collected through the Coastal Household Telephone Survey (CHTS):

- T1: Household information
- T2: Angler information
- T3: Trip information

For variable descriptions, download the survey appendices available on the [Survey Details](#) page.

MRIP Survey Data (SAS, CSV)

*** UPDATE ***

TRIP_YYYYW survey data were reposted on 10/31/2014 to correct for inadvertently missing data elements in some records for CH and HB modes, 2004-2006 waves 2-6 only, Mid-Atlantic and North Atlantic sub-regions. The only estimates impacted by this change are directed trip estimates based on target species for the above years, modes, and sub-regions.

Each survey data zip file, PS_YYYY.zip, contains three files per year/wave.

TRIP_YYYYW.sas7bdat - Trip level data (analogous to MRFSS i1 dataset) and variables required for use in estimation. Contains one record per angler-trip interview (identified by id_code).

CATCH_YYYYW.sas7bdat - Catch level data and variables required for use in estimation. Contains one record per species for every angler-trip interview.

SIZE_YYYYW.sas7bdat - Fish level length and weight data and variables required for use in estimation. Contains one record per fish caught and measured or weighed by interviewer.

For more information on each type of file, see [MRIP Read Me](#). Variable formats and descriptions can be found in [MRIP_Survey_Variables](#).

Estimates

Preliminary estimates are produced every two months, and final (revised) estimates each spring.

All preliminary data is subject to change and will likely be revised prior to being posted as final. The direction and magnitude of such revisions are unpredictable. Please familiarize yourself with the limitations and use of preliminary data.

Click on the links below to access the desired estimates.

MRFSS Estimates (SAS, CSV)

MRFSS estimates are available for the Atlantic and Gulf Coasts through 2003, Puerto Rico through 2013, and Hawaii through present.

MRFSS estimate downloads are separated by coast, combined Atlantic and Gulf of Mexico data are annotated with "AG", Gulf-only data with "GU", and Pacific data with "PC". Some downloads may have been produced in the past, but are not currently available. Legacy data for the MRFSS program are provided in a different format and the current MRIP data.

MRFSS estimates do not include revised estimates produced under the MRIP program.

MRIP Estimates (SAS, CSV)

MRIP estimates are available for the Atlantic and Gulf Coasts beginning in 2004, Puerto Rico beginning in 2014.

Variable formats and descriptions can be found in [MRIP_Estimates_Variables](#).

MRIP Template Programs

***** UPDATE *****

The Directed Trip Query and Domain_Directed_Trips.sas template program were updated on 12/11/2014, to address a few remaining issues related to the use of grouped catch as a criterion to define directed trips. This revision builds on the update applied on 11/26/ 2014. Changes in applicable directed trip estimates should be minimal, but we advise rerunning any directed trip queries that were run prior to this update.

MRIP survey datasets are optimized for use by the MRIP programs, and other files available on our website are not compatible with these programs. The programs can be modified to run for custom domain analyses. A domain is defined as a sub-level (usually geographic) of the stratified estimation design. Typically, these are sub-state geographic divisions based on county groups, or even sampled site groups if the domain cannot be defined by county borders.

For more information on each program and the datasets required to run them, see [MRIP Read Me](#).

To download the MRIP Template programs, please **RIGHT CLICK** the template program filename below and select **SAVE LINK AS**.

Catch Estimation

[domain_catch_totals.sas](#)

MRIP catch estimation for custom domains. This is a template program for estimating catch totals using the MRIP public-use datasets. The program is setup to use information in the trip_yyyyw dataset to define custom domains. The catches are estimated within the domains by merging the trip information onto the catch_yyyyw datasets. See program for additional information

Direct Trip Estimation

[domain_directed_trips.sas](#)

MRIP directed angler-trips (effort) for custom domains. This is a template program for estimating directed trips using the MRIP public-use datasets. The program is setup to use trip_yyyyw datasets to define custom domains and estimate total angler-trips within domains. Catch information can be used in defining the domains by merging the catch_yyyyw datasets onto the trip_yyyyw datasets. See program for additional information.

Length Frequencies

[domain_length_freqs.sas](#)

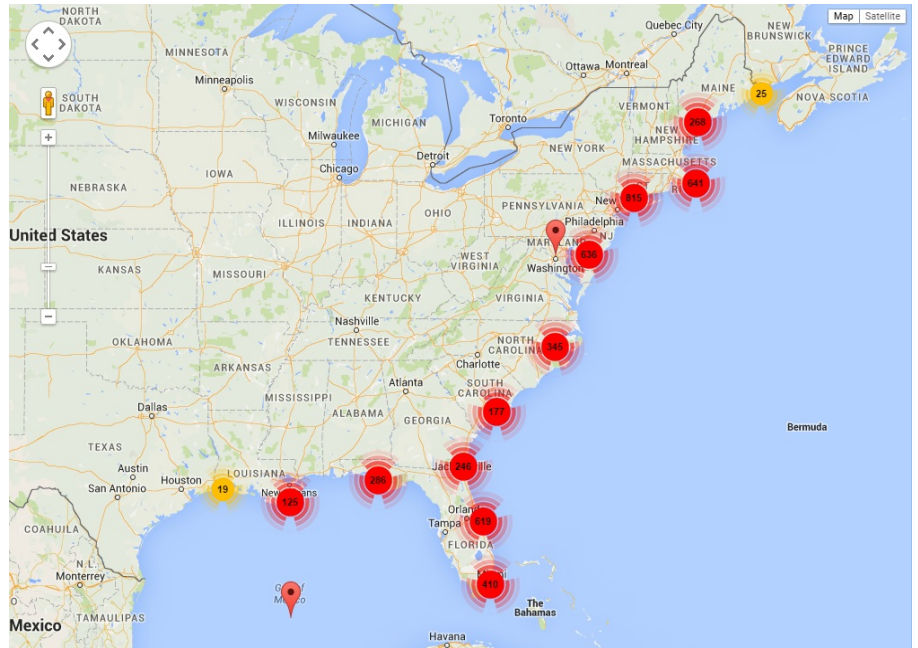
MRIP length frequencies for single species within custom domains. This is a template program for estimating length frequencies using the MRIP public-use datasets. The program is setup to calculate length frequencies (in numbers of fish and as proportions) using the size_yyyyw datasets. Custom estimation domains may be defined by merging trip information from the trip_yyyyw datasets onto the size datasets. See program for additional information.

About the Public Access Fishing Site Register

NOAA Fisheries estimates recreational fishing catch by surveying a random sample of anglers as they complete their fishing trips. Helping us determine where to send our samplers is the **public access fishing site register**.

Maintained by NOAA Fisheries, in cooperation with our state and regional partners, this register provides detailed information about every publicly accessible fishing site including marinas, boat ramps, piers, beaches and jetties.

The register is a comprehensive, online database of public recreational fishing sites on the Atlantic and Gulf Coasts (Maine through Louisiana), Puerto Rico, and Hawaii.



How to Use the Site Register

NOAA Fisheries created the register as part of our program for gathering catch data. All the characteristics we collect tell us something we need to know about each site – such as how often people fish during different parts of the year, what types of fishing occur, and what amenities might attract anglers to visit – to ensure that we’re getting an accurate picture of all the fishing activity that’s taking place. That, in turn, enables us to properly sample the activity and produce representative estimates.

The site register is also available as a resource for anglers and others. All the information in the register is available for public use or repurposing. If we can help you to share the register with your stakeholders, please let us know.

Send Us Updates

Working together, we can keep this register accurate and updated. If you see information that doesn’t look right, or if you’re aware of a fishing site we don’t have listed, please let us know and we’ll investigate. Email us at SR.Admin@noaa.gov.

Access to Metadata

Access to metadata (data describing the data) is also critical to understand and use MRIP data. Access to metadata for MRIP (and other NMFS data) are available through [InPort](#).

Glossary

SUMMARIZE BY | WAVE(S) | YEAR TYPE | GEOGRAPHICAL AREA | SPECIES | SPECIES OPTIONS | TYPE OF CATCH | AVAILABLE DATA | LENGTH DISTRIBUTIONS | FISHING AREA | TYPE OF FISHING (MODE) | PSE | WEIGHT DATA | CENSUS DATA | PARTICIPATION | SAMPLE COVERAGE | SPECIES OPTIONS - DIRECTED TRIP

<p>SUMMARIZE BY</p>	<p>There are four options for summarizing estimates,</p> <ul style="list-style-type: none"> • "By wave", which provides estimates for each two-month reference period, • "Annual", which provides summary across an entire year, • "Cumulative", which provides total year-to-date estimate, and • "Single wave", which allows you to select a single two-month reference period.
<p>WAVE(S)</p>	<p>Two-month reference period (e.g. Wave 1=January/February)</p> <p>LPS estimates are available by month for sampled months, June - October. These months encompass the majority of LPS fishing along the Mid- and North Atlantic coasts.</p>
<p>YEAR TYPE</p>	<p>For the MRIP/MRFSS Catch Estimates Comparison Query estimates are provided at the annual level for three selected year types,</p> <ul style="list-style-type: none"> • Calendar year (Jan-Dec), • May Fishing Year (May 1 - Apr 30), and • July Fishing Year (July 1 - June 30). <p>Each range begins in the year selected, and continues into the next year, if appropriate. For example: If the YEAR=2009, and YEAR TYPE=July Fishing Year, then estimates would be summarized for July 1, 2009 through May 30, 2010.</p>

<p>GEOGRAPHICAL AREA - STATE/AREA</p>	<p>Areas are arranged in geographical order by subregion. For example, the option "North Atlantic by State" will give you catch for the five states listed after that option (Maine through Connecticut) on a state-by state basis. The "North Atlantic" option will give you the catch summed across the five states.</p> <p>Florida is divided into two regions (east and west) in our survey, as is California (southern and northern). Selection of "Florida" under either subregion will give you the total for the whole state. Options for "Pacific Coast by Sub-Region" (S. California, N. California, Oregon, and Washington) and "Atlantic Coast" (Maine to East Florida) have been added to this selection group.</p> <p>Sampling began in Puerto Rico in 2000 (Caribbean subregion).</p> <p>LPS is conducted only in Atlantic coast states from Virginia through Maine. To complement NOAA Fisheries HMS management, these states are divided into two regions: Southern (Virginia-Southern New Jersey) and Northern (Northern New Jersey through Maine). New Jersey is divided along the border of Atlantic and Ocean counties. Due to the limited scale of recreational LPS fishing, several states are combined into two state groups: Maryland/Delaware, Connecticut/Rhode Island, and New Hampshire/Maine.</p> <p>HMS Catch Card programs are conducted only in Maryland and North Carolina.</p>
<p>SPECIES</p>	<p>Common species are available using the pulldown menu, for other species use the "Species Assistance" button to the right of the menu.</p>
<p>DIRECTED TRIP SPECIES OPTIONS</p>	<p>Primary Target will provide an effort estimate for all trips where the angler identified the selected species as their primary target for the trip.</p> <p>Secondary Target will provide an effort estimate for all trips where the angler identified the selected species as their secondary target for the trip.</p> <p>Caught - Available Catch (Type A) will provide an effort estimate for all trips where the selected species was caught and brought back to the dock in a form that could be identified by trained interviewers.</p> <p>Harvested - Unavailable Catch (Type B1) will provide an effort estimate for all trips where the selected species was caught and killed but not available for interviewer identification.</p> <p>Released - Unavailable Catch (Type B2) will provide an effort estimate for all trips where the selected species was caught and released alive.</p> <p>Selecting multiple of the above species options will provide an effort estimate for all trips with one or more of the above to be true, based on your selection. For example:</p> <p>Selecting Primary Target, Secondary Target, Released will provide an effort estimate for all trips with one or more of the following:</p> <ol style="list-style-type: none"> 1. The angler identified the selected species as their primary target for the trip 2. The angler identified the selected species as their secondary target for the trip 3. The selected species was caught and released alive (regardless of target species)

TYPE OF CATCH

Type A catch are fish brought back to the dock in a form that can be identified by trained interviewers.

Type B1 catch are fish that are used for bait, released dead, or filleted -- i.e. they are killed but identification is by individual anglers.

Type B2 catch is fish that are released alive - again, identification is by individual anglers.

Thus,

- TOTAL CATCH = Type A + B1 + B2,
- HARVEST = Type A + B1,
- OBSERVED HARVEST = Type A,
- UNOBSERVED HARVEST = Type B1 only, and
- RELEASED = Type B2 only

LPS catch types are limited to KEPT, ALIVE, and DEAD. **KEPT** refers to any fish retained by the vessel. **ALIVE** catch are only fish released from the vessel while still alive. **DEAD** refers only to dead fish discarded at sea.

ESTIMATES - Calculated values derived through the application of statistical methods to survey data.

- **CATCH:** Contains estimates by year, wave, sub-region, state, mode of fishing, area of fishing, and species of the number of finfish caught and either harvested or released alive. Catch estimates through 2003 are calculated using MRFSS methodology. Estimates from 2004 - present are calculated using MRIP methodology.
- **EFFORT:** Contains estimates by year, wave, sub-region, state, mode of fishing, and area of fishing of number of recreational fishing angler trips. Effort estimates through 2003 are calculated using MRFSS methodology. Estimates from 2004 - present are calculated using MRIP methodology.
- **PARTICIPATION (1981 - 2012):** Contains estimates by year, wave, sub-region, state, and resident type of number of anglers. Participation estimates are calculated using MRFSS methodology.

SURVEY DATA - Data collected directly through our surveys of recreational fishing.

- **TRIP_YYYYW.sas7bdat (2004 - PRESENT):** Trip level data (analogous to MRFSS i1 dataset) and variables required for use in estimation. Contains one record per angler-trip interview (identified by id_code).
- **CATCH_YYYYW.sas7bdat (2004 - PRESENT):** Catch level data and variables required for use in estimation. Contains one record per species for every angler-trip interview.
- **SIZE_YYYYW.sas7bdat (2004 - PRESENT):** Fish level length and weight data and variables required for use in estimation. Contains one record per fish caught and measured or weighed by interviewer.
- **INTERCEPT (1981 - 2003):** Includes survey data collected through the dockside angler intercept surveys:
 - I1: Angler information
 - I2: Unavailable catch
 - I3: Available catch
 - I4: Grouped-catch followers
 - I6: Boat-party followers
 - I9: At-sea Discards
- **TELEPHONE (1981 - 2003):** Includes survey data collected through the Coastal Household Telephone Survey (CHTS):
 - T1: Household information
 - T2: Angler information
 - T3: Trip information

MRFSS estimates and survey data are currently available through 2003 and do not include revised estimates produced under the MRIP program.

For more information on MRIP Survey Datasets, see [MRIP Read Me.doc](#). MRIP variable formats and descriptions can be found in [MRIP_Estimates_Variables.xls](#) (estimate dataset variables) or [MRIP_Survey_Variables.xls](#) (survey dataset variables).

AVAILABLE DATA

<p>LENGTH DISTRIBUTIONS</p>	<p>Length distributions are available for selected species by inch group. Inches groups contain fish that were from X.00 to X.99 inches long. For example, inch group 9 means fish that are between 9.00 and 9.99 inches. These lengths are FORK lengths.</p> <p>Methodology:</p> <ul style="list-style-type: none"> • New MRIP weighted estimation methodology used for Louisiana - Maine, 2004 - present. • For prior years and other states (Hawaii, Puerto Rico), estimates are based on MRFSS methodology until MRIP estimation is available. <p>Percent of A+B1 Landings (no. of fish) and A+B1 Landings (no.-at-length) are provided by length group. Records with missing length group values indicate the numbers of A+B1 landings with no length information.</p> <p>Percent Standard Error (PSE) is provided for MRIP based estimates of landings-at-length only.</p>
<p>FISHING AREA</p>	<p>INLAND means inshore saltwater and brackish water bodies such as bays, estuaries, sounds, etc. It does not include inland freshwater areas.</p> <p>STATE TERRITORIAL SEA is a zone extending three nautical miles from shore for all states except for Puerto Rico and the Gulf coast of Florida where the seaward boundary is 3 marine leagues (approximately 10 statute miles). The state territorial seas do not include inland areas.</p> <p>STATE WATERS is the combination of inland and state territorial seas.</p> <p>The FEDERAL EXCLUSIVE ECONOMIC ZONE (EEZ) is contiguous to the State Territorial Seas of all the United States and its possessions and extends seaward 200 nautical miles measured from the baseline from which the Territorial Sea is measured.</p> <p>OCEAN is a combination of the State Territorial Sea and the EEZ</p>

TYPES OF FISHING (MODE)

For a detailed breakdown of all modes, select ALL MODES BY MODE.

North Carolina is the only state to break SHORE mode into BEACH/BANK and MAN MADE.

The FOR-HIRE sector sampling varies over time. To see detailed breakdown of for-hire modes, select ALL MODES BY MODE:

- **1981 - 1985:** PARTY/CHARTER mode only. All for-hire boats (charter and head/party boat) were sampled as one category; a single PARTY/CHARTER mode estimate was produced (undifferentiated).
- **1986 - 2004:** PARTY/CHARTER mode continued in the Northeast states, Maine to Virginia. In the Southeast (North Carolina to Florida and the Gulf of Mexico states), CHARTER BOATS (only) were sampled by MRIP. Party (head) boats are surveyed by Southeast Head Boat Logbook Program which began in 1986 (not presenting in these estimates).

2005 - ongoing: CHARTER and PARTY (head) boats are sampled independently by the For-Hire Survey and stratified Angler Intercept Survey; separate CHARTER and PARTY (HEAD) boat estimates are produced. Undifferentiated PARTY/CHARTER sampling is no longer performed.

LPS and **HMS Catch Card** modes are limited to PRIVATE and CHARTER boat modes. PRIVATE mode includes vessels with either the HMS Angling category permit or Atlantic Tunas General category permit. CHARTER mode includes vessels with the HMS Charter/Headboat category permit. Vessels targeting large pelagic species without an HMS permit are also included in the dockside intercept survey.

The PSE, or percent standard error, expresses the standard error of an estimate as a percentage of the estimate and is a measure of precision.

- Precision refers to the dispersion of sample measurements used to calculate an estimate and the resulting variability in the estimate.
- Large PSEs indicate high variability around estimates and therefore low precision.
- It is desirable to have small PSE's and more precise estimates.
- There is a direct relationship between precision and sample size.
- When we group year, state, wave, or mode estimates, sample size increases and so does precision.
- Catch estimates for commonly caught species often are more precise than for rare event or pulse fisheries.

Data users should consider the width of confidence intervals surrounding estimates before drawing any far-reaching conclusions from point estimates.

- A confidence interval is calculated as the estimate minus 1.96 times the standard error (the lower limit) and the estimate plus 1.96 times the standard error (the upper limit).
- A 95% confidence interval means we are 95% sure that the true value lies between the lower limit and the upper limit.

PSE

Percent Standard Error (PSE) is automatically included with requested information , with one exception.

The exception is the PSE for mean lengths.

- Calculations of mean lengths involve weighting mean lengths by the estimated number of fish in a cell (state/wave/fishing mode/fishing area/species).
- These calculations are quite complicated and rely on various assumptions.
- Because of the assumptions, it is better that these calculations be made on a case-by-case basis.
- Use of mean lengths is not as useful as length distributions and is not used widely.
- Because of its limited use, we do not expect the absence of the PSE to cause any problems or lead to incorrect conclusions about a fishery.

USE CAUTION WITH WEIGHT DATA

Weight estimates are minimums and may not reflect the actual total weight landed or harvested.

Weight Estimates Prior to 2004

Weight estimates were calculated by multiplying the estimated number harvested in a cell (year/wave/state/mode/area/species) by the mean weight of the measured fish in that cell.

Sometimes we have an estimate of harvest but no mean weight, either because

- The harvest is all reported by the anglers (B1), or
- The interviewers couldn't weigh any fish (fish too big, already gutted and gilled, etc.).

If a cell is missing a mean weight, and if we have at least two fish measured in the state (all fishing areas and modes combined),

- We substitute the mean for the whole state for that wave
- We need two measured fish to get a variance estimate

After state substitution, if the mean weight is still missing,

- We use the mean from the whole subregion for that wave
- The "two fish rule" still applies

Weight Estimates 2004 to present

As part of the MRIP re-estimation project, all estimates of landings by weight (lb or kg) were recalculated using the same design-based estimation methodology used to recalculate the estimates of catch in numbers of fish (please see [REPORT LINK](#) for a description of the new catch estimation methodology).

During the MRIP re-estimation project, a new method was developed to handle missing weights as well. The new method uses a mix of hot and cold deck imputation as well as length-weight modeling to impute or fill in missing length or weight values by species at the individual angler-trip level.

WEIGHT DATA

For individual fish records where lengths are present, missing weights are imputed using length-weight modeling of the form $Weight = a * Length^b$. In most cases, models are fit by species and two-month wave in the current year. Should a model fail to converge, models are fit by species using the most recent 10 years of data.

For intercepted angler-trips with landings but no corresponding length and weight measurements, paired length and weight observations are imputed from complete cases using hot and cold deck imputation. Up to five rounds of imputation are conducted in an attempt to fill in missing values. The rounds begin with imputation cells that correspond to the most detailed MRIP estimation cells but are aggregated to higher levels in subsequent rounds to bring in more length-weight data:

- Round 1: current year, wave, subregion, state, mode, area fished, species
- Round 2: current year, half-year, subregion, state, mode, species
- Round 3: current + most recent prior year, wave, subregion, state, mode, area fished, species
- Round 4: current + most recent prior year, subregion, state, mode, species
- Round 5: current + most recent prior year, subregion, species

For All Years

If fish weights are STILL missing after all the imputation methods have been applied, we give up and leave a missing weight estimate. At that point,

- It is up to the user to determine whether to substitute, and
- What substitution is most appropriate to use (a mean from the preceding and following waves, the whole year, same wave over years, whole Atlantic & Gulf coast, some complicated regression model, whatever).
- We don't make those decisions because the information needs and sensitivity of the data vary among species.

The phenomenon of missing weights is more widespread with rarely caught species and with large fish (i.e. tunas). The existence and/or extent of missing weights for your query is provided in the column labeled "Landings (no.) without Size Information" in the weight estimates query output. This column provides the number of landed (A+B1) fish that are not included in the weight estimate column (labeled "Harvest (A+B1) Total Weight (lb or kg)"). If the "Landings (no.) without Size Information" column contains a 0 value, then all landed fish are included in the weight estimate.

<p>CENSUS DATA</p>	<p>2000 Update</p> <p>The effort estimates (numbers of trips) for the Marine Recreational Fishery Statistics Survey are calculated based on a random sample of residents of households in coastal counties. The average number of recreational saltwater fishing trips per household is calculated and this average is expanded by the number of households in the county. The number of households is based on annual projections made by the Survey of Buying Power (Bill Communications). Official Census Bureau counts of households for the 2000 Census have been recently released and where these numbers differed with the projections, the count of households has been updated to reflect the Census Bureau figure. These updates will result in some small changes to the effort, and hence also to the catch, estimates.</p> <p>2005-2006 Hurricane Katrina Update</p> <p>On June 7, 2006, the United States Census Bureau published special estimates to assess the impact of Hurricanes Katrina and Rita on population and demographic characteristics of Gulf Coast communities (http://www.census.gov/newsroom/emergencies/additional/impacted_gulf_estimates.html). These estimates are not considered part of the Census Bureau's official estimate series. Rather, they were produced using specially designed methodologies to assess the impacts of hurricane events on population sizes of affected counties (for a complete description of the methodology used by the Census Bureau, please refer to http://www.census.gov/newsroom/emergencies/additional/impacted_gulf_methodology.html). While not part of the official estimate series, these special estimates are the most accurate approximation of hurricane impacts on Gulf Coast populations. As such, they have been incorporated into the procedures used to estimate recreational fishing effort and catch, beginning with wave 5 (September/October), 2005 and continuing through 2006.</p>
<p>PARTICIPATION</p>	<p>Participation estimates are available for three categories based on area of residence:</p> <ul style="list-style-type: none"> ■ From January-April and November-December, coastal county residence means anglers from counties within 25 miles of the coast. ■ From May-October, coastal county residence means anglers from counties within 50 miles of the coast. ■ In North Carolina, the coastal zones are within 50 and 100 miles of the coast, because of the fishing patterns in that state. ■ Non-coastal counties are counties within the state but not in the defined coastal zone. ■ Out-of-State means people from other states or countries who came to the state and fished. <p>Summing across categories and geographic areas:</p> <ul style="list-style-type: none"> ■ All participants are additive within a state. ■ Coastal and non-coastal county residents are also additive across states and sub-regions. ■ Out-of-state participants should NOT be added across states or regions. ■ An out-of-state participant could have fished in more than one state that is not his or her state of residence. <p>Addition of out-of-state participants across states may result in double counting of some individuals.</p>

**SAMPLE
COVERAGE**

Currently, the recreational fishing statistics program conducted by the NOAA Fisheries includes the Atlantic coast (ME-East FL), Gulf coast (LA-West FL), Puerto Rico and Hawaii. Data presented in the queries are those from only these surveys. Data from other NOAA Fisheries and state surveys are not included in the query. Care is advised when comparing catch estimates across an extended time series because of differences in sampling coverage through the years.

In the South Atlantic and Gulf sub-regions (NC- LA) party boat catch data have not been collected since 1985, so estimates for these sub-regions only include charter boats in the for-hire sector. Prior to 1998, on the Pacific coast, ocean boat trips and salmon trips were not sampled during certain waves because they were surveyed by state natural resource agencies. West Pacific U.S. territories have not been included in the national survey program since 1981. Hawaii was not surveyed between 1981 and 2002. The U.S. Caribbean was not surveyed between 1981 and 2000. Alaska conducts an annual mail survey in place of the NOAA Fisheries' program. Marine recreational fishing in Texas is monitored by the Texas Parks and Wildlife Department and has not been surveyed by the NOAA Fisheries' survey program since 1985.

Historically, only about five percent of the annual recreational catch on the Atlantic and Gulf coasts is taken during Wave 1 (Jan/Feb). Costs to sample these months are very high due to low fishing activity. Therefore, in Jan/Feb of 1981 the surveys were not conducted in any region. In 1982, Jan/Feb data collection resumed on the Pacific and Gulf coasts and also on the Atlantic coast of Florida. With a few exceptions the recreational statistics program has not collected data in Jan/Feb on the Atlantic coast north of Florida since 1980.

Time periods when the marine recreational statistics program has not been conducted: Nov/Dec (ME & NH) - 1987 to present; Mar/Apr (ME & NH) - 1986 to present; Jan/Feb (Northern CA & OR) - 1994; Jan/Feb (Southern CA & OR) - 1995 Nov/Dec (OR) - 1994; Nov/Dec (WA shore modes) - 2003; July - Dec (OR shore modes) - 2003; All Waves (CA - WA) - 1990 to 1993, 2004 to present; All Waves (WA) - 1993 to 1994.

The NOAA Fisheries Beaufort Laboratory conducts the Southeast Region Headboat Survey (SRHS) to provide headboat (partyboat) catch and effort for the Southeast Region (NC-TX). Data are available from:

**Southeast Fisheries Science Center
Beaufort Laboratory
101 Pivers Island Road
Beaufort, NC 28516-9722**

The Texas Parks and Wildlife Department has conducted their own survey of marine recreational fisheries since 1974. Estimates for Texas are available from:

**Texas Parks and Wildlife Department,
8400 Smith School Road,
Austin, Texas 78744**

The Pacific states conduct surveys of salmon fishing, ocean-boat fishing, and California passenger fishing vessels. Estimates for these fisheries are available from:

**Pacific States Marine Fisheries Commission,
45 SE 82nd Drive, Suite 100,
Gladstone, OR 97027**

The **Alaska Department of Fish and Game** conducts surveys of recreational fishing in that state.

