Pacific Recreational Fisheries Information Network (RecFIN)

NOAA Fisheries Marine Recreational Information Program (MRIP)

Regional Implementation Plan (2023)

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Implementation Plan Purpose

The Pacific Coast Recreational Fisheries Information Network (RecFIN) is a program of the Pacific States Marine Fisheries Commission (PSFMC).

Established in 1992, the Pacific RecFIN program integrates data from state and federal marine recreational fishery sampling efforts into a single database to provide important biological, social, and economic data for state and federal fishery managers, analysts, universities, scientists, and the public.

The three Interstate Marine Fisheries Commissions[1] are critical to managing and conserving shared coastal fisheries—marine, shell, and anadromous—within the first three miles of the nation's coastline for sustainable use.

This plan was developed and revised to address Pacific Coast regional needs to enhance data for regional fishery management and science, and integrates West Coast data collection and reporting efforts with the goals of the MRIP national plan.

RecFIN Steering Committee

Barry Thom (Chair) – Pacific States Marine Fisheries Commission

Ryan Wulff – National Oceanic and Atmospheric Administration – West Coast Region

Merrick Burden – Pacific Fishery Management Council

Caren Braby – Oregon Department of Fish and Wildlife

Heather Hall – Washington Department of Fish and Wildlife

Craig Shuman – California Department of Fish and Wildlife

[1] Atlantic States Marine Fisheries Commission, Gulf States Marine Fisheries Commission, Pacific States Marine Fisheries Commission

Pacific RecFIN Funding Priorities at a Glance

1. Maintain and Restore Base Level Sampling
Maintain the current survey sampling levels and restore base levels of sampling (including new funding for certified programs).

2. Implement and Support Enhanced Electronic Data Collection
Implement and support electronic data collection applications across all sampling modes.

3. Increase Onboard Sampling
Expansion of onboard sampling of Commercial Passenger Fishing Vessels or Recreational Charter Boats.

4. Investigate and Maintain Video Effort Counts
Investigate and maintain video-based methods and technology to estimate fishing effort.

5. Stratify PC Sampling by Trip Type and Sampling Period for Southern California
Investigate stratification of PC sampling by trip type and sampling period.

6. Provide Improved Access to Marine Recreational Fisheries Statistics Survey (MRFSS) Database
Increase the quality and accessibility of the MRFSS database.

7. State Calibration of Historical Catch
Reconstruction and calibration historic catch estimates.

8. Modifications to Meet Requirements of the MRIP Recreational Fishing Survey and Data Standards
Survey design, estimation methods, and data system updates to meet new MRIP data standards.

9. Addressing Peer Reviewers' Recommendations to Achieve MRIP Survey and Estimation Methods Certification
Survey design, estimation methods, and data system updates to achieve MRIP certification.

10. RecFIN Database and Reporting Tools Development
Database and reporting system updates and data transfer modernization for the RecFIN database.

11. Collection of Recreational Caught Groundfish Age Structures
Expansion of CDFW CRFS sampling for collection and processing of groundfish age structures.

12. Outreach and Education
Maintain and improve outreach activities and educational materials for the Pacific coast sportfishing community.

13. Increase Age Reading Capacity
Increased support for additional age reading personnel to process and read recreational age structures.

Priority 1 – Maintain and Restore Base Level Surveys

Oregon Department of Fish and Wildlife

Ocean Recreational Boat Survey

The Oregon Department of Fish and Wildlife (ODFW) annually surveys the marine recreational fishery. The ocean boat fishery (i.e., charter, private) is sampled by the Ocean Recreational Boat Survey (ORBS) and data collected by this survey is used to produce estimates of catch and effort for this fishery. ORBS also samples estuary boats in the lower estuary areas where ocean sampling is occurring; however, estimates are not currently produced for estuary effort or catch.

Presently the ORBS project samples at the top ten to eleven most active ocean access points. There are an additional eleven access points which are estimated to account for less than 2% of the ocean boat activity in total, based on evaluations from salmon catch records. For Nehalem and Port Orford, recent MRIP-funded surveys confirmed the low level of ocean recreational activity and catch of bottomfish species. Note that many of these minor access points are considered unsuitable for ocean access by the Oregon State Marine Board. At the five most significant ports with recognized good non-salmon fishing activity, ORBS samples from early March and through October. This period accounts for approximately 96% of the non-salmon fishing effort in these ports. In three of these ports (Depoe Bay, Newport, and Brookings) sampling occurs for the full year. Sampling in the remaining ports typically begins in the first week of May or the third week of June, and ends in late September. Most recently, ORBS continued to perform year-round sampling at Charleston, and extended sampling in Pacific City to the period of May through October for a two-year period. During the 2011-12 winter period, additional sampling was funded through the MRIP to conduct full year sampling in all currently sampled ports. An additional MRIP study during 2012-13 included overwinter sampling in specific ports and extended sampling in several others. The ORBS also collects length and weight statistics for use in converting numbers of fish into total weight of catch landed by species and strata. This information is also utilized in assessing stock health.

At-Sea Observations and Shoreside Biological Sampling

Three PSMFC samplers supervised by ODFW conduct at-sea observations of charter fishing activity to gather information on retained and discarded fish (species, number per angler, average size, location of catch, depth of water, etc.) as well as shoreside sampling to collect age structures from select non-salmon species during the spring through fall.

The purpose of observing onboard ocean recreational charter boats is to document the physical size (length) of groundfish released from recreational charter vessels, gather depth distribution of catch and discards, and collect reef-specific location and catch per angler data. Onboard observations of recreational charter vessels targeting groundfish and Pacific halibut generally occur from March through September to observe fishing activity and to record fish release information, catch per angler, bottom depth, and GPS locations of reefs where fish were caught (when possible). At-sea sampling may occur on general season trips and others such as experimental fisheries. Additional sampling capacity is also a priority for ODFW (See Priority #3).

Biological samples of several non-salmonid species, including age structures and maturity samples, is gathered shoreside from March through October. Shoreside biological samplers collect and prepare groundfish age structures (rays from lingcod and otoliths from other groundfish species) from the ocean boat fishery in Garibaldi, Depoe Bay, Newport, Charleston, Bandon, Gold Beach, and Brookings. Annually, around 3,500 otoliths and 1,000 lingcod fin rays are collected. This sampling program has been active for 20 years and has contributed data to multiple federal fishery stock assessments.

Two of the three PSMFC samplers are currently supported by RecFIN, and the third is supported by Sport Fish Restoration grant funds to ODFW. These same samplers also conduct the only at-sea data collection in the Oregon recreational boat fishery. ODFW relies on RecFIN funding to continue this valuable data collection project.

Shore and Estuary Boat Survey

The Shore and Estuary Boat Survey (SEBS) is a state survey designed to estimate catch and effort of Oregon's non-anadromous marine recreational fisheries from shore and estuary boats. Catch and effort estimates for ocean boats are generated by the ORBS survey (described above).

Like ORBS, SEBS is concerned with groundfish, surfperch, and any other finfish species. Catch and effort estimates for these fishes are derived from two complementary surveys: (1) an angler intercept survey to determine catch-per-unit-effort (angler trip) and average weight by species and (2) a telephone or mail survey of angling licensees to generate an estimate of angler effort. Future SEBS effort estimates could incorporate other means of contacting shore and estuary boat anglers, including e-mail or online surveys. It is necessary to combine results of both survey types to generate catch estimates in both numbers and weight of fish.

Year-round SEBS sampling was last conducted in Oregon from July 2003 through April 2005, when the survey was suspended due to budget constraints and reprioritization of sampling

resources. More recently, an MRIP-funded SEBS pilot study was implemented from May 1–October 31, 2016, during three consecutive 2-month waves (waves 3, 4, and 5) in a limited geographic area to (a) evaluate the need and expense of reinitiating a SEBS program in Oregon and (b) compare response rates and potential bias in effort estimates between telephone and mail surveys. Data from that pilot study have been analyzed and final reports are available.

Catch estimates for shore and estuary boat fishers from the surveys that ended in 2005 inform management and stock assessments of groundfish (e.g., black rockfish), surfperch, greenling, and other species. It is unlikely, however, that these legacy data sets are representative of the current status of the resource, or of fishing effort. There is a need for more current and representative data to effectively and responsibly manage this fishery.

Baseline Survey Requirements

Table 1 provides a summary of the required baseline sampling, data processing, and supervisory support for the ORBS and at-sea observations/shoreside biological sampling surveys. Funding for these projects comes from a variety of sources, including NOAA Fisheries, US Fish and Wildlife Service (USFWS), and state funds. The PSMFC contribution to this monitoring program, which supplements funding from other federal and state sources, was increased in 2020 after remaining relatively flat since 2011. At-sea observation and shoreside biological sampling is also partially funded with MRIP funds. Current funding levels are sufficient to conduct ORBS and at-sea/age sampling at baseline levels; however additional funding may be required in the future to account for increasing survey costs, additional sampling requirements, and reductions of other funding sources.

Table 1. ORBS and at-sea CPFV observing and shoreside biological sampling personnel requirements

Survey Sampling/Support	Months
Ocean Recreational Boat Survey	182
At-Sea CPFV observing and shoreside biological sampling	36
Data Processing	12
Crew leads	12
Supervisory	24
Total	266

To restore the Oregon SEBS program, all coastal regions (north, central, and south) will be sampled annually during all months of the year (i.e., waves 1–6) by both angler intercept surveys and off-site surveys (e.g., online, mail, telephone). This will include nine samplers (three in each region) conducting work during waves 2–5, and three samplers (one in each region) conducting work during winter months (waves 1 and 6). Winter sites will be reduced to include primarily estuary anglers (boat and shore). Sampling will be reduced along ocean beaches because it is unlikely that much fishing would occur on the beach during winter months. Support staff to implement the survey includes (a) SEBS coordinator (12 months), (b) developer/database manager (6 months), (c) statistician (2 months), and (d) supervisory fish and wildlife biologist (3 months). Details are provided in Table 2.

Table 2. Oregon SEBS survey requirements

Personnel requirements

Position	**Months**
Sampler	84
SEBS coordinator	12
Developer/database manager	6
Statistician	2
Supervisory	3

Non-personnel required units/costs

SEBS non-personnel costs	**Units/Cost**
Online survey	TBD
Travel	TBD
Supplies	TBD

Washington Department of Fish and Wildlife

Ocean Sampling Program (OSP)

The Washington Department of Fish and Wildlife Ocean Sampling Program is the source of official catch and effort estimates for Washington's ocean boat recreational fishery. The OSP generates estimates of total ocean recreational effort and catch by boat type (charter and private), port, catch area, and trip type (primary target species). Boat trip sampling is conducted randomly to generate estimates of catch for most ocean-caught species: salmon, rockfish and other groundfish, halibut, albacore, sharks, and cods. Estimates of released fish are also generated using angler interviews. The ocean fisheries have been sampled by the Washington Department of Fish and Wildlife since the early 1960's. Creel data are used exclusively in the ocean areas to estimate Washington recreational catch and effort.

Field samplers are stationed in all major coastal access sites: Ilwaco, Chinook, Cape Disappointment State Park, Westport, La Push, and Neah Bay. All ports are monitored from May through September, with additional sampling coverage occurring during March, April, and October in some areas to monitor groundfish fisheries. Approximately 29 field samplers are employed each season to collect catch and effort data. Two full time biologists coordinate sampling activities, one full time biologist generates in-season groundfish catch estimates, and one full time biologist provides data quality control.

Results of recent MRIP-funded pilot studies and recommendations from MRIP consultants illustrated the need for minor improvements in the OSP sampling program to increase precision of effort and catch estimates. Recommendations included increases to current sampling coverage at all four major coastal ports (Ilwaco, Westport, La Push, Neah Bay) during shoulder months (March 10–April 30 and October 1–20), and periodically allocate sampling effort in "minor" coastal ports, including Ocean Shores, Tokeland, and South Bend to assess changes in fishing effort.

Marine Fish Science (MFS)

In addition to conducting groundfish fishery independent surveys and field studies, the coastal WDFW Marine Fish Science (MFS) group conducts ocean boat recreational fishery biological sampling at three major coastal ports: Westport, La Push, and Neah Bay. At Westport, groundfish biological data are collected from the charter fleet which delivers retained carcasses to a sampling platform staffed by a minimum of two technicians. At Neah Bay and La Push, one permanent seasonal technician samples whole fish landed by charter and private vessels. Length,

weight, and otoliths are collected. These sampling efforts produce key life history data, including age data, for bottomfish stock assessments, particularly black rockfish at Westport and nearshore species that are rarely encountered and sampled in other fisheries at Neah Bay and La Push. The sampling positions are supported by state funds.

Puget Sound Sampling Program (PSSU)

The WDFW Puget Sound Sampling Unit (PSSU) is the source of official catch and effort estimates for much of Washington's Puget Sound boat recreational fishery, specifically Puget Sound Marine Catch Areas 5-13. To produce estimates of marine fish catch and effort in Puget Sound Marine Catch Areas for the "private boat" mode, WDFW employs a procedure based on data collected by two independent surveys: 1) the access point intercept survey and 2) the telephone survey (described below). The WDFW Puget Sound Sampling Unit conducts the access point intercept survey, providing catch data to estimate the catch-per-unit-effort (CPUE) and the proportion of anglers without fishing licenses (primarily juveniles that are 14 years of age and younger and exempt from the fishing license requirement). A telephone survey based on the Washington Interactive Licensing Database (WILD) provides data for estimating fishing effort made by licensed anglers. The combined results from the two surveys are used to generate estimates of total catch and effort by Marine Catch Area in two-month increments (waves).

Washington Angler License Survey

Fishing effort (number of angler trips) is estimated using a contractor that conducts a telephone survey of licensed anglers and licensed charter operations. In the angler survey, a subsample of 8,400 license holders is contacted by telephone on a bimonthly basis and asked to enumerate their saltwater fishing trips during the preceding two months. The results of the phone survey are used to estimate fishing effort. Catch-per-effort is estimated through intercept (creel) surveys at sites selected throughout Puget Sound (sites selected proportional to effort). Catch rates from the angler interview program are applied to the phone survey derived effort estimates to estimate catch. As is the case in the coastal area, discarded catch are estimated as well.

Catch from non-boat based (beach/bank and manmade) modes is not included in these estimates, however effort from these modes is monitored. Smelt catch and effort are not included in these estimates since smelt are fished from the shore and have not required a license.

The telephone surveys are conducted on a bi-monthly basis. Selected anglers are randomly drawn from the WILD-license holder frame within one of four strata. The strata are 30-year-olds and over who purchased annual licenses, under 30 who purchased annuals, 30 and over who purchased day type licenses, and under 30 who purchased day type.

In the telephone interviews, each angler contacted is asked to report the number of trips they made in the two-month period. For each trip, they are asked the date, MCA, county returned to, gear type, target species, and time of return.

Baseline Survey Requirements

Tables 3, 4, and 5 provide a summary of the baseline sampling, data processing, supervisor support for the WDFW OSP, PSSU, and MFS surveys. Survey requirements for the telephone survey are also addressed.

Funding for the OSP and PSSU programs is derived from a variety of sources, including NMFS, USFWS, and state funds. Funding for both OSP and PSSU to support base level sampling has been received annually through PSMFC, and the funding is allocated between the programs. MFS has been funded solely by state sources.

The PSMFC contribution to these recreational monitoring programs remained relatively flat after 2006 but increased in 2020. Inflation and other factors such as salary and benefit increases continue to substantially reduce the purchasing power of available funds. For example, scientific technician and biological staff salaries will be increasing by 10%, not including cost of living allowances, in 2023. Staffing at all ports, especially rural ones like Neah Bay and La Push, and around Puget Sound is increasingly challenged by a lack of housing inventory and steeply escalating costs. Options in many locations have become very limited with the growing popularity of short-stay vacation rentals, such Airbnb. Housing subsidies may be necessary to maintain baseline services. Historically, shortfalls have been compensated for by obtaining additional state funding, reducing, or eliminating sampling (e.g., reductions to sampling coastwide, reductions in biological data collection, elimination of early- or late-season sampling in some coastal and Puget Sound ports), and improving efficiencies through successful application of MRIP-funded pilot study results (e.g., adoption of electronic sampling). However, state funding cannot be relied upon to backfill the inflationary deterioration of base funds provided by PSMFC.

Level funding is not sufficient to conduct WDFW OSP and PSSU surveys at baseline levels given escalating costs. Moreover, current budget resources constrain recreational fishery opportunity. For example, Pacific halibut fishing opportunity for coastal areas and Puget Sound is constrained by field staffing, sampling design, and data processing staff limitations. In Puget Sound, funding to support Pacific halibut fishery sampling has not been supported by PSFMC. Similarly, insufficient data prevents an evaluation of the potential expansion of lingcod fishing opportunity in Puget Sound. The PSSU also does not cover certain fishing modes such as diving/spearfishing and these may represent more effort than documented. The angler phone

survey estimates are not useful due to high CVs. In coastal areas, full application of descending device use "credit" for the recreational bottomfish fishery will be constrained by the need to maintain sampling rates. The Pacific Fishery Management Council has expanded the number of bottomfish species that have depth-based mortality rates when a descending device is used to release rockfish at depth. In the past, rates were available for yelloweye rockfish and canary rockfish. Increasing the number of potential candidate fish will increase dockside interview length. To take advantage of the full suite of mortality rate credit across other rockfish species while also ensuring sampling coverage rates are not compromised will require additional sampling staff. Finally, catch of some species, such as forage fish are not estimated. A significant impediment to addressing the gaps in existing baseline surveys is the lack of agency staff with skills in statistical survey design. In a competitive environment recruiting and retaining this type of expertise to the agency has been difficult. Overall, additional funding will be required in the future to account for increasing survey costs, additional sampling requirements, and reductions of other funding sources. Finally, any reduction to state resources supporting MFS recreational groundfish fishery sampling could result in a loss of crucial biological data to inform stock assessments. The telephone angler survey program is accomplished by a contractor funded through PSFMC to conduct a particular number of interviews, currently 8,400, annually. Due to increasing contractor costs, maintaining this level of coverage likely cannot be accomplished at present funding levels. Past program funding has not consistently supported a stable number of interviews. While adequate funding to maintain a stable angler phone survey is necessary, changing behaviors challenge this traditional approach. The contractor notes a diminishing capacity to reach anglers since many people now typically decline to answer calls from an unknown number and an increase in the number of anglers refusing to be interviewed when successfully contacted. To improve data accuracy, WDFW would like to increase funding for the telephone angler survey to address the need to increase the number of contacts that need to be made to complete a successful interview. At the same time, to modernize and increase survey cost effectiveness, WDFW would like to investigate an alternative approach such as online surveys to supplement or replace the existing telephone survey.

Table 3. WDFW OSP survey personnel requirements

Sampler Months

	Ilwaco	Westport	La Push	Neah Bay	Minor Ports	Total
March	1	1	1	1	0	4
April	1	1	1	2	0	5
May	3	4	2	6	2	17
June	8	7	2	6	2	25
July	10	9	2	6	2	29
August	10	9	2	6	2	29
September	10	9	2	6	1	28
October	1	1	1	1	0	4
						141

Supervisory

Position	Months
NRS3/BIO3/BIO2	60

Total	Months
	201

Table 4 PSSU survey personnel requirements

Sampler Months

	Olympic Peninsula	North Sound	Central Sound	South Sound	Total Months
January	2	2	6	7	17
February	2	2	6	8	18
March	3	2	6	8	19
April	11	10	5	8	34
May	15	10	6	6	37
June	15	13	12	13	53
July	15	18	18	20	71
August	15	18	19	21	73
September	15	18	19	21	73
October	3	6	10	11	30
November	0	0	3	9	12
December	0	0	5	7	12

Supervisory (Project Management, Data Management, and Support Staff

Positions	Months
BIO 4, BIO 3s, IT Data Manager, ST2s, MA3	73

Total	Months
	522

Table 5. WDFW MFS survey personnel requirements

Sampler Months

	Westport	La Push	Neah Bay	Total Months
March	2	0		2
April	2	1		3
May	2	1		3
June	2	1		3
July	2	1		3
August	2	1		3
September	2	1		3
			Total	20

California Department of Fish and Wildlife

California Recreational Fisheries Survey (CRFS)

CRFS is the primary source of official catch and effort estimates for California's diverse recreational finfish fisheries. These estimates are used in conjunction with other fisheries information to manage mixed jurisdiction Federal/State groundfish, highly migratory species and state-managed fisheries. CRFS provides recreational fisheries data and estimates needed to manage California's marine and estuarine finfish resources on a sustainable basis. Management requires accurate and timely information on catch and effort to ensure harvest does not exceed allowable levels; in addition, catch location and biological data are used in stock assessments. CRFS collects data on California's marine recreational fisheries and provides monthly estimates of catch and effort of angler fishing for marine finfish in California. CRFS currently monitors four modes of saltwater fishing:

- Party and Charter boat (PC)
- Private and rental boats (PR)
- Man-made structures (MM)
- Beach and Bank (BB)

CRFS is composed of several onsite angler intercept surveys conducted at public access sites and an off-site complimentary survey aimed to estimate recreational finfish effort and harvest for BB and PR modes of fishing. CRFS's Angler License Directory Online Survey (ALDOS) (described below) is used to estimate effort where onsite surveys are not feasible such as PR private access and night-time fishing, and beaches and banks fishing effort. PC estimates are derived from California's mandatory Commercial Passenger Fishing Vessel logs for effort, a validation survey used to estimate log compliance and an onsite intercept survey to estimate catch per unit effort (CPUE). BB catch estimates are derived from ALDOS effort estimates and a roving onsite intercept survey for CPUE. Salmon estimates are produced by CDFW's Ocean Salmon Project (OSP) using CRFS PR intercept data and an independent salmon specific PC dockside survey supported by OSP.

The data and estimates generated by CRFS are provided to RecFIN as part of the MOA between California and the National Oceanic Atmospheric Administration (NOAA) granting an exemption to the National Angler Registry.

California Angler License Directory Online Survey

A contractor is used to conduct a license frame online survey, known as the Angler License Directory Online Survey (ALDOS), where angler contact is based on licensed anglers' email addresses. Prior to 2023, CDFW used a telephone-based Fishing Effort Survey (FES) known as the Angler License Directory Telephone Survey (ALDTS). In May 2018 CDFW began testing ALDOS as a replacement for ALDTS because the CRFS budget could no longer support the increasing costs of ALDTS. ALDOS and ALDTS data were collected in parallel from May 2018 to May 2022 (with a break between February 2019 and October 2020) to gather data to inform the ALDTS to ALDOS transition plan. ALDOS received MRIP certification in January 2023 and replaced ALDTS as California's offsite FES. Effort (number of angler trips) is estimated through surveys of 11,927 licensed anglers. Surveys are conducted on a monthly basis. Each angler contacted is asked to report the number of trips made in a survey covered month. Results are transmitted to PSMFC and CDFW monthly, within 30 days after the monthly sampling period. Over the history of California's FES, a number of different methods have been used to contact anglers. These methods have included face-to-face interviews, RDD-based telephone interviews, license-frame based telephone interviews and email/online based interviews. Anglers are now accustomed to using a variety of devices to communicate both in a business and personal environment. Currently, the proportion of anglers who provide their email address is roughly 38 percent. However, telephone numbers are provided by all anglers, and 83 percent of these telephone numbers are estimated to be associated with smart phones. In November 2022, California tested the use of text messages to initially contact the angler and the results indicated that it would be feasible to supplement ALDOS email invites with text message invites. CDFW is considering next steps that would need to be taken to implement text message invites to ALDOS since coverage of the online survey would increase dramatically with the use of text messaging.

Baseline Survey Requirements

Tables 6 and 7 provide a summary of the baseline sampling, data processing, supervisory support, and online survey requirements for the CDFW CRFS survey.

CRFS is partially supported by a NOAA grant with funding passed through PSMFC. The state provides the majority of funds, which support dedicated permanent staff, temporary staff for field sampling, and operational costs. The NOAA grant funding is primarily used to supplement data collection activities. This funding was increased in 2020, after remaining relatively flat since 2004 when CRFS replaced the Marine Recreational Fisheries Statistics Survey.

Inflation continues to substantially reduce the purchasing power of available funds. In the past, funding shortfalls have been compensated by obtaining additional state funding, promoting sampling efficiencies, and reducing sampling or sampling rates, at the cost of estimate precision. Sampling rate reductions occurred in 2015 for PR, PC, and MM modes. In 2016, the monthly quota of anglers contacted by the Angler License Directory Telephone Survey (ALDTS) that previously produced data needed to estimate BB and PR-PAN effort was reduced. In 2018, further budget reductions offset inflation and limited state resources. CDFW had to reduce sampling by eliminating the ALDTS and the BB catch rate survey, so CRFS did not have full coverage of all modes of access to the recreational fisheries and could not directly estimate effort and catch from PR-PAN (based on ALDTS data) or BB. Remaining funds resulting from the sampling reduction were redirected to increase sampling of other modes to pre-2015 sampling rates (PR: 20% of available site days; PR2 and MM: 10%). Using additional funds provided by MRIP for FY2020, CDFW was able to reestablish the BB survey and ALDTS in late 2020.

CDFW maintains a data system for CRFS that is essential for entry, quality assurance, quality control and maintenance of sample data; partial automation of estimate production; and access to sample data and estimates. The data system includes a SQL Server database; a data entry system that is in the process of being upgraded to digital field data collection; a data portal that acts as a partial interface to the CRFS database; and a data warehouse that enhances efficiency of data access.

Baseline funding is needed to maintain and make required enhancements to the CRFS data system. Temporary funding is helpful when major enhancements to the data system are needed. However, full-time permanent information technology staff who are dedicated to the CRFS data system are needed to maintain the legacy knowledge necessary to complete routine maintenance; troubleshoot and fix unexpected errors; update data collection forms and the data upload process in response to changes in sampling methods; ensure the data system is secure; and lead and manage the work of temporary staff.

Full-time permanent information technology staff will help ensure that several major and required changes to the CRFS data system succeed. Major enhancements to the CRFS data system will be needed in the coming years as CRFS continues migration to electronic data collection, CRFS responds to state or federal requirements, as CDFW enhances tracking of quality control to meet MRIP data standards, and as CRFS sampling and estimation methods change in response to statistical consultant feedback provided as a result of MRIP's certification process.

Current funding levels are sufficient to conduct the CDFW CRFS survey at baseline levels; however, additional funding may be required in the future to account for increasing survey costs,

additional sampling requirements, and reductions of other funding sources. Survey costs may increase in 2023 if average PC onboard trip duration increases as a result of changes to groundfish depth restrictions. CRFS onboard sampling of longer duration groundfish trips (to access depths not previously accessible) is essential for collection of biological data on retained and discarded catch and for identification of catch of shelf and slope rockfish to the species level.

Table 6. CDFW CRFS survey personnel requirements

Sampler (Scientific aid) Months

Mode	Sampling rate	Samples	Months
PR1	20%	1710	135
PR2	10%	1210	66
PC	4%	890	48
MM	10%	1430	81
BB	3%	800	43

Supervisory/Support

Category	Position	Months
Field Implementation and Coordination	Sr Env Sci (specialist)	12
	Sr Env Sci (supervisory)	24
	Env Sci	60
	F&W Tech	84
Database Maintenance and Improvements	Information Technologist II	17
Methodology, Estimation and Statistical Support	Sr Env Sci (supervisory)	12
	Env Sci	36
	Statistical Methods Analyst II	12
CPFV log	Office Technicians	10

Total	Months
	640

Table 7. CDFW CRFS Angler License Direct Online Survey requirements

Month	Number of Completed Interviews	ALDOS Cost Per Complete Interview	ALDOS Monthly Cost
January	2021	$6.68	$13,500.28
February	2021	$6.68	$13,500.28
March	2297	$6.68	$15,343.96
April	2297	$6.68	$15,343.96
May	2379	$6.68	$15,891.72
June	2379	$6.68	$15,891.72
July	2681	$6.68	$17,909.08
August	2681	$6.68	$17,909.08
September	2093	$6.68	$13,981.24
October	2093	$6.68	$13,981.24
November	1529	$6.68	$10,213.72
December	1529	$6.68	$10,213.72
		Estimated Annual Costs	**$173,680.00**

Priority 2 - Implement and Support Enhanced Electronic Data Collection Applications

Oregon Department of Fish and Wildlife

Oregon's marine recreational fisheries benefit from timely and accurate data collection and harvest estimation. New handheld computers will allow the ORBS to continue to provide catch estimates and biological data that are critical for fisheries management. Timely and accurate fisheries data maximizes fishing opportunity while preventing harm to our marine resources.

Many marine fish species are managed with annual quotas, and recreational harvest estimates rely on dockside creel survey data reaching fisheries managers as soon as possible. Upgrades to the hardware and software are continually needed to provide the highest quality catch estimates to avoid exceeding quotas.

ORBS currently has 40 handheld computers in service used by samplers in 11 different ports. The handheld devices are programmed with a custom survey application written and maintained by ODFW's Application Development team. The current devices (Juniper Systems Mesa2, Windows 10 OS) have been in service since 2018 and have reached end-of-life.

Estimated Budget

Data collection tablets (40 @ $1,400, plus indirect cost)	$88,400

Washington Department of Fish and Wildlife

The WDFW OSP implemented electronic data collection for recreational dockside interviews in 2016; the PSSP followed in 2017. Electronic sampling requires data capture devices, technical support, education, and forms updates.

Both the OSP and the PSSP are currently using iPads and the iForms application to collect marine fishery catch and effort data. Biological data are also recorded electronically. Electronic sampling allows WDFW to build criteria into the data collection application (minimizes potential error) and significantly increase the speed at which data can be processed and used for catch estimation. Although some cost savings were realized with electronic sampling (cost of keying paper data, form-related materials), other costs were incurred.

Annual costs – Devices are purchased incurring one-time charges. Ongoing expenses include costs for repair and regular replacement. For example, 67 of the 110 total needed devices were replaced in 2022.

Monthly costs – Devices are purchased for both OSP and PSSU. In addition, the PSSU devices are enabled with wireless capacity; the service fee is $40 per month each.

Training – A number of staff have taken an iForms certification course ($600/person) to allow them to develop and manipulate data collection applications, but more staff need this training to ensure adequate support in-season.

Technology Support – Dedicated technology support for sampling applications and data storage and transfer is necessary; current staffing levels are inadequate to provide the support needed for the volume of data collected by these two programs.

Estimated Budget

	OSP	PSSP
iPad Purchase	$35,746 (40 units, no 4G)	$84,118 (110 units)
iPad Accessories	$4000 (40 units)	$11,000 (110 units)
iPad Data (LTE)		$26,406.6 (110 units for 6 months)
Technical support	$37,480 (5 months)	$44,976 (6 months)
Sub-Totals	$77,226	$164,500.70
Total	$241,726.70	

California Department of Fish and Wildlife

West Coast marine recreational fisheries benefit from timely and accurate data collection and harvest estimation. Handheld computers or tablets used in Oregon and Washington have proven beneficial by reducing data processing time and have promoted cost efficiencies. Electronic data collection allows for additional validation checks and immediate feedback to the data collector to correct errors or conduct additional checks. Quality assurance checks can also be implemented when the data is uploaded to a database. Electronic data recording eliminates the need to record on paper and key the data into a database. The potential benefits for CDFW in adopting a similar system include reduced time between data collection and estimation providing for timely catch data for in-season tracking of quota or fisheries constrained with low ACLs and provide cost savings.

In late 2020 CDFW completed an initial business analysis to determine the feasibility of adopting electronic data collection. The results of the analysis ensured compliance with the California State Administrative Manual Data Security and Standards policies, determined logistical feasibility, and selected a data recording application platform and equipment. In FY2020/21 CDFW used surplus MRIP funds, resulting from COVID-19 cost savings supplemented by state funds, to purchase 90 Apple iPad Pros. CDFW provided in-kind services to purchase MS Power Apps software and develop a prototype form to record CRFS data. Pilot testing in the field is anticipated to begin in 2023.

CDFW has provided 100% in-kind fiscal, technical, and programming support for the preliminary development of CRFS electronic data collection forms. Additional programming support from a specialist with expert knowledge in the design and creation of Power Apps data entry forms will be needed to complete form development and to make modifications throughout the pilot testing phase. In addition, CDFW will need the services of a skilled external contractor to develop a system to transfer the data to the CRFS database, track assignment status, and verify the quality of data entered.

CRFS plans to use up to 90 iPads to record data at over 450 sampling sites from the California-Oregon border to the California-Mexico border. Sampling occurs year-round, subjecting the iPads to extreme inclement weather, with temperatures up to 90 degrees and in moist environments (i.e., fog and rain). Life expectancy for an iPad in normal operating conditions ranges from four to five years and we expect a higher failure rate due to adverse working conditions. We anticipate an initial annual replacement rate of 10% that will increase as iPads age. Replacement cost projections are calculated for the first year but will increase in subsequent years.

Estimated Budget

Programmer support (6 months @ $20,000, plus indirect cost)	$120,000
iPad and protective equipment (9 @ $1,300 plus indirect cost)	$11,700
Total Annual Cost	$131,700

Priority 3 - Increase Onboard Sampling

Oregon Department of Fish and Wildlife

Expansion of On-Board Sampling of Commercial Passenger Fishing Vessels or Recreational Charter Boats in Oregon

PSMFC biologists currently conduct at-sea sampling on board charter vessels operating off Oregon's coast. This onboard sampling program provides essential information necessary for responsibly managing Oregon's recreational fisheries, such as providing supplemental data for ORBS, ODFW's shore-side recreational sampling program. At-sea data collection is necessary to provide improved catch per unit effort (CPUE) estimates (e.g., used in stock assessments) and to provide size/weight data of discarded fish (e.g., needed for expanded catch weights). Two of the three PSMFC samplers are currently supported by RecFIN, and the third is supported by Sport Fish Restoration grant funds to ODFW.

About 100 charter trips are sampled at-sea by PSMFC biologists each year. These trips are voluntary; charter companies do not receive monetary compensation for allowing samplers on board. The current sampling effort (about 100 trips) may represent a saturation point, in which a higher sampling rate can only be achieved through a cash incentive to attract additional volunteer vessels, or through regulations that require charter vessels to accept at-sea samplers. Vessels that currently opt out from accepting PSMFC samplers do so because vessel capacity is often met due to small vessel size or popularity of the fishing season and/or fishing port. Hence, carrying an at-sea sampler may reduce their income by one paying customer for certain trips.

Expanding the at-sea sampling program would be beneficial to reduce uncertainty in CPUE indices and in the calculations of weight and length of discarded fish. The latter benefit is especially true for less common species. Expanding this program may also improve the representativeness of samples (i.e., reduce bias).

Estimated Budget

PSMFC sampler	12 months/year
Travel and other supplies	$5,000
Vessel incentive ($100 / trip x 130 trips)	$15,000

Priority 4 - Investigate and Maintain Video Effort Counts

Oregon Department of Fish and Wildlife

ODFW seeks to improve the recreational saltwater fishing vessel effort count procedures in nine Oregon ports through the deployment of High Definition (HD) video camera and networked video systems. ORBS has proven that using strategically placed video cameras can provide round-the-clock monitoring of recreational fishing vessels as they exit harbors to fish in the ocean. The current video camera systems used to enumerate fishing effort were first installed in 2007. ODFW seeks to explore high tech solutions as an upgrade from the analog standard definition cameras in use today.

The equipment needs include nine replicate systems of cameras, recorders, cabling, and media storage devices. The new Internet Protocol (IP) cameras will be HD, outdoor-rated (IP67), Power over Ethernet (POE), and will be connected to an on-site server. The server will be connected to the internet via cellular modem or hardwired high-speed internet. Depending on the needs of each individual port location, each system will have one to three cameras networked to one recorder.

Video data from each location will be transmitted to the ODFW storage server. Video review (counting boats) is accomplished using a custom web application.

Estimated Budget (including 30% indirect cost)

HD Camera and recording system (9 @ $4,000 each), **one-time cost**	$46,800
Annual Technical support and software licensing (12 months @ $3,100/month)	$48,360
Travel	$6,500
Total	$101,660

Washington Department of Fish and Wildlife

A video monitoring system to record daily boat effort in ports sampled by the Washington OSP would provide a complete record of departing/returning trips throughout the entire fishing day, and could free sampler work shifts normally assigned to boat counts to be reassigned to increase dockside sampling. Also, daily effort for non-sampled days is currently estimated from the mean observed effort of sampled days within the stratum. Because ocean recreational effort is often highly variable from one day to the next, estimates generated from mean daily effort add significant variability to the estimate. Video monitoring would provide a more precise count of effort for every day, potentially improving the precision of catch estimates.

Washington's OSP currently uses several methods to estimate ocean recreational fishing effort. Primarily, exit (visual counts of vessels leaving port) or entrance (visual counts of vessels entering port) counts are used; these may be augmented by slip counts (identification of vessels missing from their mooring slips) or trailer counts (counts of empty trailers at launch sites). Both exit and entrance counts rely on staff presence for the entire period of time each day that vessels are either exiting or entering port. Boat counts are collected only on sampled days and are the foundation of the catch and effort estimates generated by the OSP.

Since 2010, Oregon's ORBS has employed video monitoring systems as a tool to estimate ocean recreational fishing effort in Oregon. This technology could potentially benefit Washington's coast in ways similar to the benefits seen in Oregon, including increased temporal coverage of effort counts both within and across days, greater flexibility and efficiency in allocating sampler work shifts, increased safety, reduced staff costs and increased accuracy and precision of effort and catch estimates.

The OSP proposes a multi-stage implementation process for migrating to video effort counts. The first stage was initiated in 2022 and piloted the accuracy and effectiveness of using video counts for effort counting. Testing occurred during the 2022 sampling season from May through June in La Push and in Neah Bay from July through October. The evaluation of the initial pilot is complete, and WDFW is now moving onto the next stage of implementation, which includes pursuing permanently mounted video camera systems in all five primary ports: Neah Bay, La Push, Ilwaco, Westport, and Chinook. The final stage of implementation will involve revising the catch and effort estimation program used by the OSP to incorporate new effort data for non-sampled days.

An FIS proposal for a one-year project was granted for the 2023 sampling season. Funds will be dispersed in the spring of 2023 and have already been fully allotted. Camera equipment and installation costs exceed FIS project funding, and no current source exists to fully implement

video monitoring at the level necessary. All annual costs required to continue the video monitoring are currently unsupported.

Estimated Budget

One-time costs	
Installation supplies and services	$55,430
Staff time for video review/camera installation support, 2-Sci Tech II's @ 2 months	$6,892
Travel – video equipment installation/maintenance	$3,579
Biometrician support (catch estimation algorithm review)	$20,540
Overhead (33.5%)	$28,958
Total	$115,399

Annual costs	
Repair, replacement, and maintenance of equipment and systems, services, utilities	$15,115
Travel – video equipment inspection/maintenance/troubleshooting	$5,579
Staff time for video review, repairs- 2 Sci Tech II's @ 9 months	$31,014
Overhead (33.5%)	$17,322
Total Annual	$69,030

California Department of Fish and Wildlife

The CRFS currently uses several methods to estimate private and rental boat recreational fishing effort in coastal waters. Primarily, tallies of angling parties are collected during the catch rate surveys and are supplemented by trailer counts for late returning boats after the survey has concluded. ALDOS collects data on trips that originate from private marinas and nighttime fishing effort not sampled by CRFS field intercept surveys. Current ALDOS quota for completed interviews is insufficient to properly represent sparsely populated districts of California's north coast. CDFW would like to explore alternative onsite methodologies to collect effort data to compensate for low or sporadic interviews containing private access and nighttime fishing effort in northern California.

The ODFW ORBS has demonstrated that using strategically placed video cameras can provide round-the-clock monitoring of recreational fishing vessels as they exit harbors to fish in the ocean. ODFW has integrated video counts in the ORBS effort estimation procedures and is undergoing the final steps of certifying this method through MRIP. It is expected MRIP will endorse ORBS effort estimation methods. In addition, ODFW is currently testing new video capture technologies to automatically identify and count fishing vessels. California's north coast ports have similar logistical attributes to ports sampled by ORBS and video monitoring may be a feasible means to collect effort data. With funding, CDFW will investigate video monitoring in northern California by conducting feasibility studies. Without additional information CDFW cannot provide a budget but supports further investigation into video effort counts in northern California.

Total Annual Cost: TBD

Priority 5 - Stratify Party/Charter Vessel Sampling by Trip Type and Sampling Period

California Department of Fish and Wildlife

Fisheries commonly targeted by Party/Charter (PC) support an important recreational fishery in California, providing substantial economic contribution to the local economy. When various fisheries are present, both recreational private boat and commercial passenger fishing vessel (CPFV, also commonly called party or charter boats) anglers commonly target select fisheries based on location and timing. The majority of the effort occurs in southern California on CPFVs ranging in capacity from a few anglers to more than 100 anglers, and with trip durations ranging from one half-day to 14 days. The long-range trips almost exclusively target Highly Migratory Species (HMS) in more distant U.S. and Mexican waters whereas the shorter duration trips occur in local waters targeting groundfish, coastal pelagic (yellowtail) and basses. The logistics of departure and subsequent landings are dependent on the duration, target, and port for each CPFV trip and can occur day or night.

The Pacific Fisheries Management Council (PFMC), CDFW and the Inter-American Tropical Tuna Commission (IATTC) manage southern California fisheries. Within this management framework, concerns regarding overfishing certain stocks have highlighted the need for more representative data collection and greater precision of estimates of removals and effort. Management relies on estimates of catch in numbers of fish as well as tonnage, catch rate indices, biological measurements for average weight calculations, and ancillary data collection for stock assessments (e.g., genetic samples). Data collection is achieved using multiple surveys for estimates of total removal and opportunistic data collection. When direct recreational data are absent, surrogate data are used.

In California, multiple data sources are combined to estimate total removals: CRFS Private and Rental Boat Survey (PR) estimates, CRFS PC estimates, and in the case of HMS, CPFV log summaries. CDFW currently relies on CPFV log data for management of select HMS instead of PC estimates. CPFV log data have been collected in a similar manner since 1936. They provide a long-term data set of self-reported data on effort and catch from CPFV owners or operators. The CDFW log program requires that captains and operators submit logs for each trip that contain a complete and accurate record of fishing activities. Data collected in the log consists of target species, duration, start and return times, fishing location, number of fishing passengers and catch by species. Caveats:

1) Although logs are required to be submitted monthly, not all logs are submitted and compliance is typically about 70% for southern California.
2) CPFV log catch reports are not validated and are subject to self-report bias.
3) The CPFV log does not collect biological measurements, therefore disconnected data sources are used by managers to determine average fish weights. Biological data used for average weight calculations are determined by ancillary collections, which may not be representative of the fishery, and thus is a concern (A. Siddall, Sportfishing Association of California, personal communication, 2017).

CRFS PC estimates use the effort data from CPFV logs (number of angler-days) and the corresponding confirmed CPFV fishing trips from the CRFS effort check survey to determine compliance fractions (the percent of confirmed trips identified in the CRFS survey that submitted logs). The compliance fraction adjusts CPFV log summaries for trips not reported to produce an estimate of total angler trips. This assumed unbiased effort estimator is applied to catch rate data collected by field intercept surveys to estimate catch along with biological data used for conversion of catch in numbers to metric tons. The data are either collected onboard Party and Charter boats while at-sea (PCO) or dockside (PCD) at the end of the fishing trip.

CRFS PC catch rate surveys perform well for the majority of California's fisheries. However, the CRFS PC catch rate surveys do not adequately represent fisheries where landings occur at night or trips lasting multiple days for several reasons. For example, the majority of HMS catch occurs during multiday trips and trips in Mexican waters, which typically return at night. Due to logistical sampling constraints, CRFS does not sample PCO multi-day trips or trips to Mexico, and the PCD survey is not conducted at night when a substantial amount of HMS landings occur. In addition, CRFS relies heavily on PCO sampling in southern California to maximize the collection of biological data on retained and discarded catch, rarely relying on dockside. The deficiency of the existing PC catch rate survey's sampling frame produces non-representative samples for certain trip targets and types.

To account for unique attributes of multiday trips, CDFW is proposing this separate pilot dockside sampling program. Although no MRIP-certified methods are available to specifically address California's unique CPFV fisheries, CDFW will build upon the framework of the MRIP Large Pelagic Intercept Survey and the Access Point Angler Intercept Survey. The design will use weighted probability sampling for landings based on historic CPFV log summaries by trip types with similar attributes. In addition, the proposed survey will use non-overlapping sampling shifts to cover a 24-hour sample day. Fishing pressure for each shift will be determined from landing data recorded on CPFV logs (number of anglers and time of landing). The fishing pressure is site- and time-specific based on the average number of anglers landing at each site

within a specific shift. The sample selection probability for each site will be weighted by the pressure estimates for each domain (month, kind of day and time period). The proposed methods are conceptual and as additional information becomes available, CDFW will evaluate the methods to better align the survey with the fishery attributes while considering the data needs for fisheries management.

The new survey will directly benefit management of HMS fisheries, other fisheries where multiday trips occur, and will allow CRFS to intercept longer duration groundfish trips that may result from the 2023 regulation change that allows recreational fishers to retain groundfish from all depths. Estimates of effort and catch will be based on comprehensive sampling frames. Biological data collected will be directly representative of the fishery. Based on weighed probability sampling, the new survey will also be cost efficient. The survey will be conducted year-round and require about 40 sampler months to conduct. The total cost of the survey is estimated at $125,000 and is inclusive of wages, benefits, travel costs, equipment and overhead.

Estimated Budget

Dockside Party Charter Surveys Sampling Cost	$100,000
Overhead rate (25%)	$25,000
Total	$125,000

Priority 6 - Provide Improved Access to Marine Recreational Fisheries Statistics Survey (MRFSS) Database

Pacific States Marine Fisheries Commission

UPDATE: Recently, a FY 2023 Fisheries Information System/Electronic Technologies/Catch Share Program proposal was selected for funding to address this priority. After completion of this work, this priority will be removed. Funds for this project should become available around Spring 2023.

Prior to 2014, the RecFIN database stored all data in a network of SAS data files. To improve data integrity, accessibility, and analytical efficiency, RecFIN completed a project in 2015 to redevelop its database architecture to a relational structure on an Oracle platform. As part of the redevelopment, data collected by the states after the cessation of the MRFSS was migrated to the new Oracle-based database. However, data collected by MRFSS prior to 2004 has not been migrated and remains stored in the SAS-based system. Work has been completed to extract this data from the legacy reporting system and upload it to the current RecFIN database. However, the data is difficult for users to access, and the structure is not consistent with the contemporary data set. To improve the accessibility and usability of the MRFSS dataset, RecFIN will:

1) standardize MRFSS data elements to match the data model of the contemporary RecFIN dataset;
2) leverage the relational structure of the current RecFIN database to create linkage between MRFSS data types;
3) perform data cleaning including identification of outliers and correct erroneous records;
4) document and provide access to methodology, table and column comments, data use guidelines, and relevant MRFSS metadata;
5) develop enhanced reporting tools for MRFSS data

Estimated Budget (One-Time Funding):

To incorporate the MRFSS data into the current RecFIN database architecture and develop reporting tools will require contractual services for about seven weeks of dedicated effort, estimated at $40,000. This work may need to be distributed among several different Database Management Consultants to effectively complete the database redevelopment.

Priority 7 - State Calibration of Historical Catch

Washington Department of Fish and Wildlife

Catch and effort creel data and expanded catch data for Washington's ocean boat recreational fishery are available from OSP sampling from 1990. Prior to that, records of catch exist in Washington Sport Catch Reports. During some years, data from the federal MRFSS are also available. Both MRFSS and OSP data reside in the RecFIN database. There is a need to identify the best data sources to avoid duplication and maximize accuracy and precision of catch and effort statistics for Washington's recreational fisheries.

Groundfish stock assessments rely on historic catch and effort data available in the RecFIN database. Prior to 1990, both the WDFW OSP and federal MRFSS programs collected ocean boat-based catch and effort data. In addition, MRFSS collected data from land-based (mainly beach/bank) fisheries along the Washington coast. Electronic creel data and groundfish catch estimates from the OSP prior to 1990 were not migrated to an in-house mainframe from an external mainframe storage system. The original survey cards from 1976–1989 exist; some of these data have been keyed, and some cards have been scanned, but the data are currently not in useable form.

We propose inventorying available data, assessing formats, standardizing electronic formatting of pre-1990 WDFW data, and comparing WDFW and MRFSS data to identify the best data sources and develop the most complete dataset possible while eliminating duplication. This may include re-estimation of historical total catch if sufficient data and design documentation allow.

Estimated Budget

One entry-level project biologist (12 months)	$71,160
Equipment	$600
Total	$71,760

Priority 8 - Modifications to Meet Requirements of the MRIP Recreational Fishing Survey and Data Standards

In December 2020, NOAA Fisheries established Recreational Fishing Survey and Data Standards to guide the design, improvement, and quality of information produced by the recreational fishing surveys that are administered or funded through the agency's Marine Recreational Information Program. The Pacific coast marine recreational fisheries surveys conducted by WDFW, ODFW, and CDFW are partially funded through MRIP, and thus are required to meet the following standards.

- Standard 1 – Survey Concepts and Justification: Surveys must address identified priorities, produce key statistics, and include expected measures of precision. Written survey plans must describe survey goals, legislative mandates, adherence to applicable OMB guidelines, and intended uses and users.
- Standard 2 – Survey Design: Documentation must describe sampling plans, evaluation plans, and data collection and estimation designs.
- Standard 3 – Data Quality: Documentation must describe procedures for data processing, methods to compensate for item nonresponse, actions taken during data editing, and the quality assurance plans that are in place for each phase of the survey process.
- Standard 4 – Transition Planning: Transition plans must be prepared before new or improved data collection or estimation designs are implemented *if* the designs are likely to result in large deviations from historical estimates.
- Standard 5 – Review Procedures: Data collection and estimation designs are subject to existing certification requirements. Annual reports must be submitted at the end of each survey year, and peer reviews of both annual reports and information products will be completed by the Office of Science and Technology.
- Standard 6 – Process Improvement: The ongoing evaluation of survey designs should ensure emerging needs are addressed and best practices are incorporated. Recommended revisions and unanticipated modifications must be documented, reported, and evaluated. Unmet needs for improvement should be prioritized as part of the Regional Implementation Plans.
- Standard 7 – Access and Information Management: Survey data, microdata, and measures of precision must be published online, and data collections funded by NOAA Fisheries are subject to existing information management requirements.

MRIP publishes cumulative estimates where estimates are available sub-annually; presents a warning when the percent standard error for an estimate exceeds 30%; and does not publish an estimate when its PSE exceeds 50%.

RecFIN and its partner agencies may require additional resources to meet the newly established MRIP data standards. Specifically, adhering to standard 7 will require modifications to the RecFIN database and reporting system and state survey data collection and estimation methods. Requirements to conditionally display warnings and withhold estimates based on percent standard error (PSE) will require redevelopment of RecFIN database objects and associated APEX reports. MRIP has also provided tools for analysts to create non-standard estimates using microdata and custom domain analysis programs. Programming support will be required to develop and document similar tools in the RecFIN environment.

Additionally, modifications to state survey sampling and estimation methods will likely be necessary as domain estimates which consistently exceed PSE thresholds are identified. Approaches to reduce PSE may include increasing sample size, spatiotemporal changes to sampling allocation, supplemental surveys, alternative estimation methods, etc.

The implementation of the data standards will be phased and is at an early stage at the time of this writing. Therefore, it is not possible to develop a complete list of updates required by RecFIN and the state surveys to comply with the new standards, and an estimated total budget cannot be provided at this time. However, a current list of agency-specific priorities is described below.

California Department of Fish and Wildlife

MRIP established recreational fishing survey and data standards in late 2020 to guide the design, improvement, and quality of information produced by supported marine recreational fishing surveys. The standards will require that CDFW make changes to the CRFS data system to allow for submission of additional data elements to RecFIN.

CDFW continues to provide in-kind fiscal, technical, and programming support to make improvements to the CRFS database and data warehouse. The data warehouse is designed to enable and support business intelligence activities. Implementation of MRIP data standards will require additional data be included in the CRFS database and data warehouse and a skilled external contractor will be needed to assist with these changes and improvements. Once changes are complete, an external contractor can work with CDFW and RecFIN staff to transform CRFS sample data and estimates into formats designed for efficient transfer of data to RecFIN that

satisfy the new MRIP data standards. Both CDFW and RecFIN will benefit from a more efficient and flexible data transfer method.

Estimated Budget

Programmer support (9 months @ $25,000, plus indirect costs)	$225,000
Total Annual Cost	$225,000

Priority 9 - Addressing Peer Reviewers' Recommendations to Achieve MRIP Survey and Estimation Methods Certification

The WDFW Ocean Sampling Program (OSP), ODFW Ocean Recreational Boat Survey (ORBS), and CDFW California Recreational Fisheries Survey (CRFS) are currently being reviewed for MRIP certification. From this evaluation, the states may require support to implement improvements to their respective survey design and/or estimation methods based on peer reviewers' recommendations. Additionally, if significant modifications are made to the state data collection and/or estimation procedures, RecFIN may require support to update corresponding database architecture and procedures, reporting system tools, and data use and metadata documentation.

At the time of this writing certification review is in progress, and it is unknown what updates will need to be performed by the state surveys to achieve MRIP Certification status. Therefore, an estimated budget cannot be provided at this time.

However, as an example, CDFW programming personnel and/or contractor personnel will need to edit or replace database tables and code currently used to generate ALDTS estimates now that MRIP review of ALDOS is complete. CDFW also expects programming resources will be needed to add code to calculate variance from ALDOS estimates now that ALDOS has achieved MRIP certification as well as variance from PR total estimates once MRIP review of PR onsite field survey methods are complete.

Priority 10 - RecFIN Database and Reporting Tools Development

A primary goal of RecFIN is to consolidate and integrate disparate data sets collected by WDFW, ODFW, CDFW, SAC, and other data partners into a single comprehensive management system. Moreover, RecFIN processes these diverse data into functional information, provides value-added analysis and interpretation, and makes the data available to state and federal fishery managers, analysts, universities, scientists, and the public. The quantity of data and number of data sources integrated into the RecFIN environment continues to grow, and the information required by fisheries data users is dynamic. Correspondingly, the number and diversity of requests for RecFIN data, reporting tools, and data products has also increased. To achieve RecFIN objectives and meet the needs of data users, additional support is requested to improve the RecFIN database and reporting system through database modernization, data integration, and enhanced reporting. Overall objectives of development efforts include facilitating data transfer, enhancing data validation procedures, updating database architecture, identifying and eliminating data gaps, increasing data integration and standardization, documenting and tracking data in the system, addressing technical debt, and improving data dissemination. Continual improvement to the RecFIN data system will increase efficiency and reduce costs, and improve data quality, usability, timeliness, and accessibility. Specific database development priorities are provided below.

Database and Reporting System Improvements

The current RecFIN database was redeveloped in 2016 as part of a project to migrate the previous data storage solution off the legacy SAS environment to the modern production Oracle database. Since this project, RecFIN personnel and the current support team involved in the redevelopment have gained an intimate understanding of the source data, its flow through the current data system and how it is made available for related system integration or presentation via analytical tools. In addition to these lessons learned, technologies have evolved and new/updated source data inputs have become available. As a result, the RecFIN database and related processes retain some design elements that would benefit from additional optimization and modernization. A priority of the RecFIN program is to review, analyze, and improve all elements of the existing system. The results of the analysis will be used as the basis for development of an updated database (and related systems) design. Specific areas of focus for review and subsequent improvement include:

Database Architecture - The current RecFIN database structure will be evaluated to assess its suitability as a modern analytical database and identify structural deficiencies. This analytical focus area will include a review of the newly identified and previously known issues, and weigh alternative analytical storage options.

Data Import Processes - RecFIN data source partners (e.g., agencies) often provide very different data feed structures with some requiring unique elements by source. The flow of data into the system will be thoroughly reviewed with a focus on optimization and increased standardization, so that they may work efficiently with the updated analytical database solution. This assessment and subsequent updates will promote data integration of RecFIN data sources.

Data Reporting Processes - Since the redesign in 2016, the "downstream" analytical tools and reporting mechanisms have grown significantly. Migrating the database to Oracle from SAS allowed for simple integration of existing reporting tools (APEX). While the focus of the existing marts and similar analytical end-user tools may not change, this area of focus will attempt to identify components and sub-processes that could be optimized and take advantage of an updated source database solution. These upgrades will improve the accessibility and usability of data, reports, and tools from the RecFIN system.

Addressing Known Issues (Maintenance and Enhancement Task Backlog) - Since the migration to the current Oracle database, the RecFIN database support team has completed several low-level update cycles in various parts of the data ecosystem. As this work progressed, additional known issues have been identified and cataloged (in Jira). While many specific issues have been addressed, some have been identified as design challenges requiring more investigation and/or resources to resolve adequately. This focus area will review all cataloged issues to determine if efficiency can be gained by integrating them into a larger redesign. A comprehensive, long-term approach to addressing this technical debt may provide more efficient and reliable operation and maintenance of the data system.

Legacy Data Integration - A current parallel task in the RecFIN data ecosystem is completion of the import of legacy data. Because of prioritization, during the previous redevelopment some data elements and objects were not migrated to the current system. Importing and assessing this data will likely result in discoveries that may influence details of any process and/or data storage redesign. This focus area will review the results of that parallel effort to ensure legacy data needs are covered in the updated environment.

Enhanced data validation and ETL testing - A primary objective will also be to expand, strengthen, and automate existing data validation procedures and ETL tracking metrics. This will include an assessment of current validation practices and identification of shortcomings.

Automated validation procedures will be developed to confirm uploaded source data from data partners matches those in the RecFIN data tables and reporting system. Data validations will utilize modern database management techniques and will be automated in the ETL process. The procedures will flag outliers and potential errors in uploaded data, providing a value-added service to reduce errors and allow an opportunity for partner review. Existing procedures and new protocols developed during the project will be fully documented and will contribute to the development of RecFIN quality assurance, quality control, and data management plan documentation.

Improved documentation and system integration – A final intention for this work is to integrate and consolidate the output from the above system improvements for monitoring. A new application in the RecFIN Database Command Center will document the ETL and reporting processes by allowing for the registration of incoming data sources, intermediate data products, and reports. This tool will bring together the processing logs, improved load metrics, and database metadata for review. An internal, web-based dashboard will display visual stoplight indicators and flags with drilldowns to the detailed log and metrics reports. This will provide insight to the logs and metrics to communicate the status and overall health of the RecFIN data ecosystem.

The analytical focus areas described above will be used as the basis for development of an updated database (and related systems) design and implementation. Design artifacts will include documents, illustrations and diagrams intended to communicate the structure of the system at a detailed level. This documentation will be used in incremental review cycles and updated/formalized by the end of the project to cover maintenance needs into the future.

Data Transfer Modernization for RecFIN Partner Source Data

The Pacific RecFIN database integrates recreational fisheries data from CDFW, ODFW, and WDFW and provides a complete data repository accessible to fishery biologists, managers, stock assessors, and the public. The current data upload procedure to RecFIN consists of multiple stages of queries, data manipulations, uploads, transfers, and file conversions. Source data elements and formatting varies by state, but the general procedure is as follows: State data coordinators query data from their internal databases, perform required manipulations, and export the data to a series of CSV or Excel files for transfer. The files are uploaded to a secure data transfer site (Sharefile), where they are accessed by RecFIN personnel and transferred to the RecFIN Oracle database server. RecFIN personnel perform required formatting manipulations and execute ETL (extract, transform, load) procedures to transform the state data format to the RecFIN specification and move the data into the RecFIN Oracle database. Validation procedures

are performed to check for potential data or upload errors and state coordinators are contacted if problems are identified.

Due to multiple data transfers, excessive manual processing, and varying file formats (i.e., CSV, Excel, XML), the current data transfer process has a high likelihood of creating numerous problems with respect to data quality, process efficiency, and data security. Excessive manual processing during the upload procedure increases the risk of data quality degradation including missing, duplicate and/or incongruous data. Because the data transfer procedure is not automated, the RecFIN database is only updated when states manually upload new data. If states modify their internal data and the updated records are not provided to RecFIN, version mismatches will exist between the state agency and RecFIN databases. The lack of automation in the current upload procedure also reduces process efficiency for RecFIN and its partner agencies by unnecessarily increasing staff workload and operational costs associated with manual data processing. Finally, the current data transfer procedure requires RecFIN data partners to create external files (i.e., CSV, Excel, XML), some containing sensitive fisheries data, to upload to RecFIN. The existence of multiple copies of these files, outside of the primary source database, creates a security risk. Although existing systems and procedures are believed to be secure, the preference is to reduce the overall number of potential security risk points.

To address the shortcomings of the existing approach, a modernized data transfer method is required. PSMFC and WDFW have already successfully implemented web API-based protocols to upload WDFW Biological Data System (BDS) data to PacFIN and RecFIN. Ongoing work also includes FIS-funded projects to employ web API technology for data transfer from the WDFW Ocean Sampling Program (OSP) and the Puget Sound Sampling Program (PSSP). The web API data access technology will eliminate manual processing, ensure equality between agency and RecFIN databases, reduce staff workload and processing time, remove the need for external source files, and increase security.

The tools and methods produced by these projects are intended to be portable and scalable to Oregon and California state data systems, and future implementation could be achieved more efficiently by leveraging the expertise and lessons learned from previous efforts. ODFW and CDFW have expressed interest in exploring the feasibility of employing similar web API-based transfer methods; however, if web API cannot be employed, alternative data transfer approaches may be considered (e.g., custom data upload application).

Priority 11 - Collection of Recreational Caught Groundfish Age Structures

California Department of Fish and Wildlife

Age data is critical to reliably inform stock assessments of long-lived groundfish species. Growth rates can slow greatly after maturity making it difficult to accurately assign individuals to year classes from length data which increases the uncertainty in the assessment outcome. By having age data, it informs the estimation of key parameters in stock assessments including growth, recruitment, and natural mortality, which are frequently the primary axis of uncertainty in stock assessments used to manage groundfish stocks. Some of these parameters are sex specific, making identification of the sex of the individual as well as age and length essential.

Stock assessments that lack age data have a greater scientific uncertainty associated with the findings and require additional reductions between the derived overfishing limit and acceptable biological catch, which reduces annual catch limits available for harvesting by fishing sectors. As a result, the lack of ages not only results in less robust assessments but also decreases harvest opportunities. This necessitates the development of a program to collect biological parameter data for ageing, preferably in a manner that provides representative samples of the age composition from the recreational groundfish fishery.

CRFS is operating at full capacity to collect essential data needed to make estimates of effort and total catch. Additional field support is needed to collect specimens and associated data needed for the extraction, processing, and aging of structures (e.g., otolith, fin spines). CRFS sampling logistics are diverse, and in most situations, will require additional samplers to collect additional data elements and specimens along with essential catch, effort and biological data needed to make estimates. For example, filet stations at public launches are often far apart from egress points used to intercept all anglers regardless of catch success, requiring an additional sampler to collect age specimens. Party and Charter (PC) operations in California are allowed to filet at sea, requiring specimen collections to occur onboard. The extra data needed along with the specimen collection will require additional samplers onboard to keep up with PC fileting operations.

CDFW is currently unable to determine the scope of work and therefore the cost. Pacific Fisheries Management Council's Groundfish Management Team (GMT) and NOAA Fisheries have not provided CDFW prioritized species in need of age data or determined sample sizes across fishery sectors or management zones.

With funding, CDFW will begin collecting specimens for age structures during CRFS randomly selected samples for private and rental boats and PC onboard assignments. The scope of work for specimen collection will be determined based on available funds and the most recent guidance by GMT and NOAA Fisheries.

Total Annual Cost: TBD

Oregon Department of Fish and Wildlife

Three PSMFC samplers supervised by ODFW collect age structures year-round from the recreational boat fishery in multiple Oregon ports. Age structures collected from the recreational boat fishery include otoliths from rockfish and greenling, and fin rays from lingcod. Annually, around 3,500 otoliths and 1,000 lingcod fin rays are collected. This sampling program has been active for 20 years and has contributed data to multiple federal fishery stock assessments.

Two of the three PSMFC samplers are currently supported by RecFIN, and the third is supported by Sport Fish Restoration grant funds to ODFW. These same samplers also conduct the only at-sea data collection in the Oregon recreational boat fishery (See Priority #1). ODFW relies on RecFIN funding to continue this valuable data collection project.

Resource Needs

Survey Sampling/Support	Months
At-Sea CPFV observing and shoreside biological sampling	36

Priority 12 – Outreach and Education

The RecFIN program continues to invest considerable resources to support state, federal and private efforts to inform and educate marine recreational anglers on fish identification and barotrauma reduction device use along the Pacific Coast.

Since 2014, descending devices (e.g., FishGrip landing devices, Shelton Fish Descenders, SeaQualizers) have been provided throughout the West Coast to state and federal management agencies and organizations to inform and educate anglers and sport fishing businesses and organizations about the need for the use of fish descending devices in the marine recreational fishery. RecFIN has also supported an ongoing descending device awareness campaign by distributing "No Floaters – Release at Depth" educational materials (e.g., hats, stickers, cup holders) to state agencies, NOAA, and angling organizations. Correct identification of species encountered by anglers is important for the accurate estimation of kept and released catch and to avoid retention of prohibited species. To assist anglers in accurately identifying their catch, RecFIN has developed and distributed a variety of fish identification tools and other printed materials. Distribution of descending devices and educational materials has been accomplished via contact with anglers at various ports along the West Coast, trade shows (e.g., Pacific Northwest Sportsmen's Show), and other sportfishing events/venues.

Correct identification of angler catch at the species level and barotrauma reduction device use will continue to be critical to the long term, sustainable management of marine recreational fisheries on the West Coast. Also, new marine recreational fishing issues may require additional public outreach in the future. Therefore, RecFIN aims to continue existing activities and potentially expand outreach to the Pacific coast sportfishing community as needed.

Priority 13 – Increase Age Reading Capacity

Oregon Department of Fish and Wildlife

Three PSMFC samplers supervised by ODFW collect age structures year-round from the recreational boat fishery in multiple Oregon ports. Age structures collected from the recreational boat fishery include otoliths from rockfish and greenling, and fin rays from lingcod. Annually, around 3,500 otoliths and 1,000 lingcod fin rays are collected. This sampling program has been active for 20 years and has contributed data to multiple federal fishery stock assessments.

Only a fraction of the available age structures collected are read, due to a number of factors. First, fishery stock assessments prioritize which age structures are read. Species currently being assessed are prioritized by age reading labs, and therefore only the small number of recreationally caught species are a priority during any given stock assessment cycle. Therefore, age structures from species in an "off-year" are preserved for when a species is assessed. Second, compared to the commercial fishery, there is minimal capacity for age reading of recreationally caught species in Oregon. ODFW has one age reader to handle all recreational species and for our fishery independent research projects. This position is not supported by RecFIN funding, but instead with a combination of Sport Fish Restoration and state funds.

Priorities #1 and #11 in this Regional Implementation Plan highlight the need for continuing or expanding the collection of age structures from the recreational fishery. However, additional age structure collection can only provide a meaningful contribution to stock assessments if the structures are processed and read. ODFW proposes that RecFIN support one additional full-time PSMFC age reader to focus on recreationally caught species. The PSMFC position could be housed either within ODFW's office or with the PSMFC Age Reading Lab at Hatfield Marine Science Center.

Resource Needs

Position	Months
Recreational Age Reader (PSMFC employee)	12

Adopted by RecFIN Steering Committee 4/3/2023