UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

7/6/2023

MEMORANDUM FOR: The Record

FROM: Cisco Werner, Director of Scientific Programs and Chief Science Advisor, National Marine Fisheries Service

SUBJECT: Certification of The Washington Department of Fish and Wildlife's (WDFW) Ocean Sampling Program (OSP)

This memorandum certifies the WDFW OSP design described herein as an approved method for derivation of estimates of recreational fishing catch and effort.

UNDERSTANDING CERTIFICATION

The steps of the certification process are described in detail in NMFS Procedural Directive 04-114-02 (see https://media.fisheries.noaa.gov/2021-06/04-114-02_06.28.2021_Howell%20signed.pdf?null). In summary, the certification of a survey design means:

- The design has been sufficiently documented, adheres to applicable standards, is statistically sound, and has been validated by a peer review.
- NMFS may fund use of this design and fund and/or provide technical support for similar designs proposed or used by partner organizations.
- The resulting estimates are eligible for use in federal stock assessments and management once they have been incorporated into the historical time series.

Note that certification is not always a guarantee that a survey design will be implemented, a program will receive financial or technical support, or the resulting estimates will be used immediately in stock assessments and management. In the case of a new survey design, the decision to implement it must consider the cost and practicality of changing methods, as well as the fit of any new estimates into science and management needs. Furthermore, the use of a new design's estimates in the federal stock assessment and management process requires the development and execution of a Transition Plan, pursuant to NMFS Policy Directive 04-114 (see https://media.fisheries.noaa.gov/dam-migration/04-114.pdf) and Procedural Directive 04-114-01 (see https://d23h0vhsm26o6d.cloudfront.net/04-114-01_Guidance_Transition_MRIP.pdf).

It should also be noted that if changes to the underlying survey design are made after this survey is certified, those design changes must be documented and re-reviewed for the survey to maintain its certification.

BACKGROUND

NOAA Fisheries' Marine Recreational Information Program (MRIP) is the state-regional-federal partnership that develops, implements, and continually improves a national network of recreational fishing surveys to estimate total recreational catch. MRIP was initiated in 2008 to replace the Marine Recreational Fisheries Statistics Survey (MRFSS) which was NOAA Fisheries' prior recreational data collection program that began operations on the Atlantic, Gulf, and Pacific coasts in 1979. MRFSS consisted of two primary surveys: the Coastal Household Telephone Survey (CHTS), a fishing effort telephone survey, and the Access Point Angler Intercept Survey (APAIS) where anglers were interviewed in-person at fishing access sites to obtain information about recreational catch. Catalysts for creating MRIP included an independent peer-review (National Academies of Sciences Engineering and Medicine, 2006) and the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006. The new program revised the MRFSS survey methods to address issues identified by the review, and created the Fishing Effort Survey and a redesigned Access Point Angler Intercept Survey. These surveys implement more advanced statistical methods and address identified sources of bias in the MRFSS surveys.

MRFSS was discontinued in Pacific coast states in 2004 prior to the initiation of MRIP. In 1990, WDFW began implementing the OSP to conduct more targeted sampling of the ocean boat recreational fishery that was encountered infrequently by MRFSS. The state survey ran alongside the federal survey until MRFSS' discontinuation.

In 2010, MRIP arranged for an initial peer review of the OSP to be completed, after which WDFW proposed, and was funded for, five MRIP pilot projects to improve the survey. These studies investigated potential sources of bias due to spatial and temporal undercoverage, and methods for electronic data collection. WDFW underwent a second peer review in 2015, and reviewers recommended expanded survey coverage and further study, as well as improvements to the estimation methods and survey documentation. Since the 2015 review, WDFW expanded coverage of the survey and adopted electronic data collection methods for portions of the OSP.

DESCRIPTION OF SURVEY METHODS

OSP is used to produce 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. Field samplers are stationed in all major coastal access sites in the state. Ports are monitored from May through September, with additional sampling occurring during March, April, and October in select areas.

Documentation of OSP survey methods and peer review findings are provided in the attachments listed below.

IMPLICATIONS AND CONSIDERATIONS

OSP is an ongoing survey with no major changes to the methodology occurring as a result of this certification. As such, a transition plan may not be necessary at this time. However, following any survey design certification, partners coordinate to discuss transition planning needs. Even if changes are not being made to estimates, and calibration is not needed, a transition plan may be beneficial to ensure partners are on the same page with implementation of surveys. These are essential discussions that will be had among partners following certification. Certification of this survey was pursued by WDFW to comply with the NMFS survey and data standards and to maintain MRIP funding for this survey - generally MRIP only funds recreational fishing surveys that have been appropriately validated by a peer review and certified.

ATTACHMENTS

WDFW OSP Survey Documentation
WDFW OSP Peer Review Documentation
MRIP Program Management Team (PMT) Review and Recommendation
Executive Steering Committee Review and Recommendation

PLEASE NOTE

To receive a Microsoft Word version of this document with screen-readable equations and notations, please email fisheries.mrip@noaa.gov.

Washington State Department of Fish and Wildlife
Ocean Sampling Program Overview

Updated November, 2017

Introduction

The Washington Department of Fish and Wildlife's Ocean Sampling Program (OSP) estimates 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.

Sampling Methods

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 some sampling occurring during March, April, and October in some areas.

The OSP mainly uses a two-stage design for each port, with days constituting the primary sampling units (PSU) and boats within each sampled day as the secondary sampling units (SSU). Selection of days follows simple random procedures. Although sampling of boats is approximately systematic (e.g., every k*th* boat), the selection procedure is not exact and this stage is treated as simple random for estimation purposes. Each port is sampled a minimum of 4 to 5 days per week and days are stratified by weekend and weekday. Typically, all weekend days and holidays are sampled and the remaining available sampling effort within a port is randomly assigned to the weekdays. Daily estimates are expanded over days within strata to produce weekly, monthly and annual estimates. Variations on this theme are employed when sampling the land-based fishery at the Columbia River North jetty; here, weekdays and weekend days are not distinguished.

Effort is measured in units of boat-trips and angler-trips, and on sampled days, is measured throughout the entire period of boat activity, i.e., from the time when the first boat leaves a port until the last boat returns. On a given sampling day, the total number of boats leaving or entering a port is counted. During periods of high effort, effort is measured through an exit count, where all boats exiting a port are counted throughout daylight hours. In Westport, this method includes boats exiting from Ocean Shores and all Grays Harbor launching sites. In Neah Bay, this method includes boats launching from the Snow Creek resort.

During periods of low effort, effort is measured through an entrance count: a count of all boats entering that marina. During an entrance count, boats that exited from Ocean Shores and other Grays Harbor launching sites are excluded from the Westport effort count; in Neah Bay, entrance counts include boats exiting from the Snow Creek resort.

The catch per boat is sampled through intercept surveys. Returning boats are systematically sampled at a minimum target rate of 20% within each boat type (charter and private). Every *k*th boat to enter the harbor is included in the sample regardless of size, mooring location, trip type, etc. The size of the sample (leading to the calculation of *m*) depends on the projected effort and the number of available samplers. Overall, the sampling rate in each port in a year averages over 50% for charter boats and over 40% for private boats.

Through year 2000, data collected from each sampled boat trip include target species, area fished, number of anglers, landed catch by species, released salmon by species, and other biological data. Beginning in 2001, data collected include released yelloweye and canary rockfish and beginning in 2002, releases of all marine fish by species were enumerated in the samples. Beginning in 2003, depth at which the majority of rockfish in the catch were hooked was added. Beginning in 2013, data were recorded on the use of descending devices by anglers targeting bottomfish; recorded data evolved such that by 2014, numbers of yelloweye and canary rockfish released using a descending device was added. In 2016, the Ocean Sampling Program transformed its data collection method from paper-based to electronic using Apple iPads and the iForms form-building platform.

Catch and Effort Estimation

The OSP generates preliminary estimates of catch and effort in-season to meet the demands of ocean fishery management. Catch estimates for quota fisheries (currently salmon and halibut) are generated weekly; catch estimates for all other species are generated monthly and provided to the RecFin database by the end of the following month. Final post-season catch and effort estimates for all species are generated by February 1 each year; these post-season estimates replace any existing in-season estimates.

OSP Estimated Stratum Totals (Primary Stage)

Combined (total) catch estimates are typically stratified by weekend/holiday and weekday. In some strata, every day is sampled. In those strata the combined estimates are simply sums of the daily catches. In other strata, where some days are not sampled, the average catch per day over all sampled days is multiplied by the number of days in the stratum to estimate the total catch.

Let:

a = the marine catch area,

i = trip type,

h = Weekend/holiday or Weekday stratum,

N_h = the number of days in stratum h,

T_h = collection of all days in stratum h,

N_h = the number of days sampled in stratum h, (rather than the number of boats sampled as above),

S_h = collection of sampled days in stratum h (when S=T, n=N),

Y_{haik} = estimated catch (or effort) on day k for stratum h in area a from trip type i,

C_{hai} = catch for stratum h in area a from trip type i,

Then

$$\hat{C}_{hai} = Nh \frac{\sum_{k \in Sh} \hat{Y}_{haik}}{n_h}$$

with estimated variance (Thompson 1992, p. 129):

$$\hat{V}\left(\hat{C}_{hai}\right) = \frac{N_h(N_h - n_h)}{n_h} \frac{\sum_{k \in S_h} \left(\hat{Y}_{haik} - \hat{\bar{Y}}_{hai}\right)^2}{n_h - 1} + \frac{N_h}{n_h} \sum_{k \in S_h} \hat{V}\left(\hat{Y}_{haik}\right)$$

where

$$\hat{\bar{Y}}_{hai} = \frac{\sum_{k \in S_h} \hat{Y}_{haik}}{n_h}.$$

For strata with all days sampled, $n_h = N_h$, and the catch and variance estimators reduce to:

$$\hat{C}_{hai} = \sum_{k \in T_h} \hat{Y}_{haik}$$

and

$$\hat{V}\left(\hat{C}_{hai}\right) = \sum_{k \in T_h} \hat{V}\left(\hat{Y}_{haik}\right).$$

OSP Daily Catch and Effort Estimation (Secondary Stage)

Both catch and effort are grouped by trip-type and area fished. Effort in terms of boat-trips is simply the sample number of boats for each trip-type and area expanded by the appropriate boat-type (charter or private) exit/entrance count. Effort in terms of angler-

trips is calculated as the mean number of anglers per boat (indexed by trip-type and area) expanded by the counted total population of boats.

The total catch for a given species on a sampled day is the product of the population of boats and the estimated catch per boat, grouped by trip-type and area fished. Key assumptions in the current estimation procedures are that:

1) All boats exiting/entering a port are included in the exit/entrance count
2) Exit/entrance counts are made without error
3) The approximate systematic sample of boats can be treated as a simple random sample
4) Anglers answer questions accurately and do not conceal fish

In the following discussion, subscripts referring to port and boat-type are suppressed. Let:

M_t = total exit or entrance count for a given port on day *t* (assumed known without error),

m_t = total boats sampled on day *t*,

m_{tai} = number of boats sampled of trip type *i* fishing in area *a* on day *t*,

a_{taij} = number of anglers on the *j*th boat from trip type *i* fishing in area *a* on day *t*,

y_{taij} = number of species specific fish caught on the *j*th boat from trip type *i* in area *a* on day *t*, and

Y_{tai} = total catch of specific species caught from trip type *i* in area *a* on day *t*.

The estimate of the number of boat-trips of trip-type *i* and area *a* follows the procedure outlined in Lai et. al. (1991) where the proportion of boats in each category is estimated by:

$$\hat{p}_{tai} = \frac{m_{tai}}{m_t}$$

with estimated variance (Cochran 1977, p. 52):

$$V(\hat{p}_{tai}) = \frac{\hat{p}_{tai} \cdot (1 - \hat{p}_{tai})}{(m_t - 1)} \cdot (\frac{M_t - m_t}{M_t})$$

The estimated total boat-trips is then obtained by:

$$\hat{M}_{tai} = M_t \cdot \hat{p}_{tai}$$

with estimated variance:

$$\hat{V}(\hat{M}_{tai}) = M^2{}_t \cdot \hat{V}(\hat{p}_{tai})$$

Effort expressed in terms of angler-trips is the product of the average anglers per boat-trip times the total number of boat-trips. The mean number of anglers per boat-trip (for trip-type *i* and fishing area *a*) is estimated as:

$$\hat{\bar{a}}_{tai} = \frac{\sum_j a_{taij}}{m_t}$$

with variance:

$$\hat{V}(\hat{\bar{a}}_{tai}) = \frac{\sum_j (a_{taij} - \hat{\bar{a}}_{tai})^2}{m_t(m_t - 1)} \cdot (\frac{M_t - m_t}{M_t})$$

Thus the estimated total number of angler-trips is:

$$\hat{a}_{tai} = M_t \cdot \hat{\bar{a}}_{tai}$$

with variance:

$$\hat{V}(\hat{a}_{tai}) = M^2{}_t \cdot \hat{V}(\hat{\bar{a}}_{tai})$$

The catch (or number released) for a specific species on sampled day *t* in area *a* from trip type *i* is similarly estimated by:

$$\hat{Y}_{tai} = \frac{\sum_j y_{taij}}{m_t} M_t$$

with estimated variance:

$$\hat{V}\left(\hat{Y}_{tai}\right) = \frac{\sum_j \left(y_{taij} - \hat{\bar{y}}_{tai}\right)^2}{m_t\left(m_t - 1\right)} M_t\left(M_t - m_t\right)$$

This estimate and it's variance differs somewhat from that described in Lai et al. (1991) since the total count, M_t (assumed to be a known quantity), is used to expand the estimated CPUE (calculated over all sampled boats) rather than the estimated boat-trips by trip-type and area fished.

Staff and Training

Approximately 24 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 technician provides data quality control. In addition, 2 onboard observers collect encounter, mark status, and other information from salmon fishing vessels participating in mark-selective fisheries.

Each season, new samplers are provided a general sampling manual and a sampling supplement specific to the port to which they are assigned. One or more days of office training is provided, followed by two or more days of intense field training. Field training and performance feedback continue throughout the season.

Budget and Data Collection Statistics

The OSP utilizes a budget of over $900,000 annually. This funding consists of both Federal and State sources. Some funds are specifically dedicated to certain data collection aspects while other funds are more general.

Since 1990, the OSP has conducted between 16,000 and 28,000 boat interviews per season coastwide. In 2014, for instance, 78,394 angler interviews were completed (38% of total estimated angler trips), and 16,271 chinook (34% of total estimated catch) and 41,013 coho (38% of total estimated catch) were examined and scanned for CWTs. Approximately 30,000 albacore, 141,000 black rockfish, 4,000 halibut, and 20,000 lingcod were examined and speciated.

Literature Cited

Cochran, W. G. 1977. Sampling techniques. 3rd ed. John Wiley. 428 pp.

Lai, H-L., R.Moore, and J. Tagart. 1991. Methodologies for estimating catch and effort statistics of ocean sport fishery off the Washington Coast with users guide for the program 'OSFP.FOR'. Prog. Report No. 289. Wash. Dept. of Fisheries, Olympia, WA. 35 pp.

Thompson, S.K. 1992. Sampling. John Wiley. 343 pp.

TO: Rob Andrews, John Foster, Richard Cody
National Marine Fisheries Service (NMFS)
National Oceanic and Atmospheric Administration (NOAA)

FROM: Jill A. Dever, RTI International

DATE: November 18, 2022

RE: Review of Certification Materials for The Washington Department of Fish and Wildlife's (WDFW) Ocean Sampling Program (OSP)

This memo provides an updated review comments—following "[November 18, 2022]"—of the WDFW-OSP certification material including informative clarifications submitted by WDFW staff on November 11, 2022 (included below). Text included in the February 7, 2022 memo is retained below for documentation purposes.

Review Memo (February 7, 2022)

This memo summarizes the review of the most recent materials provided by WDFW on certification of the OSP. This review uses NOAA's current Fisheries' Marine Recreational Information Program (MRIP) certification terms of reference (TORs). For documentation purposes, this memo also summarizes the materials made available for the certification.

WDFQ-OSP Certification Materials

An initial MRIP consultant report was submitted on December 6, 2010 in response to discussions held with WDFW-OSP staff (summarized in Attachment B noted below). A subsequent consultant report dated November 22, 2015 contains comments on documentation provided, including an overview of the sampling program and reports on 5 pilot studies to enhance the sampling program.

Comments organized by the TORs below reflect a review of three updated documents—Executive summary (dated May 2021), an overview of the OSP (Attachment A, November 2017), and reports on the 5 pilot studies (Attachment C, October 2017)—and email communications with WDFW-OSP staff June-September 2021.

One overarching comment is that the certification materials contain some detailed information on a complex sampling program, but the materials lacks certain specifics for a complete evaluation of the design and quality monitoring/assessment as noted below. Detailed documentation is important to understand the current sampling design and key study protocols especially if future modifications are needed to address changes in the environment under study.

[November 18, 2022] Clarifications provided in a memo from WDFW on November 11, 2022 were especially helpful in the revised certification assessment.

1. Does the survey design follow a formal probability sampling protocol with known inclusion probabilities at all stages and/or phases of sampling?

Appendix A of the certification materials provides an overview of the two-stage probability-based sampling protocol implemented within each access site for WDFW-OSP. Days of the week, the primary sampling units (PSUs), are chosen via simple random sampling from two mutually exclusive groups—weekday vs. weekend/holiday (day type). Consequently, the first-stage strata are defined as access site by day type.

Details on the number of PSUs selected was not provided. As mentioned, "Typically, all weekend days and holidays are sampled and the remaining available sampling effort within a port is randomly assigned to the weekdays." The draft 2017 Ocean Selective Fishery Sampling Report (April 2018) suggests that "a minimum of 4 to 5 days per week" (PSUs) at each access site was randomly chosen.[1]

The sampling protocol would benefit by having details on sample size needs and associated calculations. For example, certain access areas may require additional sample days to improve precision for certain species, borrowing from design components where available.

The secondary sampling units (SSUs) are boats. SSUs are systematically chosen within boat type (charter vs. private) at a rate of approximately 20%. For variance estimation purposes, this sampling methodology is approximated as a simple random sample within the second-stage strata, an appropriate assumption. Note that the point and variance estimates at the first and second stage suppress notation for access site and boat type for convenience; however, it is assumed that the first and second stage stratification are accounted for in the estimates.

The certification documentation should include a detailed definition of the SSU target population. Boats excluded from this target population are by definition ineligible and consequently excluded from the estimation process. Boats sampled and identified as ineligible (e.g., pleasure cruising only) could impact sample size calculations, protocols to distinguish eligible from ineligible vessels, and resources to collect detailed information from eligible boats.

Response: Yes, the survey design appears to follow a formal probability sampling protocol with calculatable inclusion probabilities at all stages of sampling. Though additional documentation is recommended, TOR #1 is believed to be sufficiently satisfied.

2. Do the estimation methods appropriately weight the sample data to account for the sampling design and produce design-unbiased point estimates and variance estimates?

Point Estimation

The certification materials would benefit from a more thorough discussion of data collected from each sampled boat. For example, trip type is defined by the "primary target species" for each vessel. Presumably data are collected on species other than the primary target that were harvested during the trip. However, the discussion on estimation suggests that values are produced by trip type only.

[1] https://wdfw.wa.gov/sites/default/files/publications/02066/2017_ocean_msf_report%20%281%29.pdf

Survey Analysis Weights

Information on the weighting methodology and associated adjustments to limit biases was not included in the certification materials. This includes, for example, nonresponse from anglers (boat captains) on the sampled boats or possibly zero sampling linked to insufficient field staff for sampling on a particular day. WDFW-OSP staff (09/01/2021) indicated that the relevant documentation was not available. Consequently, TOR #2 cannot be determined.

Additionally, though updated, Attachment C does not address the prior consultants' recommendations to investigate sources of weight calibration (poststratification) adjustments to increase the precision of the estimates.

Variance Estimation

Regarding the certainty selection of PSUs, as noted in the "Sample Methods" section of Attachment A, WDFW states: "Typically, all weekend days and holidays are sampled and the remaining available sampling effort within a port is randomly assigned to the weekdays." Clarification on whether all or certain weekend days and holidays are sampled with certainty is suggested.

Please note that PSUs (i.e., days) selected with certainty should be treated as (fixed) strata for variance estimation purposes (see, e.g., Valliant et al. 2018, Chp. 15). The associated documentation does not clarify how certainty selections are accounted for in the estimation. Such an approach could benefit the precision of the estimates.

Previous reviews by MRIP consultants suggested an evaluation of the design stratum sizes for variance estimation. As noted, precision of the estimates may be improved by collapsing small design strata to form variance strata. Discussion of small sampling strata was not located in the certification materials; as this issue could have implications on sample size requirements, WDFW may wish to investigate this issue using historical data.

Response: The estimation methods for producing design-unbiased point and variance estimates are not clearly documented in the certification materials. Consequently, TOR #2 is not sufficiently satisfied.

OSP Response: Data are collected on all species composing catch regardless of primary target species (trip type). During sampling, all encountered fishes are identified to species, counted, and recorded for all trips for both released and retained catch. Various, species-dependent biological data (coded wire tags [CWTs], PIT tags, length measurements, DNA and scale samples) are collected by OSP staff during sampling. Combination "combo" trips, such as salmon/halibut, capture both targeted quota managed species as well as all associated retained and released fish. There are ten unique trip types, as well as more than ten unique catch areas. All encounters are assigned to whichever appropriate catch area and trip type was reported by the angler. See data dictionary (Attachment D).

Nonresponse from anglers is very uncommon, and the OSP does not explicitly enumerate the instances and they are not quantified. When purchasing a Washington State fishing license, anglers are made aware of the legal requirement to "cooperate with data collection or other sampling of fish, shellfish or seaweed upon request of Department of Fish and Wildlife personnel". It is Washington State law and clarified in Washington Administrative Code 220-305-070 (https://app.leg.wa.gov/WAC/default.aspx?cite=220-305-070&pdf=true) that "it is unlawful for any person to fail to comply with the directions of authorized department personnel related to the collection of sampling data or material from salmon or other food fish". In the rare event an angler does not cooperate, sampling staff cease the interaction and instead sample the next boat that is part

of the sample population. In the even more rare circumstance where an angler is nonresponsive more than once, the OSP involves WDFW Enforcement Officers to immediately enforce compliance or cite anglers for an infraction to encourage future participation.

All weekends and holidays are selected with certainty, sampled, and estimated independently of weekdays. Non-holiday weekdays are selected randomly; three weekdays are sampled during the week. Since the methods of sampling day-type selection are different from one another, they are estimated separately from one another, having no effect on the precision of either grouping. If the suggestion is that two different methods of expansion are used for the different day-type strata, then the investigation would be much more involved, and any resulting methodology changes would be challenging to implement due to existing policy agreements between fishery management entities. Deviation from current estimation methodologies would require extensive review by affected users of OSP produced catch estimates in addition to any other analysis. Strata are estimated appropriately according to the number of days available in that fishery. For example, the Washington coastal bottomfish fishery is typically open for an entire month at a time, so data are expanded to the monthly level, which is the largest fishery strata in the OSP dataset. Conversely, some fisheries are only open for a single day, such as coastal halibut fisheries, and are stratified at the daily level, which is the smallest stratification. In the instance of a one-day strata, that day is purposefully selected as a sample day to ensure adequate representation of that fishery. The OSP is contractually obligated to meet a minimum 20% sampling goal for Washington ocean salmon fisheries annually as a funding requirement by the Pacific Salmon Commission (PSC), so any fishing days open to salmon are under that minimum rate guidance. Since ocean fisheries are dynamic, staffing levels need to be consistent so that staffing strength is sufficient during periods of high angling effort to achieve that minimum sampling rate goal.

An example of where estimate precision could be improved by collapsing small design strata to form variance strata and, in effect, reduce the need for additional sampling staff and/or sampling days, is provided in the MRIP consultants' review indicating that a port such as Neah Bay and its secondary launch site, Snow Creek, could be sampled independently at different rates. While implementation was initially explored in these ports, this situation no longer exists, as Snow Creek has been decommissioned and Neah Bay now only has one boat launching site. Outside of the former Neah Bay and Snow Creek dynamics, the OSP has not identified alternative areas where collapsing small design strata could be beneficially implemented within the established sample design. A consideration of reducing sampling days or collapsing small strata is the increased variance of "rare occurrences" such as species that are infrequently caught in recreational fisheries. "Rare occurrences" can include prohibited species like yelloweye rockfish, or CWT recoveries, which are instrumental in modeling salmon stocks. Even though the PSC established a 20% minimum sampling rate threshold to provide fishery managers adequate sample size to assess salmon stock impacts by fishery, it has been recommended that the OSP aim for higher sampling rates in order to increase the likelihood of recovering CWTs from stocks that are not prevalent in Washington ocean salmon fisheries or are tagged at reduced rates. Collapsing small design strata increases the risk of missing these less common encounters that are necessary to capture to meet specific fishery management goals.

[November 18, 2022]

Point Estimation. Clarifications were provided that data are collected beyond the "primary target species" for each vessel.

Survey Analysis Weights. Information related to negligible nonparticipation from anglers / boat captains as it related to Washington State Law, and sampling related to availability of field staff.

Variance Estimation

Additional information was provided on certainty selection of weekend days and holidays.

A bit of clarification may be required regarding WDFW's response above: "Since the methods of sampling day-type selection are different from one another, they are estimated separately from one another, having no effect on the precision of either grouping. If the suggestion is that two different methods of expansion are used for the different day-type strata, then the investigation would be much more involved, and any resulting methodology changes would be challenging to implement due to existing policy agreements between fishery management entities." The prior review comments were focused on precision of the estimates for fisheries where weekend days, holidays, and weekdays are combined. Presumably the "expansion" techniques are used to generate point estimates of catch, which seem appropriate as stated.

Response: The certification documentation along with the November 11, 2022 suggest that TOR #2 is sufficiently satisfied.

3. Are appropriate methods in place to measure and/or correct for potential biases due to undercoverage, nonresponse, or response errors?

Undercoverage

WDFW-OSP staff are commended for undertaking 5 well-planned and executed pilot studies, 4 of which were conducted to evaluate temporal and spatial sampling undercoverage in the estimates (Attachment C). Modifications were made to include sampling in "shoulder" months of the year, as well as on-going evaluations of, for example, non-major access points in the future when additional funds are available.

Nonresponse

Information on nonresponse rates or correlates of nonresponse (paradata) were not included in the certification documents. For example, field staff could collect boat type and other characteristics on all sampled vessels for use in evaluating differences by participation status. Moreover, nonresponse may occur at busy ports if field staff strength is not adequate for interviewing every sampled vessel in the systematic sample sequence.

Additionally, as mentioned for TOR #2, documentation on weighting adjustments for nonresponse (calibration alone or in addition to a separate nonresponse adjustment) were not available for comment. Consequently, this component of TOR #3 cannot be determined.

Response Errors

Electronic collection of WDFW-OSP catch and effort data have been collected since 2017. If not so already, this "complex recreational data collection application" should include quality checks (including outlier detection) for data verification. No additional information was submitted on verification procedures.

Response: Methods to measure and/or correct for potential biases due to, for example, nonresponse were not discussed in the certification materials. Consequently, TOR #3 is not sufficiently satisfied.

OSP Response: The legal requirements, ocean access port locations and logistics, staffing levels and scheduling, electronic data collection form validation design, and sampling methodology in place lead the OSP to conclude there is minimal potential for undercoverage, nonresponse error, and response error to occur following the established sampling methodology. Therefore, the OSP has not attempted to quantify the potential bias as it is believed to be insignificant.

In the event an angler refuses to comply, that interview is not conducted/ceased and the next boat from within the sample population is interviewed in its place. The nonresponsive boat that was unable to be interviewed will remain in the sample population and all other interviews will be expanded out to surrogate the data that were not collected from the nonresponse interview, as is the case for a non-selected, or "skipped", boat. In busy ports, nonresponse error is not encountered under normal conditions. Hiring and staffing is approached temporally and on a port-by-port basis so that sampling strength is sufficient for peak periods of fishing activity and sampling demand. Additionally, to avoid periods of nonresponse due to sampling strength not being sufficient, sampling staff incorporate daily boat effort expectations into daily sampling rate determinations so that systematic random boat selection rates are appropriate for staffing strength and boat effort. For example, on sample days with high staffing strength for the level of boat effort the sampling rate may be set at 80-100%, while on days with low staffing strength and/or a high level of boat effort, the sampling rate may be set as low as 20-25%. Systematic random sampling rates are maintained throughout the entirety of the sampling day. During unusual occurrences when staffing strength is insufficient and nonresponse error is encountered (i.e. staff not available for a scheduled shift and options don't exist for coverage, boat effort is mis-forecasted) it is for a portion of the sample day. In these situations when nonresponse occurs, sampling staff interview the next boat in the sample population in place of the "missed" boat.

Verification procedures exist in both iForm, which is the electronic form application that OSP uses to collect dockside interview and sample data, and the Access database in which dockside data are housed and processed. Verification procedures are incorporated into the iForm electronic data collection form and reduce data entry error by sampling staff and alert staff to a suite of potential outliers that may arise during data entry that can be corrected. The iForm client validations that samplers encounter while dockside sampling include, but are not limited to, verifications if the limit by species is exceeded per angler, if prohibited species are retained, and if values are expected in certain fields but have been left blank. In addition, sampling supervisors are in the field weekly, and observe "over the shoulders" of staff to verify sampling staff are following the standardized interview protocol, recording data accurately, and adhering to OSP sampling methodology. As for QA/QC procedures after the data are collected and synced to the Access database, three rigorous phases take place. The first is a weekly check, where office staff review data and contact field staff to verify any issues that exist in the data that meet certain criteria being checked against (Attachment E). The second process is at the monthly level, where the database manager compiles the effort counts, builds the strata file for all open fisheries by area during that timeframe and does another check of the dataset, including trip types matching fisheries that should be open, etc. The third and final process occurs post-season, and involves a three-phase data scrub executed by WDFW IT staff independent of the OSP. These checks include finding duplicated records, reconciliation of all CWT recoveries of salmon against the species and mark types recorded, verification of appropriate/anticipated values in all fields, etc. After all encountered QA/QC concerns are resolved the final estimates are then generated.

[November 18, 2022]

Nonresponse. Clarifications were provided on the negligible levels of nonresponse as noted for TOR #2.

Response Errors. WDFW is commended for the multifaceted approach to ensuring data quality and minimal response errors provided in the most recent response to comments.

Response: TOR #3 is believed to be sufficiently satisfied.

4. **How sensitive is the accuracy of the survey to assumptions made about segments of the target population that are not covered by the survey frame? What can be done to reduce or limit that sensitivity?**

   As noted in comments on TOR # 3, a total of 5 pilot studies were implemented to evaluate undercoverage of the OSP. The subsequent enhancements appear to address key concerns expressed in prior consultant reviews. Funding is an important to ensure on-going evaluations of coverage in an ever-changing ecological and data collection environments.

   Response: Yes, the enhancements made to the design based on information obtained from the pilot studies appears to have addressed the consultants' concerns about coverage bias. Consequently, TOR #4 is believed to be sufficiently satisfied.

5. **How sensitive is the accuracy of the survey to other potential sources of nonsampling error? What can be done to reduce or limit that sensitivity?**

   The WDFW-OSP protocol assumes that the count of boats by boat type is known without error and consequently does not contribute to variance estimation. Details on verification of this assumption would strengthen the certification materials. For example, are additional field staff or electronic monitoring capabilities available to verify boat counts? Moreover, are certain types of boats more likely to be counted multiple times on a single day especially during a peak season?

   The certification materials did not discuss protocols for verifying other field staff activities including data entry. For example, are analysts available to evaluate the data for possible outlier information based on historical information?

   As noted previously, information was also not available in the materials on nonresponse. For example, are larger vessels more likely to result in some level of nonresponse? Were auxiliary data used to adjust the inverse probability weights?

   Response: Methods to assess (e.g., quality control procedures) and to address (e.g., weight adjustments) nonsampling error were not available for review in the certification materials. Consequently, TOR #5 could not be sufficiently evaluated.

   OSP Response: Boats are counted as they pass a consistent, specific point in the marina/harbor at all sampling locations and can only be counted multiple times if they make multiple trips, regardless of boat type and level of boat effort. A count verification procedure in place involves staff visiting the known mooring locations (charter boats are individually recognizable and have a reserved mooring location that doesn't change inseason) of charter-type boats to visually confirm their absence from the marina and validate their inclusion on the boat count each sampled day.

Funding has not been sufficient to employ additional staff to verify boat counts. The OSP does not currently utilize electronic monitoring for boat counts and has not attempted to verify boat counts by means of video monitoring or alternative technology. There is interest in evaluating the potential of incorporating electronic monitoring technology into the OSP's sample design, specifically for conducting boat counts, and funding has been approved for a video monitoring pilot project in 2023. As part of the project, comparisons between video counts and counts performed by field staff are expected to be conducted and evaluated.

Field staff are provided training, prior to beginning any field work, on how to collect data using predefined, standardized interview questions. Those questions are described in the iForm electronic sampling form verbatim, so that staff can reference the precise language while conducting an angler interview. The appropriate interview questions will populate in the electronic form dependent on boat type, trip type, port worked, etc.; the sampler must record an answer for each field, some of which are simply YES/NO questions while others require a numeric answer, including a value of zero. The iForm client validations identify any missing or erroneously entered data field staff must resolve in real time before moving on to their next sample. Any errors found during the weekly in-office QA/QC process may result in contacting field staff to clarify and resolve those issues. All of these processes prevent the majority of the potential errors occurring in the field and represent a significant improvement when compared to the previous method of paper data collection that allowed staff to leave fields blank or enter alpha characters in numeric fields, etc.

The OSP employs two dedicated field staff supervisors that evaluate field staff employees on a daily/weekly basis to ensure adherence to data collection protocols. Additionally, the "non-field" biologists and natural resource scientist mandatorily participate in field activities and staff evaluation, reducing the potential for incorrect implementation of protocols to be a result of inaccurate field supervisor guidance. The OSP also purposefully involves the five supervisory level staff members in review of protocols and sampling situations coastwide, reducing the possibility of isolation of a single field crew and ensuring uniformity of data collection protocol application in all regions the OSP is operating.

Trained field staff evaluation is not limited to check-ins with staff or observation-from-distance. The OSP supervisory staff regularly accompany field staff to selected sample boats and evaluate the interview process, in detail, while it takes place. Field staff are observed by supervisors "over the shoulder" recording angler responses and sampled catch data into the iPad to ensure adherence to data collection protocols, accuracy of species identification, and accuracy of data entry.

The OSP has not observed a higher incidence of nonresponse in relation to boat type (charter/private) nor vessel size. This can be partly attributed to the longstanding compliance requirements required by Washington State, as detailed in the OSP response to TOR #2. Additionally, the OSP benefits from large boats being more easily identifiable and having established moorage locations and restricted options for anglers to disembark. Field staff are trained to intercept large vessels immediately upon landing, to reduce the chance of missing quickly departing anglers, and utilize specific methods to interview disembarking anglers efficiently while minimizing the potential of encountering nonresponse.

[November 18, 2022]

Response: Quality control procedures in combination with high participation were clarified in the most recent response. Consequently, TOR #5 is believed to be sufficiently satisfied.

6. **How sensitive is the survey design to potential errors in implementation? What can be done to evaluate, reduce or limit that sensitivity?**

   As noted under TOR #5, the certification materials do not contain a discussion about quality control procedures to verify and monitor that the trained field staff are correctly implementing the data collection protocols.

   Response: The WDFW-OSP protocol does not contain sufficient information to evaluation TOR #6.

   OSP Response: Please see response to TOR #5.

   [November 18, 2022]

   Response: The extensive quality control procedures, including "over the shoulder" monitoring of field staff, were clarified in the most recent response. Consequently, TOR #6 is believed to be sufficiently satisfied.

7. **How does the survey design compare to the legacy survey design it would replace? Is it more statistically sound and efficient, or is it at least comparable in its statistical validity and efficiency? What design features are most important in supporting this assessment?**

   Information on legacy surveys was not provided and deemed outside the scope of this review.

   Response: The evaluation of TOR #7 could not be conducted.

8. **How does the survey design compare with other survey designs previously certified by MRIP for estimating fishing effort and/or catch for the same fishing mode(s)? Is it more statistically sound and efficient, or is it at least comparable in its statistical validity and efficiency? What design features are most important in supporting this assessment?**

   Insufficient experience to comment on TOR #8 at this time.

   Response: The evaluation of TOR #8 could not be conducted.

9. **Is the survey collecting data and producing information products that will meet the needs of the primary customers (stock assessment scientists and fishery managers)?**

   Any comments for term of reference #9 will be provided by NOAA staff.

   Response: TOR #9 was not evaluated.

Summary of WDFW-OSP Certification Documents

Several files were provided by NMFS staff for the WDFW-OSP certification process. An updated executive summary was provided by Wendy L. Beeghley (DFW) on 05/21/2021; the document and associated email was forwarded to Rob Andrews (NMFS) on 06/10/2021.

The following documents were consulted for this review.

WDFW-OSP Certification Review Response 2022_1110.docx (11/10/2022)
WDFW responses to reviewer comments on TORs submitted via email.

ExecutiveSummary-UpdatedMay2021.docx (05/21/2021)
Responses to consultant comments with updates since *ExecutiveSummary-UpdatedMay2019.docx* was submitted to NMFS. Updates include

- funding received for sampling of shoulder months (March, April, and October) for all major ports with anticipated funding for continued efforts
- funding received and activities underway for monitoring of minor access points with results anticipated in fall 2021

AttA-Washington Ocean Sampling Program (OSP) Overview for RECFIN-… .doc (May 2019)
Details of sampling and estimation methods plus other topics with updates from November 2017 to address certain consultant comments.

AttachmentB-OSPConsultantsReport.pdf (May 2019)
Original consultant report from December 6, 2010 included in the May 2019 submission.

AttachmentC-RevisedOct2017perConsultantComments.docx (May 2019)
Reports on evaluative projects conducted by WDFW to address consultant recommendations from 2010. Materials were updated to reflect some 11/2015 consultant recommendations.

AttachmentD- OSP_Response_Data_Dictionary.xlsx (November 2022)

AttachmentE- OSP_Reponse_Dataflow.pdf (November 2022)

Evaluation_of_MRIP_Certification_Application_November_22.pdf (11/22/2015)
Consultant comments to updated certification materials. Additional recommendations for the certification materials includes:

- correction to subscripts in the notation to ensure consistency and clarity
- correction to distinguish poststratification (weight adjustment) from domain estimation
- clarification on how effort is defined and measured
- correction to bias estimator, bias correction, and associated variance estimate
- recommendation for further evaluation of the electronic data capture

References

Valliant, R., Dever, J., & Kreuter, F. (2018). *Practical tools for designing and weighting survey samples*. (2nd ed.) (Statistics for Social and Behavioral Sciences). Springer. https://doi.org/10.1007/978-3-319-93632-1

The MRIP Program Management Team (PMT) has completed its evaluation of the California Department of Fish and Wildlife's (CDFW) Angler License Online Directory Survey (ALDOS) and Private/Rental Boat Recreational Fishing Surveys (PR1 and PR2) certification peer reviews. The peer reviews of ALDOS, PR1 and PR2 note the surveys use appropriate probability-based sampling designs. For ALDOS, while there may be opportunities to improve the efficiency of the designs through stratification or weighting approaches, the review concluded that the surveys should produce design-unbiased point and variance estimates. Similarly for PR1 and PR2, while the peer review recommended additional clarifications to the documentation, the certification terms of reference were sufficiently satisfied.

The PMT has also completed its evaluation of the Washington Department of Fish and Wildlife's (WDFW) Ocean Sampling Program (OSP) certification peer review. The review highlighted the positive aspects of the OSP design, including adherence to probability-based sampling protocols and administration of pilot studies to evaluate noncoverage bias. The peer review also highlighted some deficiencies in the survey documentation that WDFW addressed iteratively working with the MRIP PMT and the peer reviewer.

The PMT agrees with the results of these peer reviews and recommends certification of each of these surveys.

Katherine Papacostas - NOAA Federal

MRIP Certifications

Gordon Colvin - NOAA Affiliate Mon, Apr 10, 2023 at 10:21 AM
To: Katherine Papacostas - NOAA Federal
Cc: Richard Cody - NOAA Federal

Hi, Katherine. No feedback at all. So, they are ESC cleared and ready to send up.

On Mon, Apr 10, 2023 at 10:06 AM Katherine Papacostas - NOAA Federal wrote:
> Hi Gordon,
>
> Did you happen to receive any feedback from the ESC on these? Please lmk and I'll initiate seeking Evan's and Cisco's clearance of these certifications.
>
> Thanks,
> Katherine
>
> On Thu, Mar 30, 2023 at 9:24 AM Gordon Colvin - NOAA Affiliate wrote:
> > Good morning, MRIP Executive Steering Committee:
> >
> > The MRIP Program Management Team (PMT) has completed its evaluation of two of the west coast states' Pacific RecFIN Surveys, and is recommending their certification.
> >
> > California: The California Department of Fish and Wildlife's (CDFW) Angler License Online Directory Survey (ALDOS) and Private/Rental Boat Recreational Fishing Surveys (PR1 and PR2) have completed certification peer review, and are recommended for certification. ALDOS is a monthly survey used to collect recreational effort information from anglers fishing from private or rental boats and from shore. Samples are drawn from an angler license directory of California sport fishing license holders. The survey is administered via email, which directs respondents to a link to fill out the questionnaire. California's monthly private/rental boat surveys are conducted through angler intercepts at public access sites and are used to collect catch rate information. There are two components: a survey of primary sites (PR1) and a survey of secondary sites (PR2). Designation of sites as primary or secondary is based on the amount of expected effort and relative catch of species under active management, with increased sampling rates for PR1.
> >
> > Together, ALDOS, PR1, and PR2 data are used to estimate catch and effort for all private and rental boat trips in California.
> >
> > The peer reviews of ALDOS, PR1 and PR2 note the surveys use appropriate probability-based sampling designs. For ALDOS, while there may be opportunities to improve the efficiency of the designs through stratification or weighting approaches, the review concluded that the surveys should produce design-unbiased point and variance estimates. Similarly for PR1 and PR2, while the peer review recommended additional clarifications to the documentation, the certification terms of reference were sufficiently satisfied.
> >
> > Washington: The PMT has also completed its evaluation of the Washington Department of Fish and Wildlife's (WDFW) Ocean Sampling Program (OSP) certification peer review. OSP is used to produce 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. Field samplers are stationed in all major coastal access sites in the state. Ports are monitored from May through September, with additional sampling occurring during March, April, and October in select areas.

> The review highlighted the positive aspects of the OSP design, including adherence to probability-based sampling protocols and administration of pilot studies to evaluate noncoverage bias. The peer review also highlighted some deficiencies in the survey documentation that WDFW addressed iteratively working with the MRIP PMT and the peer reviewer.
>
> The PMT agrees with the results of these peer reviews and recommends certification of each of these surveys. Copies of the survey documentation and peer reviews are available. Please get back to me oif you want to see any of them.
>
> Please advise me and Evan by cob Friday, April 7 if you have any concerns or questions regarding these recommended certifications.
>
> Thanks,
>
> -Gordon
>
> --
> Gordon C. Colvin
> Contractor
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