RECREATIONAL FISHERY INFORMATION REQUIREMENTS FOR STOCK ASSESSMENT AND REGULATORY ANALYSIS

Provided as Advance Material for the August 28-31, 2006 RecFIN Workshop
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Pacific Fishery Management Council
Scientific and Statistical Committee

I. Introduction.

This document is provided in response to a request from the Council for input from its advisory bodies regarding recreational fishery data needs, which will be a major topic of discussion at the August 28-31 RecFIN Workshop. Sections II and III describe data needs for Council activities that involve the SSC, namely stock assessment and regulatory analysis. Data needs associated with activities that do not involve the SSC (e.g., in-season monitoring and management) are not addressed here.

Recreational fishery data are collected in surveys that differ among states, fishing modes and years. Estimates of catch, effort and other variables of interest are subject to sampling error. Lack of standardization in data collection and estimation methods further complicates use and interpretation of the data. Identifying the types of recreational fishery data needed for management is an important step toward enhancing the utility of RecFIN to the Council. Ensuring that RecFIN data provide "best available science" additionally requires (1) statistically valid data collection and estimation methods, (2) adequate and transparent documentation, (3) a transparent review process, and (4) accurate, consistent and timely transmission of data and estimates to the Council. The RecFIN Workshop will provide a useful venue for addressing these issues.

II. Recreational Fishery Data Needs for Stock Assessment

Table II-1 describes population estimates and sample data needed for stock assessment.

Table II-1. Species-Level Recreational Fishery Data Needed for Stock Assessment

Data Needs	*Discussion*
(1) Removals (landings + discard mortality, numbers and weight)	Population totals by species and year are needed for (1) thru (3); variances also highly desirable. Access to sample data associated with (1) thru (7) is needed to explore alternative methods and hypotheses as part of the stock assessment and review process. Data should be distinguished by species, year, month/survey wave, fishing mode, landing site, and (for boat modes) area/depth of catch. Breakdown of catch by sex highly desirable and most feasible for species whose sex can be determined by visual inspection. Methods used to estimate discard mortality (3) should be explicit and well documented. Separate length distributions for landed and discarded catch are highly desirable. Length information in historical databases includes mixture of observed lengths and lengths deduced from observed weights, with no apparent way to distinguish between the two. Given the anomalous length frequency results often associated with weight-to-length converted data, data provided for purposes of (4) and (5) should be limited to observed lengths and observed weights. For purposes of (6), raw catch and effort data are needed rather than summary CPUE estimates generated by RecFIN. Observer programs that identify catch and effort by location/depth of catch are ideal. Trip-level intercept data on effort and species composition of removals are also useful. Species composition needed to analyze species associations used to filter trips relevant to estimating CPUE for a given species. For GLM analysis, CPUE is distinguished by year as well as month/survey wave, fishing mode, landing site, and/or area/depth of catch. Spatial scales used to characterize area of catch have been largely dictated by available data (e.g., inside/outside 3 miles, CDFG block areas). Consistent and finely delineated data on area of catch are needed. Utility of (7) contingent on data analysis (e.g., aging of otoliths) as well as data collection.
(2) Discards (numbers and weight)	
(3) Discard mortality	
(4) Length distribution of landed catch	
(5) Length distribution of discards	
(6) CPUE	
(7) Biological data (otoliths, maturity stage, etc.)	
(8) Sportfishing regulations - by year (e.g., bag limits, areas, seasons)	

III. Recreational Fishery Data Needs for Regulatory Analysis

Tables III-1, III-2 and III-3 respectively describe angler-, trip- and CPFV-level data needed for regulatory analysis. Data needs are distinguished by these levels to reflect the fact that the unit of observation can affect what can be done with the data.

Table III-1. Angler-Level Recreational Fishery Data Needed for Regulatory Analysis

Data Needs	***Discussion***
(1) Number of anglers	Population estimate of (1) needed to expand results of (2) thru (5) to the angling population. (2) is useful for (a) estimating distribution of fishing effort by trip type, and (b) identifying which trip types co-occur in angler's choice set and thus where effort is likely to shift when particular trip type(s) are restricted. Surveys where anglers rather than trips are the unit of observation (e.g., comprehensive license frame survey) allow collection of data on all trips made during survey recall period; this may be the most feasible way to estimate (2) for all trip types, given the incomplete coverage of trip types in existing intercept surveys. Locational data (angler zipcode of residence, trip landing sites) are important for evaluating effects on fishing communities and regional economic impacts. Access to sample data for (2) thru (5) is needed to (a) tailor analyses to specific regulatory issues, (b) identify angling subpopulations that may be differentially affected by a management issue, and (c) estimate economic models of angler behavior. (3) thru (5) may be collected in periodic economic surveys rather than as part of routine catch and effort surveys.
(2) Number of trips per angler - by trip type (e.g., fishing mode, species targeted/caught, landing site, whether private or public access site)	
(3) Expenditures per angler - e.g., for boat, fishing gear, trip-related expenses	
(4) Angler characteristics - e.g., boat ownership, fishing experience, age, gender, ethnicity, employment status, income, zipcode of residence	
(5) Angler responses to hypothetical management scenarios (e.g., choice elicitation surveys)	

Table III-2. Trip-Level Recreational Fishery Data Needed for Regulatory Analysis	
Data Needs	***Discussion***
(1) Number of trips	Population estimate of (1) needed to expand results of (2) thru (5) to the trip population. Access to sample data associated with (2) thru (5) is needed to (a) tailor analyses to specific regulatory issues, and (b) estimate economic models of angler behavior. (2) and (3) are useful for (a) determining differences in species-specific harvest among fishing modes, seasons, locations where fish are landed/caught, and (b) evaluating effect of seasonal, spatial and bag limit restrictions. Data on area/depth of catch are increasingly important for spatial management. Land-based locational data (angler zipcode of residence, landing site) are important for evaluating effects of regulations on fishing communities and estimating regional economic impacts. Routine collection of data on angler zipcode of residence (combined with data on zipcode of landing site for the same trip) allows travel distance, time and cost to be estimated using zipcode-to-zipcode software. Travel costs provide "shorthand" method of estimating marginal change in angler expenditures associated with changes in regulations, fuel prices and other factors that affect the spatial pattern of fishing activity. For boat-based fishing modes: Sampling at boat-trip level may be efficient way to estimate catch and determine effective change in bag limit when bag limits are enforced at the boat level. Sampling at angler-trip level needed to evaluate behavioral response to bag limits and other regulations, and associated economic effects. (5) may be collected in periodic economic surveys rather than as part of routine catch and effort surveys. (5) is useful for analysis of regulatory changes that affect numbers and types of trips taken. (Note that (3) in Table III-2 involves collection of non-trip as well as trip related expenditures and thus allows more comprehensive treatment of economic impacts.) Data on all trips - not just trips associated with currently managed species - are needed to put regulatory changes in context of broader fishing opportunities available to anglers and fishing communities. Comprehensive fishery coverage also provides flexibility to address currently unanticipated management issues.
(2) Number of trips by trip type - e.g., species targeted/caught, fishing mode, month/survey wave, trip length, landing site, area/depth fished (boat modes).	
(3) Number of fish retained and released per trip - by species, fishing mode, month/survey wave, trip length, landing site, area/depth fished	
(4) Zipcode of residence of angler making the trip	
(5) Trip expenditures - e.g., travel, private boat fuel, CPFV passenger fees, tackle, bait, food, lodging	

Table III-3. CPFV-Level Recreational Fishery Data Needed for Regulatory Analysis	
Data Needs	***Discussion***
(1) Number of active and inactive CPFVs - by homeport and passenger carrying capacity	Population estimate of (1) needed to expand results of (2) and (3) to the CPFV fleet.
(2) Number of fishing trips per CPFV by trip type - e.g., species targeted/caught, month/survey wave, trip length, landing site, area fished, # passengers	Access to sample data for (2) and (3) needed to (a) tailor analyses to specific regulatory issues, (b) identify CPFV subpopulations that may be differentially affected by a management issue, and (c) estimate models of CPFV behavior.
(3) Extent of fishing and non-fishing (e.g., whale watching) activity and associated revenues and costs per CPFV	(3) may be collected in periodic economic surveys rather than as part of routine catch and effort data collection. Complete accounting of fishing and non-fishing activity is needed to evaluate extent of CPFV dependence on regulated fishing activities.