Which fish stocks are assessed: an analysis and forecast of stock assessment in the United States

Philipp Neubauer, Dragonfly Data Science, Wellington, NZ
James T. Thorson, NOAA Northwest Fisheries Science Center, Seattle
Michael C. Melnychuk, School of Aquatic and Fisheries Science, University of Washington, Seattle

Richard Methot, NOAA Northwest Fisheries Science Center, Seattle,
Kristan Blackhart, NOAA Northwest Fisheries Science Center, Seattle

March 31, 2017

Target journals

1. Fish & Fisheries
2. ICES JMS
3. Journal of Applied Ecology (should be easy to write for this, but maybe have less of a fisheries audience)
4. Ecological Applications (ditto JAPPL)

Abstract

Effective fisheries management requires scientific estimates of harvested quantities or fishing rates so that the fishery can sustainably derive value from the resource. In addition, many management agencies also define conservation objectives regarding population status (e.g., biomass relative to biological targets). However, estimating population status generally requires a stock assessment, which are often more costly and resource-intensive than simple models that only estimate harvest limits, and to date only a subset of landed species have stock assessments. Here we quantitatively explore the factors influencing the probability that a previously unassessed stock in the United States will become the subject of a stock assessment. Using a statistical model based on time-to-event analysis and 564 coastal marine fish and invertebrate stocks landed in commercial fisheries, we quantify the impact of region, habitat, life-history, and economic factors on the annual probability of being assessed. Although the majority of landings come from assessed stocks in all regions, less than half of the regionally-landed species currently have a stock assessment. Nevertheless, we find that the overall rate at which new stocks are assessed has been increasing since the 1960, the year of the first recorded stock assessment (as per our definition). Our time-to-event model identifies landed tonnage and ex-vessel prices as the dominant factors determining

the rate of new assessments, with greater landings and higher prices leading to higher probabilities of being assessed. Placement of stocks within federal fishery management plans was identified as adding further momentum towards assessments for these stocks. However, we also find that after controlling for landings and price, there has been a consistent bias towards assessing larger-bodied species. A number of vulnerable groups such as rockfishes (Scorpaeniformes) and groundsharks (Carcharhiniformes) have a relatively high annual probability of being assessed after controlling for their relatively small tonnage and low price. Given the characteristics of species that are currently unassessed, our model suggests that the number of assessed stocks will increase more slowly in future decades, as the landed tonnage and price for the remaining unassessed stocks stocks are relatively low, and may therefore confer less incentive for implementing costly stock assessments.

1 Introduction

It is often said, “what gets measured, gets managed”. Fisheries scientists have measured human impacts on populations of finfishes and invertebrates for over 100 years with the goal of balancing the value derived from fishing with the long-term sustainability of populations ([28]). This is principally achieved by estimating two measures of human impact: (1) fishing rate, i.e., the instantaneous mortality or annual fraction of the population that is harvested relative to an estimated target level, and (2) the population abundance, i.e., spawning biomass or reproductive output relative to an estimated target level. Together these measures reflect the ”stock status” of an assessed population, and fisheries agencies are increasingly committed to maintaining fished populations at fishing rates below and population abundances above limit-levels that are defined based on biological and economic considerations ([21]).

The National Marine Fisheries Service (NMFS, the agency in charge of science supporting federal fisheries management in the United States (US)) is committed to ”end overfishing” for all marine species within regional fisheries management plans (with exceptions granted in a few potential circumstances; [21]). In the US, overfishing is defined as any stock having annual harvest rate or quantity above limit levels. A target (or limit) harvest can in theory be calculated by combining a target (limit) harvest rate with a target (limit) population abundance. However, the vast majority of overfishing limits are currently estimated using methods that do not individually estimate either harvest rate or population abundance ([1, 24]). For example, catch-only methods (COMs), such as depletion-corrected average catch (DCAC; [18]), are used to estimate an annual fishing limit for many data-limited stocks, but are not capable of estimating population abundance. COMs can therefore be used to help ”end overfishing”, but are not otherwise informative about the status of a fished population.

Conservationists and ecologists will often be more interested in estimating population abundance (or abundance relative to equilibrium conditions) than estimating an overfishing limit (e.g., [16]). Estimating abundance generally requires applying a population model to available harvest data and an index of population depletion (either an index proportional to population abundance, or average body size or age data). Estimated abundance is then compared to a biological reference point, or benchmark, for assessing current status relative to target levels. In the following, we consider this pairing of model-estimated abundance with estimated reference points as ”stock assessments”, although we acknowledge that other authors have used the term "stock assessment" more broadly to also include methods for estimating overfishing limits (e.g., DCAC [18]). Although NMFS has estimated overfishing limits for the vast majority of fishes in US fisheries management plans, a smaller percentage of fished species have a stock assessment as we define them. The dearth of stock assessments arises because developing a stock assessment typically has greater data input needs, is time-consuming, and requires extensive financial resources from NMFS and other interested parties ([10]).

Stock assessments are important for many applied and theoretical questions regarding marine ecosystems. In particular, managing and monitoring rebuilding of overfished stocks to a target biomass level, rather than simply managing annual fishery removals, is possible only by estimating population abundance relative to target levels using stock assessment models. However, there is little previous research regarding which fished species are more or less likely to receive sufficient attention to develop a stock assessment. Understanding which species are more or less likely to be assessed could be useful for the following three reasons:

1. Conservation concerns and, conversely, missed opportunities for increased exploitation will be undocumented, so will receive less attention from the public and fishery managers..

2. Output from stock assessments has often been used in meta-analyses to understand ecological characteristics of marine fishes in general ([23, 30, 17]). Therefore, any systematic bias in which particular stocks are assessed will also bias our ecological understanding of marine fishes.

3. Stock assessments often require periodic updates (e.g., Pacific hake has been re-assessed annually from 1982 through 2016; [e.g., 14]), and agency resources might be fully expended while assessing a small fraction of possible stocks. If the rate of assessing new species is decreasing, this could indicate the need for additional public resources for stock assessment or improved strategies for prioritizing which stocks to assess ([22]).

In this paper, we provide a quantitative analysis of which marine species landed by commercial fisheries are likely to have undergone a stock assessment using a statistical population dynamics model that estimates abundance based reference points. To do so, we combine two databases representing fished coastal marine species in the continental US and Alaska: a database of landed tonnage and value by species from 1950 to 2013, and a database of management and stock assessment attributes for US fishes and invertebrates drawn from peer-reviewed stock assessments. We record the year that each stock landed in the continental US and Alaska (whether caught in US federal or state jurisdictions) first had a stock assessment, and we treat any stock that did not have an assessment by 2015 as a "censored" observation (i.e., it might eventually have an assessment). We then apply a censored time-to-event model to answer the following questions: (1) What economic and biological characteristics are associated with a high or low annual probability of being assessed for the first time?; (2) how has the rate of assessing stocks differed among four US regions (Northeast, Southeast, Alaska, and US West Coast) and with federal vs non-federal management authority?; (3) are there certain taxa (e.g., invertebrates, sharks, flatfishes, etc.) that are assessed substantially faster or slower after accounting for biological and economic attributes?; and (4) is the rate of stock assessment accelerating or decelerating over time? We show that landed tonnage and ex-vessel price are the main drivers of increasing rates of stock assessments, but larger fish and some taxa of conservation concern defy these trends and are more or less likely to be assessed.

2 Methods

2.1 Operational definition of US stock assessments

Many types of stock assessments are applied in the US, with varying levels of model complexity and input data requirements. Assessments for any given stock also tend to change over time, typically becoming more complex as warranted by available data. For consistency across US regions, we defined a stock assessment in this study as:

(A) a single-species model of density-dependent population dynamics (e.g., including some combination of individual growth, recruitment, or aggregate surplus production); where

(B) model parameters were estimated by fitting to abundance index and/or age or length compositional data;

(C) the model provided time series estimates of population abundance (e.g. total biomass, spawning biomass) and/or exploitation rates (e.g., fishing mortality or harvest fractions); and

(D) management benchmarks corresponding to these time series estimates were estimated within the assessment or were otherwise explicitly stated, where benchmarks included target reference points, reference points based on maximum sustainable yield (MSY) or its proxies, or initial population abundance; ratios of the time series and their corresponding reference points provide a relative index of stock status.

Age-structured models, delay-difference models, biomass dynamics models, and surplus production models all qualified as assessment models ([7]). We recognize that COMs such as stock-reduction analyses (SRAs) are often used to estimate overfishing limits for stocks in the absence of a population-dynamics model fitted to data ([18, 8]). However, stock-reduction analyses did not qualify as stock assessments under this definition because they typically are not fitted to abundance-index or compositional data.

2.2 Defining the set of landed stocks

We next defined the set of stocks that are included in this analysis. We sought to include all landed stocks of fish and invertebrates in marine waters, rather than restricting analysis to stocks listed in federal fishery management plans (FMPs). We note that NMFS only has jurisdiction over those stocks listed in federal FMPs. We chose to analyze all landed stocks because we believe that many consumers, scientists, and conservationists take interest in management performance across jurisdictions.

We exclude some stocks based on practical considerations. We exclude highly migratory species, because these species often have population boundaries that substantially exceed the jurisdiction of any single nation, and also are often difficult to assign to any of the regions that we define for later analysis. We therefore excluded species that are typically assessed by Regional Fisheries Management Organisations, including tuna, billfish, and oceanic shark species. We also excluded salmon and shad species from our analysis because assessments for these species are often conducted at a fine spatial resolution which might otherwise either numerically dominate the other landed marine species or conflict with the typical spatial resolution for marine stock assessments. We include mollusks, crustaceans and echinoderms, but exclude corals, sponges, and other benthic invertebrates as the latter have limited use as seafood. Finally, we exclude stocks landed or assessed in the US Pacific Islands and the Caribbean, which have not yet been added to our stock assessment database.

After excluding the above species, we used the US National Oceanic and Atmospheric Administration (NOAA) landings database to identify all landed stocks that meet our criteria. This database provides annual landings for both assessed and unassessed stocks by species and state from 1950-2013. We aggregated state landings into four bio-geographic regions, defined as: Alaska (i.e., the Eastern Bering Sea, Gulf of Alaska, and Aleutian Islands); US West Coast (i.e., the marine waters of Oregon, Washington, and California); Northeast Coast (including the mid-Atlantic Coast); and Southeast Coast (including the South Atlantic Coast and Gulf of Mexico). Assignments of states to regions were generally unambiguous, except for distinguishing between stocks in Northeast and Southeast regions. For dividing state landings into Northeast vs. Southeast regions, we generally treated all states north of North Carolina as the Northeast region, and all other east coast states as the Southeast region. However, we made exceptions as several assessed stocks on the US east coast straddle our regional boundary; we assigned the assessed stock and its associated state landings to the region with the greatest average landings.

Landings of each species in each state were either assigned to an assessed stock or used to define an unassessed "stock". For assessed stocks, we used areas of distribution as defined in assessments to link their state landings. We considered occasional low-volume landings in nearby states to also belong to an assessed stock, because straying occurs and because fleets may catch fish in waters within a stock's area of distribution but land fish in nearby states outside of that distribution. For example, the area of distribution for the South Atlantic/Gulf of Mexico finetooth shark stock comprises waters from North Carolina southward, but occasional landings in Virginia and Maryland were considered to also pertain to the assessed stock. However, if an assessment indicated that landings from only certain state(s) were considered for the assessment, we did not link landings in other nearby states to the assessed stock. Landings from states that were not linked to assessed stocks allowed us to define unassessed stocks. These state landings were pooled within each region to define the unassessed stock; thus, a maximum of one unassessed stock per region was defined for each species.

2.3 Defining year of first stock assessment

Given the set of assessed stocks in each of our US regions, we determined the year of first assessment for each of them. Identifying assessed stocks and their year of first assessment was accomplished by a combination of interviews with regional stock assessment scientists and literature reviews of archived assessments. For quality control, we compared our assignments of first assessment year with the NOAA Species Information System (SIS) database to ensure consistency for federally managed species (Appendix C). The SIS database does not contain information about when a stock was first assessed for the entire period considered here, so comparisons were restricted to the most recent SIS classification. These comparisons generally showed consistency among datasets, with categories of Levels of Stock Assessment Models in SIS aligning with our assignments of first stock-assessment year (as defined by criteria A-D above). Of the nearly 200 stocks for which we assigned a year of first assessment, there were seven discrepancies with SIS classifications which resulted from violation of criteria A-D (see Appendix C). These stocks were previously assessed using populations models, but currently are assessed with less complex methods. For our analyses, we continue to consider these stocks as "assessed" and use the year that they were first assessed by a population dynamics model as their year of first stock assessment.

2.4 Explanatory variables

Several variables were considered as explanatory factors affecting the year in which a stock was first assessed. To assess whether the presence of particular stocks in FMPs changes the time-to-assessment, this factor was included as a binary fixed effect in our model detailed below. Region and habitat typically occupied by the population were each treated as categorical random effects. Habitat types from FishBase [12] or SeaLifeBase [25] were compiled in R using rfishbase [2] and aggregated into six categories: deep sea (>200m; bathy-pelagic or bathy-demersal); benthic; demersal; benthopelagic; pelagic; and reef-associated. Maximum body length of the species was also assigned to each population and used as a numerical predictor, drawing from FishBase and SeaLifeBase. The catch quantity and ex-vessel price of the population together determine landed value of the population; more valuable populations may be more likely to be assessed. We considered maximum annual landings prior to the first assessment and mean ex-vessel price (US$$\cdot$kg^{-1}) prior to the first assessment as separate numerical predictors, drawn from the NOAA landings database. Note that the database starts in 1950 and these values may therefore be biased for stocks for which maximum landings occured prior to 1950, or that were the mean ex-vessel price has changed substantially since 1950. Hoewever, given that we consider time-to-assessment from 1960 (see next paragraph), we have at least 10 years worth of data for stocks landed prior to 1950. The full dataset is given in Tables B.1, B.2.

2.5 Time-to-event model

To assess which factors drive the overall rate of assessments and the time from first recorded landings to a full stock assessment, we applied a time-to-event model. These models account for censored data (i.e., species that are landed but not yet assessed) while modeling time-to-assessment within a parametric framework. The first stock assessment (as defined by our criteria above) occurred in 1960, and we therefore used 1960 as the first possible assessment year for stocks that were first landed prior to 1960. We thus assume, based on the first recorded assessment, that the technology (models, computers to fit models etc.) was not available prior to 1960 to conduct a full stock assessment, and therefore any stocks that did not have landings post-1960 were excluded from the analysis. Thus $T = \min(Y_a - Y_l, Y_a - 1960)$, where Y_a is the year of first assessment for assessed stocks or 2013, the last year in our database, for unassessed stocks, and Y_l is the yer of first landings in the NOAA database (starting in 1950). In other words, we defined time-to-event (T) as the time between 1960 (or first recorded landings if psot-1960) and the time of the first full stock assessment or last record in our database (2013) for unassessed stocks.

The Weibull distribution is often used as a flexible model that has several desirable properties for this type of analysis, and one can easily check whether the Weibull model is appropriate for the data at hand (see Figure D.1). The shape parameter of the Weibull density can be interpreted in terms of the rate of events occurring. A shape parameter >1 suggests an increasing rate of events, whereas a shape parameter <1 indicates a decreasing rate. This allows us to directly estimate the change in assessment rates over time.

A further desirable property is that the estimated regression coefficients can be interpreted both in terms of the ratio of event rates as well as time-to-event probabilities. For example, one can interpret a model coefficient as decreasing or increasing the likelihood of an event occurring at any particular time relative to the baseline (this is usually called the hazard ratio interpretation). Coefficients are estimated for explanatory variables and thus indicate the level and direction of influence of the variable on the base rate of assessment. A coefficient can also be transformed to allow a time-to-event interpretation, where time-to-event parameters represent a multiplicative increase or decrease in the expected time until an event occurs. For example, in a hypothetical scenario, the median time-to-assessment of a demersal stock may be 0.5 times that of a pelagic stock, suggesting that it takes twice as long for pelagic stocks to get assessed. Such acceleration factors are just transformations of the parameters obtained for the event rate interpretation - the two interpretations are easily exchangeable in the Weibull model.

We thus model time-to-assessment as Weibull- distributed with shape parameter τ and rate λ:

$$T \sim Weibull(\tau, \lambda) \tag{1}$$

The connection between the event rate and the time-to-event interpretations can be is made explicit by writing the Weibull density as a function of the product of the rate $r(t)$ at which assessments occur, and the probability $A(t)$ of the assessment not occurring prior to time t.

$$f(t) = A(t) \times r(t) \tag{2}$$

$$= \exp(-\lambda t^{\tau}) \times \lambda \tau t^{\tau-1}, \tag{3}$$

where $A(t) = 1 - P(T \leq t) = 1 - F(t)$, with $F(t) = \exp(-\lambda t^{\tau})$ the Weibull distribution function.

We modeled the scale λ of the Weibull distribution as a linear combination of covariates and categorical random effects via a log-link function:

$$log(\lambda_{i,r,h,c,o,f}) = \beta X_i + \alpha_r + \gamma_h + \kappa_c + \omega_o + \zeta_f, \tag{4}$$

where β is a row-vector of regression coefficients, and X_i is a vector of continuous covariates as well as the binary FMP effect. Continuous covariates were taken as the (base 10) logarithms of mean ex-vessel price per kg, maximum landings, their interaction (i.e., mean ex-vessel price per kg $\times$ maximum landings) and species maximum length, all standardised by twice the standard deviation of the variable to allow comparison with the binary predictor for presence in FMPs ([13]). Categorical variables other than presence in FMPs, α (region), γ (habitat), κ (class), ω (order), and ζ_f (family) were all treated as random effects. The model was implemented within a Bayesian framework, using Markov Chain Monte Carlo (MCMC) as implemented in the JAGS package. MCMC was run using three chains of 210 000 iterations each, keeping every 100th iteration, with 10 000 iterations for each chain discarded as burn-in. This provided 6 000 samples from the posterior distribution for each parameter.

The variance of each random effect was given a half-Cauchy prior with a scale of $\Theta = 100$, regression coefficients had vague normal priors with a precision of $1/\sigma^2 = 1e^{-5}$, and τ was estimated using a gamma distribution prior with parameters $a = b = 1e^{-5}$.

3 Results

The number of landed marine stocks in the US (excluding salmons, shads, some benthic invertebrates, and highly migratory species) increased steadily from the 1950s into the 1990s (Figure 1a). During this period, the number of landed stocks in Alaska, West Coast, and Southeast regions approximately doubled, while the number of landed stocks in the Northeast increased more slowly (but was already relatively high at the start of this period). Most of the newly-landed stocks were unassessed throughout this period; by 1996 (the year of the reauthorization of the Sustainable Fisheries Act that required rebuilding of overfished stocks, thus required biomass limits to be estimated), less than 30 stocks in each of the four regions were assessed. As a proportion of all landed stocks, however, the trend in assessed stocks has steadily increased in all regions since the 1970s or 1980s (Figure 1b). Currently, the proportion of landed stocks that are assessed ranges from 18% in the Southeast to 39% in Alaska. In terms of regional landings, the assessment of stocks with high landings in each region between the 1970s and 2000s lead to rapidly increasing proportions of total landed tonnage being comprised of assessed populations. By 1996, >91% of landings in Alaska, Northeast, and Southeast regions were comprised of assessed stocks, and in the West Coast this proportion has increased rapidly from 45% in 1996 to >74% currently (Figure 1c).

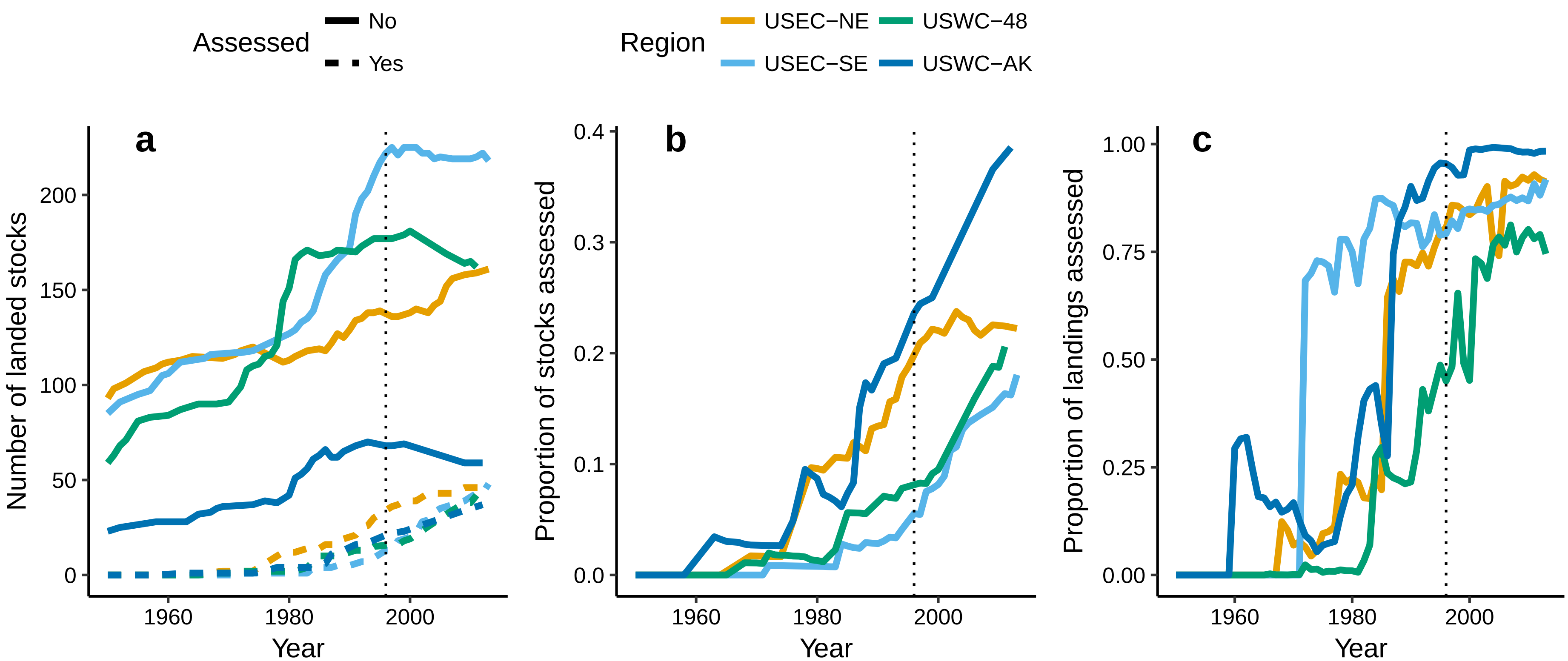

Figure 1: Timeline of a) the number of stocks landed by region and assessment status, b) proportion of landed stocks that are assessed, and c) the proportion of landed tonnage derived from assessed stocks. The dotted vertical line marks the reauthorization of the Sustainable Fisheries Act in 1996 that required rebuilding of overfished stocks, thus required biomass limits to be estimated.

The majority of landed stocks were fish species (Figure 2a), with Perciformes, Pleuronectiformes and Scorpaeniformes dominating both the number of assessed and unassessed stocks. Among invertebrate taxa, decapod species were the most commonly landed and also most commonly assessed. Demersal species represent a higher proportion of landed populations than species associated with other habitat types (Figure 2b), and also accounted for the highest number and proportion of stock assessments.

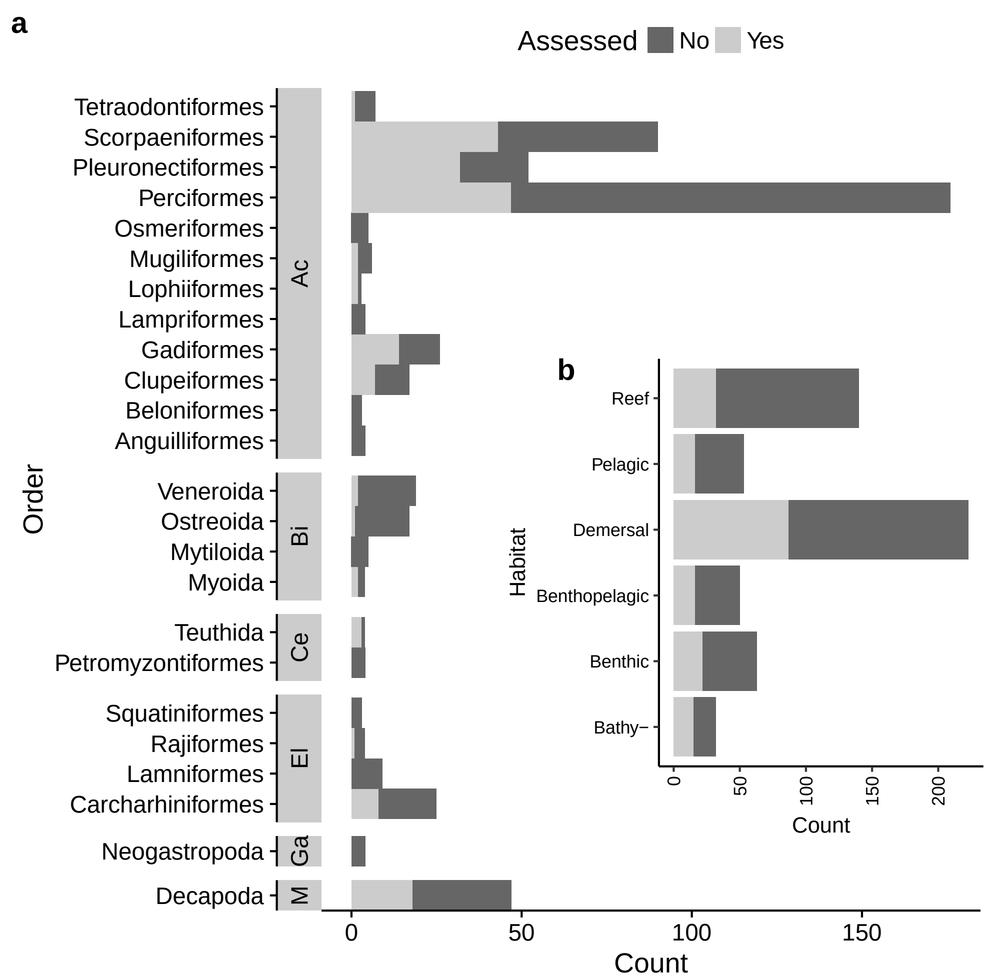

Figure 2: Assessment status at time of last known status (censoring time) a) by taxonomic order and sorted by class and b) by habitat type. In a), classes are abbreviated as Ac: Actinopterygii, M: Malacostraca, Bi: Bivalvia, El: Elasmobranchii, Ce: Cephalaspidomorphi, Ga: Gastropoda, and Ce: Cephalopoda. Only orders with more than three stocks are shown.

Our time-to-event model effectively disentangled the biological and fishery characteristics explain differences in annual probability of first assessment among stocks (see Appendix Figures D.1 and D.2 for model diagnostics). Among the numerical covariates considered (Figure 3, Table E.4), maximum annual landings and ex-vessel price both had positive and strongly significant impacts on annual assessment probabilities.

The effect of landings on assessment probability therefore explains how each region has a large proportion of landed tonnage derived from assessed populations (Fig. 2c), but a smaller proportion of landed stocks being assessed (Fig. 2b). The interaction between price and landings was negative, suggesting that price is more influential when landings are small, and that the landed tonnage drives assessments for species that only fetch a low per-kg price. The effect size (per standard deviation) of maximum body length was smaller than that for price and landings, but was nevertheless greater than zero, suggesting that larger-bodied species have been preferentially assessed. 52% of 301 stocks in our analysis within FMPs had assessments that corresponded to our criteria, compared with 12% of 260 stocks that were not in a FMP. Within our time-to-event model, the presence of stocks within FMPs lead to more rapid assessments, although the effect size was relatively small after controlling for continuous and categorical covariates.

Among explanatory random effects, taxonomic factors (order and class) explain a larger portion of residual variance than either habitat or region factors (Figure E.3). This is reflected in the probability of prior assessment in any given year after first being landed (Figures 3 and E.5, Table E.4), for which octopii and squids (Cephalopods) have a slightly higher probability of prior assessment than bony-fishes (Actinopterygii) or other taxonomic classes. Groundsharks (Carcharhiniformes), rockfishes (Scorpaeniformes), and flatfishes (Pleuronectiformes) have the highest probability of prior assessment among taxonomic orders, each having a higher assessment probability relative to the average of their taxonomic classes (Figure 4, Table E.4). Gadids (Gadidae) also have a high assessment probability relative to the average for bony fishes, while oysters (Ostreoida) have a low probability relative to average for bivalves. Habitat and regional effects were generally smaller than taxonomic effects. After controlling for other factors, benthic species had a higher probability of assessment than species from other habitats (in particular demersal species), and assessment probabilities were greatest for stocks in Alaska.

Although our model suggests an increasing rate of assessments (posterior median for τ: 2.82) over time, all regions show a relatively slow projected increase in the predicted proportion of assessed populations over the next decades (Figure 5), compared to the rapid increases in the observed proportions of assessed populations over the last 35 years (Fig. 2b). These projections rely on the values of maximum landings and ex-vessel price for all unassessed stocks, and were calculated from the final year of available time series data used for model fitting (usually 2013). The slow predicted increase thus occurs because stocks with a high assessment probability have typically been assessed early, so that remaining stocks have low landings and

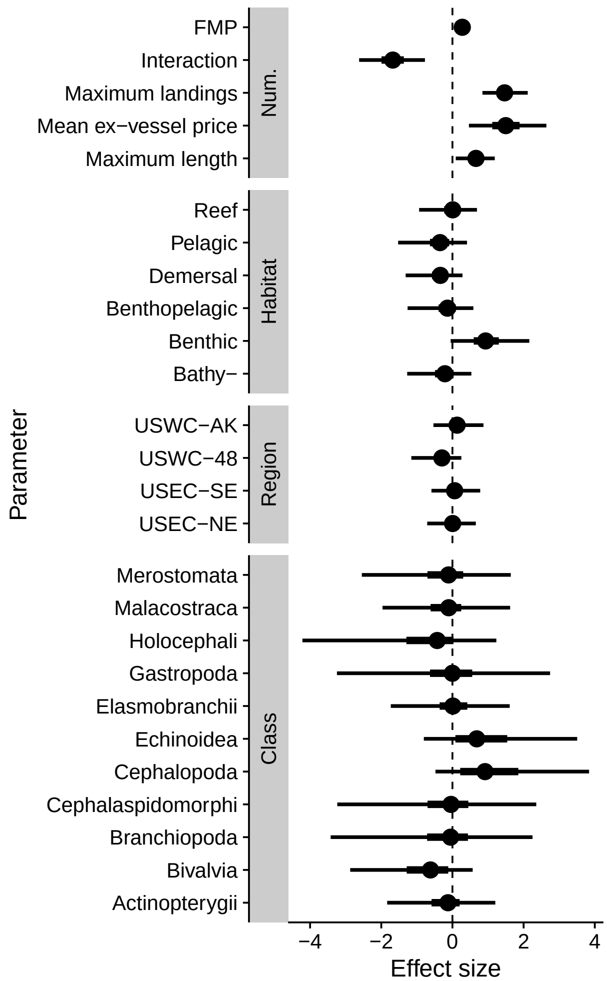

Figure 3: Summaries of estimated posterior distributions for numeric (Num.) covariates in the model, regional random effects, habitat random effects, and taxonomic class random effects. Circles show posterior medians, thick bars show inter-quartile ranges of the posteriors, and thin lines show 95% confidence intervals.

prices, or other characteristics associated with low annual assessment probability.

4 Discussion

We introduced this study with a common phrase from business management which equally pertains to natural resource management, "what gets measured, gets managed". The US National Marine Fisheries Service (NMFS) currently estimates annual catch limits (ACLs) for the vast majority of fishes in federal fisheries management plans, and has established accountability measures that are triggered whenever recorded annual harvest exceeds the ACLs ([21]). Similarly, state-based management agencies also monitor catches for many species and implement management actions once catches or catch-per-unit effort levels reach pre-specified

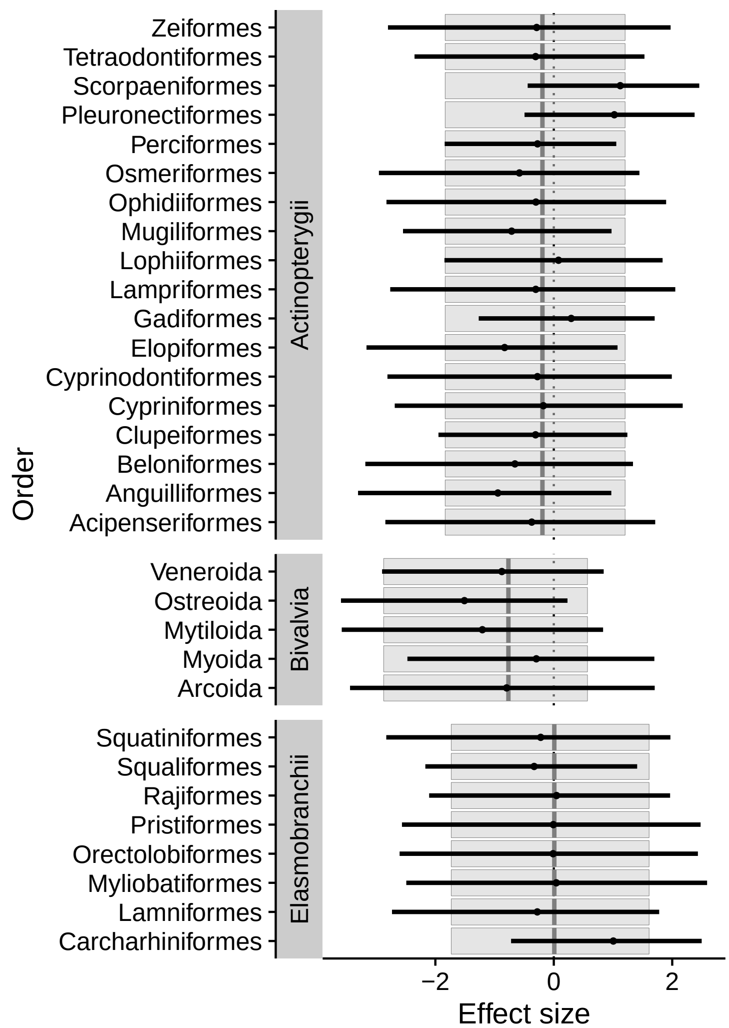

Figure 4: Summaries of estimated posterior distributions for random effects of orders within classes. For classes containing multiple nested orders in the dataset, grey lines show posterior means and coloured boxes show 95% confidence intervals of class effects. Order effects are shown as relative to the class effect within which they are nested, with points showing posterior means and black lines showing 95% confidence intervals.

limits. Thus, NMFS and other agencies both measure and manage annual harvest for the majority of US fishes. However, various different methods are used for setting ACLs. Stock-reduction analyses (SRAs) and other catch-only models (COMs), used to estimate ACLs for the majority of stocks in most federal US management regions ([1]), do not estimate population size relative to management targets ([8, 33]). In some cases, it is possible to rebuild or maintain fish and invertebrate stocks at levels of sustainable harvest without using a stock-assessment model as defined in our criteria, using only SRAs or COMs ([e.g., 31, 32]). Specifically, COMs can be used to develop a harvest plan with fishing at a proportion of the estimated ACL, which is expected to have a pre-specified probability of maintaining population abundance near management

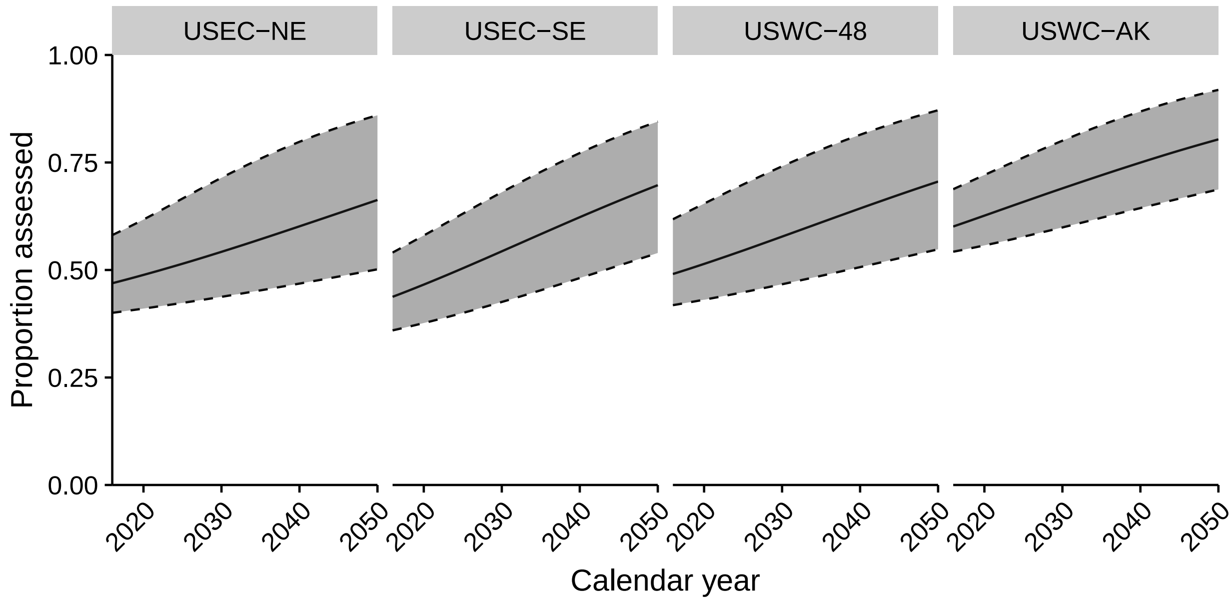

Figure 5: Projected proportion of stocks assessed by region and calendar year, based on assessment probabilities of stocks within each region over the projected year range.

targets ([32]). Nevertheless, we have excluded SRAs and COMs from our definition of “stock assessments”, since NMFS and other agencies are measuring population abundance only for those species that have a stock assessment. We see two main benefits to measuring population abundance for marine fishes beyond simply estimating ACLs:

1. COMs generally involve managing a fishery to target a constant annual harvest, which is chosen to perform adequately on average: some stocks may be overfished, others may be underfished, but the average stock has appropriate fishing rates. In contrast, stock assessments are likely to perform adequately over time for each individual stock: some decades may be overfished, others may be underfished, but on average over time each individual stock is fished sustainably. Both approaches are expected to perform well on average, but stock assessments improve the expected performance for each stock individually. This advantage is important for both conservationists and fishers who do not wish to see any given individual stock overfished, irrespective of whether or not the average stock is overfished. Not only does overfishing pose a conservation challenge for depleted stocks, but may impose stricter fishing limits for other stocks as a result of bycatch limits for the depleted stocks ([15, 19]).

2. The ability of stock assessments to inform harvest plans based on updated data has been repeatedly shown to improve management outcomes ([e.g., 3]). For example, managing with a harvest control rule in

which fishing mortality targets are updated based on stock assessment estimates of population abundance can substantially decrease variability in abundance and fishery catches (assuming the assessment does not change fundamentally over time), even relative to cases where a COM estimates sustainable fishing mortality rates perfectly ([29]). Updating harvest plans based on new data can also prevent cases in which stock reduction analyses over-estimate a sustainable fishing rate, which would otherwise collapse the fishery ([32]). We therefore see benefits both to ocean conservation and to fishing industries by continuing to transition from management based on COMs to management based on stock assessments with associated biomass reference points.

There are many differences in quality and complexity among stock assessments. NMFS categorizes assessments using five "tiers", and high-tier assessments are distinguished by having more or higher-quality data assimilated, using a model that allows for greater attention to biological mechanisms and realism. We have ignored these subtler distinctions here, and have instead used a single cutoff criterion, which essentially falls between statistical population models and SRAs. In general, our classification of unassessed stocks aligned with the SIS categories 0–2, while our assessed stocks aligned with SIS categories 3–5 (Appendix C). We suggest that future research could build on our model to include annual probabilities of transitioning among multiple categories (e.g., among six categories including unassessed and all five NMFS assessment tiers). This future analysis would allow greater detail regarding historical changes over time in the average quality of stock assessments, and may show alternative patterns among regions dependent on the level of assessment complexity considered. NMFS has already embarked upon the task of defining and compiling records of different assessment types and qualities, so this research will soon be feasible for stocks in US-federal jurisdiction.

Given our operational definition of stock assessment, maximum landings were a particularly strong predictor of the year in which stocks were first assessed, and ex-vessel price was also positively correlated with the rate of assessments. The product of landings and price is a rough measure of the gross economic value to commercial fishers derived from fish and invertebrate stocks. Fisheries managers and scientists must choose among several candidate species in a given region and devote stock assessment time and resources towards only a subset of these. Our results suggest that fisheries managers prioritize stocks with high commercial value for stock assessment, and this result is consistent with previous research showing that fishery development is also driven primarily by landed tonnage and ex-vessel prices of fished species ([27]). We were unable to identify a variable proportional to recreational value that was consistently measured across all regions, so we cannot estimate the potential impact of economic value for recreational fishing on assessment probabilities. However, we acknowledge that recreational value and take will likely have an impact on both population dynamics and management in many regions, and especially for state-managed near-shore stocks.

The presence of stocks within FMPs was found to lead to accelerated time-to-assessment. The small effect size for this factor is likely driven by the strong dependence of presence in FMPs on other factors in our model, such as landings and price. Indeed, logistic regression of the presence in a FMP against the same linear predictor used in our time-to-event model (without FMP factor) shows similar strong effects of landings and price, and qualitatively similar results to our time-to-event analysis. It thus appears that other predictors in our model are primary drivers on the path towards assessment, and that placing stocks within FMPs increases the momentum towards a full assessment for these stocks. It should be noted that, despite the apparent co-linearity of continuous covariates and presence in FMPs in our model, the model fits the data well. Furthermore, model sensitivities without the FMP factor give very similar results for all other predictors, suggesting a limited influence of the FMP variable on all other model results.

We suspect that the positive effect of body size on time-to-assessment may be due to large number and diversity of small stocks that are landed in low numbers and at a relatively low ex-vessel price. Since these stocks do not have a consistent price or landings, and are taxonomically diverse, it may be more parsimonious within the model to attribute the lack of an assessment for these stocks to body length.

Certain taxonomic classes, or orders within classes, stood out as being more likely to have undergone a stock assessment after controlling for landings, ex-vessel price, and other factors. Elasmobranchs, and in particular groundsharks (Carchariniformes), had relatively high rates of stock assessment when controlling for other variables. This likely results from increasing conservation interest in recent decades for shark species both in the US and worldwide ([11]). This high assessment rate after accounting for maximum landings may also result in part from the high discard rates of small coastal shark species often caught as bycatch in shrimp trawl or other fisheries ([6]). Due to bycatch, our database values for shark landings may be smaller than true harvest, thus resulting in a compensatory increase in the estimated assessment rate for this taxon. A similar effect may drive time-to-assessment probabilities of popular recreational species, for which the true landings are probably substantially higher than those reported in the NOAA landings database. Such under-reported total landings may explain higher than average assessment probabilities found for flatfishes (Pleuronectiformes), which are often estuarine or near-shore species. Among bony fishes scorpaenfishes such as rockfishes and greenlings (Scorpaeniformes) also had high rates of assessment. Results for Scorpaeniformes seem reasonable to us, given the number of Pacific rockfishes included, which have been a topic of conservation concern in Alaska and the US West Coast ([4, 5, 23]). While cephalopod abundance is commonly estimated using catch-per-unit effort indices or survey abundance indices ([9]) rather than stock assessments, in the US most landed cephalopods are assessed (all are squid species). This may result from defined units of assessment having coast-wide distributions rather than assuming a more disaggregated stock structure in which only some of the stocks would be assessed.

Results from our model could be used to evaluate and control for systematic differences between assessed and unassessed US stocks in other analyses. These differences are important because meta-analysis of assessed stocks is widely used to understand management performance and biological characteristics of marine fishes in general ([30]). To account for systematic differences between assessed and unassessed stocks, authors could use our model within a "propensity score matching" or propensity score weighting framework ([26, 20]). For example, pairwise comparisons (or matching) between assessed and unassessed stocks should involve stocks with similar likelihoods of being assessed. Similarly, calculated propensity scores can be used as predictor variables in regressions involving variables of interest to control for the non-random assessment probabilities among analyzed stocks. If analysts find systematic differences in management outcomes or biological characteristics between assessed and unassessed stocks (e.g., systematic differences in recruitment compensation), then the relationship between the propensity of assessment and the variable of interest can be used to improve predictions for unassessed stocks.

Fish and invertebrate stocks in the US are reaching saturation with respect to the rate of first assessment. Even though most stocks in all regions are as yet unassessed (Figure 1b), the predicted rate of increase in assessed stocks over the next few decades is slower than the rate observed over the last few decades because the stocks most likely to be assessed have already been assessed. Furthermore, fisheries management agencies must weight the benefit of attempting to obtain full assessments for new stocks against the need to update assessments of previously assessed stocks. Since the latter have higher commercial value, and updating assessments is often a more straightforward task than collecting data and developing assessments for previously unassessed species, the percentage of assessed stocks is unlikely to attain 100%. Rather, at some point funding and resource limitations will likely lead to a "steady state" where no new stocks will be assessed and priority is given to updating exsisting assessments for stocks of high commercial, recreational and ecological value or concern.

It is not necessarily the case that stock assessments are required for effectively managing fish and invertebrate stocks, as harvest control rules or in-season adjustments to fishing effort can instead be based on fishery-independent survey indices or fishery-dependent catch-per-unit effort indices rather than on stock status estimates from assessments. However, a logical leap from ”what gets measured, gets managed” to ”what is better measured, is better managed” suggests the value of better estimating stock status through the use of stock assessments. Further improvements in management performance given current resources could also be attained by improved methods for prioritizing which stocks to assess ([22]).

5 Acknowledgements

We thank Jeannette Banobi for compiling year of first stock assessment records in the management attributes database, and Nicole Baker for conducting online searches to identify additional assessments. We thank Cody Szuwalski for productive discussions while planning out the data set and analysis. We are grateful to fisheries scientists and managers who participated in interviews to characterize management attributes of U.S. stocks including the year of first stock assessment. These individuals include: Ingrid Spies, Grant Thompson (Alaska Fisheries Science Center); Scott Kelley, Tim Baker, Gretchen Bishop, Dave Harris, Tim Sands, Mark Stichert, Joe Stratman, Jeff Wadle (Alaska Department of Fish and Game); Edward Poulsen (Alaska Bering Sea Crabbers Association); John Devore, Mike Burner, Kerry Griffin (Pacific Fishery Management Council); Paul Crone (Southwest Fisheries Science Center); Steven Hare (International Pacific Halibut Commission); Dan Ayres, Heather Reed, Bob Sizemore, Mike Ulrich, Lorna Wargo (Washington Department of Fish and Wildlife); Kelly Corbett, Scott Groth, Robert Hannah (Oregon Department of Fish and Wildlife); Kristine Barsky, Peter Kalvass (California Department of Fish and Game), Toni Chute, Ruth Haas-Castro, Dvora Hart, Joseph Idoine, Larry Jacobsen, Chris Legault, Loretta O'Brien, Paul Rago, Gary Shepherd, Fred Serchuk, Katherine Sosebee (Northeast Fisheries Science Center); Andy Applegate, Phillip Haring, Chris Kellog, Tom Nies, Lori Steele (New England Fishery Management Council); Robert Beale, Toni Kerns, Nichola Meserve, Brad Spear, Christopher Vonderweidt, Michael Waine (Atlantic States Marine Fisheries Commission); Jason Didden, Tom Hoff (Mid-Atlantic Marine Fisheries Commission); Derek

Orner (National Marine Fisheries Service); John Carlson, Shannon Cass-Calay, Nancy Cummings, Enric Cortes, Rick Hart, Erik Williams (Southeast Fisheries Science Center); Sue Gerhart, Peter Hood, Jack McGovern, Andy Strelcheck (NOAA Southeast Regional Office); Gregg Waugh (South Atlantic Marine Fisheries Commission); Tom Matthews, and Bill Sharp (Florida Fish and Wildlife Conservation Commission). M.C.M. was supported in this work by the Walton Family Foundation and by a NSERC Banting Fellowship.

References

[1] Jim Berkson and James T. Thorson. "The determination of data-poor catch limits in the United States: is there a better way?" In: *ICES Journal of Marine Science: Journal du Conseil* 72.1 (Jan. 2015), pp. 237–242.

[2] Carl Boettiger, Duncan Temple Lang, and Peter Wainwright. "rfishbase: exploring, manipulating and visualizing FishBase data from R". In: *Journal of Fish Biology* (2012).

[3] Thomas R. Carruthers et al. "Evaluating methods for setting catch limits in data-limited fisheries". In: *Fisheries Research* 153 (May 2014), pp. 48–68.

[4] W. G Clark. "The effect of recruitment variability on the choice of a target level of spawning biomass per recruit". In: *Proceedings of the International Symposium on Management Strategies for Exploited Fish Populations*. Ed. by G. Kruse et al. Fairbanks, AK: University of Alaska, Alaska Sea Grant Report 93-02, 1993, pp. 233–246.

[5] Flaxen Conway and Wesley Shaw. "Socioeconomic Lessons Learned from the Response to the Federally-Declared West Coast Groundfish Disaster". In: *Fisheries* 33.6 (June 2008), pp. 269–277.

[6] Enric Corts. *Stock assessment of small coastal sharks in the U.S. Atlantic and Gulf of Mexico*. Sustainable Fisheries Division Contribution SFD-01/02-152. National Marine Fisheries Service, Southeast Fisheries Science Center, 2002, p. 133. URL: `http://www.nmfs.noaa.gov/sfa/hms/species/sharks/documents/scs_assessment_rev2.pdf`.

[7] Catherine M. Dichmont et al. "A review of stock assessment packages in the United States". In: *Fisheries Research* 183 (2016), pp. 447–460.

[8] E. J. Dick and A. D MacCall. "Depletion-Based Stock Reduction Analysis: A catch-based method for determining sustainable yields for data-poor fish stocks". In: *Fisheries Research* 110.2 (2011), pp. 331–341.

[9] Zo A. Doubleday et al. "Global proliferation of cephalopods". In: *Current Biology* 26.10 (2016), R406–R407.

[10] N. A. Dowling et al. "From low- to high-value fisheries: Is it possible to quantify the trade-off between management cost, risk and catch?" In: *Marine Policy* 40 (2013), pp. 41–52. ISSN: 0308-597X. DOI: 10.1016/j.marpol.2012.12.009. URL: http://www.sciencedirect.com/science/article/pii/S0308597X12002503 (visited on 12/08/2016).

[11] Nicholas K Dulvy et al. "Extinction risk and conservation of the worlds sharks and rays". In: *eLife* 3 (2014), e00590. ISSN: 2050-084X. DOI: 10.7554/eLife.00590.

[12] Rainer Froese, Daniel Pauly, et al. *FishBase*. 2012.

[13] Andrew Gelman and Jennifer Hill. *Data analysis using regression and multilevel/hierarchical models.* Cambridge university press, 2006.

[14] Thomas E Helser et al. "Stock assessment of Pacific hake (whiting) in US and Canadian waters in 2006". In: *Pacific Fishery Management Council* 7700 (2006), pp. 97220–1384.

[15] RAY Hilborn et al. "Defining Trade-Offs among Conservation, Profitability, and Food Security in the California Current Bottom-Trawl Fishery". In: *Conservation Biology* 26.2 (2012), pp. 257–268. ISSN: 1523-1739.

[16] Jeffrey A. Hutchings et al. "Trends in the abundance of marine fishes". In: *Canadian Journal of Fisheries and Aquatic Sciences* 67.8 (2010), pp. 1205–1210. (Visited on 12/08/2016).

[17] Olaf P Jensen, Trevor A Branch, and Ray Hilborn. "Marine fisheries as ecological experiments". In: *Theoretical Ecology* 5.1 (2012), pp. 3–22.

[18] Alec D MacCall. "Depletion-corrected average catch: a simple formula for estimating sustainable yields in data-poor situations". In: *ICES Journal of Marine Science: Journal du Conseil* 66.10 (2009), pp. 2267–2271.

[19] Michael C. Melnychuk, Jeannette A. Banobi, and Ray Hilborn. "Effects of Management Tactics on Meeting Conservation Objectives for Western North American Groundfish Fisheries". In: *PLOS ONE* 8.2 (2013), pp. 1–15. DOI: `10.1371/journal.pone.0056684`. URL: `http://dx.doi.org/10.1371/journal.pone.0056684`.

[20] Michael C Melnychuk et al. "Can catch share fisheries better track management targets?" In: *Fish and Fisheries* 13.3 (2012), pp. 267–290.

[21] R. D. Methot et al. "Implementing a science-based system for preventing overfishing and guiding sustainable fisheries in the United States". In: *ICES Journal of Marine Science: Journal du Conseil* 71.2 (2014), pp. 183–194.

[22] Richard D. Methot. *Prioritizing fish stock assessments.* NOAA Tech. Memo. Washington, D.C.: NMFS, NOAA, US Department of Commerce, 2015, p. 31. URL: `https://www.st.nmfs.noaa.gov/Assets/stock/documents/PrioritizingFishStockAssessments_FinalWeb.pdf`.

[23] R. A. Myers, K. G. Bowen, and N. J. Barrowman. "Maximum reproductive rate of fish at low population sizes". In: *Canadian Journal of Fisheries and Aquatic Sciences* 56.12 (1999), pp. 2404–2419.

[24] David Newman, Jim Berkson, and Lisa Suatoni. "Current methods for setting catch limits for data-limited fish stocks in the United States". In: *Fisheries Research* 164 (2015), pp. 86–93.

[25] MLD Palomares and D Pauly. "SeaLifeBase". In: *World Wide Web Electronic Publication,¡ www. sealifebase. org, version¿(10/2016)* (2010).

[26] PAUL R. Rosenbaum and DONALD B. Rubin. "The central role of the propensity score in observational studies for causal effects". In: *Biometrika* 70.1 (1983), pp. 41–55. DOI: `10.1093/biomet/70.1.41`. eprint: `http://biomet.oxfordjournals.org/content/70/1/41.full.pdf+html`. URL: `http://biomet.oxfordjournals.org/content/70/1/41.abstract`.

[27] S. A. Sethi, T. A. Branch, and R. Watson. "Global fishery development patterns are driven by profit but not trophic level". In: *Proceedings of the National Academy of Sciences* 107.27 (June 2010), pp. 12163–12167.

[28] Tim D. Smith. *Scaling Fisheries: The Science of Measuring the Effects of Fishing, 1855-1955.* 1st ed. Cambridge, UK: Cambridge University Press, Aug. 2007. ISBN: 0-521-03896-0.

[29] James T. Thorson, Olaf P. Jensen, and Ray Hilborn. “Probability of stochastic depletion: an easily interpreted diagnostic for stock assessment modelling and fisheries management”. In: *ICES Journal of Marine Science: Journal du Conseil* 72.2 (2015), pp. 428–435.

[30] James T. Thorson et al. “Giants' shoulders 15 years later: lessons, challenges and guidelines in fisheries meta-analysis”. In: *Fish and Fisheries* 16.2 (2015), pp. 342–361.

[31] Chantell R. Wetzel and Andr E. Punt. “Model performance for the determination of appropriate harvest levels in the case of data-poor stocks”. In: *Fisheries Research* 110.2 (2011), pp. 342–355.

[32] Chantell R. Wetzel and Andr E. Punt. “Performance of a fisheries catch-at-age model (Stock Synthesis) in data-limited situations”. In: *Marine and Freshwater Research* 62.8 (2011), pp. 927–936.

[33] John Wiedenmann, Michael J. Wilberg, and Thomas J. Miller. “An Evaluation of Harvest Control Rules for Data-Poor Fisheries”. In: *North American Journal of Fisheries Management* 33.4 (2013), pp. 845–860.

A Assignment of year of first stock assessment

We used a three-step process to classify stocks as assessed or unassessed and, for assessed stocks, to identify the year of first assessment.

1. Management attribute database and interviews: As part of a larger data collection effort to characterize management attributes at the stock level, we conducted a survey which included the question "Year of first stock assessment", with a description of what qualifies as an assessment (as outlined in the main text). To answer this question, we first looked through historical stock assessments archived on fisheries agency websites to identify the first assessment that met our defined criteria (as not all published assessments would meet our relatively strict criteria). Websites accessed included those of U.S. Fisheries Management Councils, NMFS Science Centers, and state-level fisheries management agencies. To confirm our findings, or if we were unable to answer the question from archived assessments, we conducted interviews with fisheries scientists and managers familiar with one or more stocks in each region. Individuals who participated in interviews for management attributes for U.S. stocks are listed in our Acknowledgments. These surveys were conducted for 196 U.S. stocks, of which 165 were found to have a stock assessment as defined. The intention of these surveys was to cover primarily well-studied stocks and stocks important to regional fisheries, not to draw a random sample from the NOAA landings data. Therefore, the proportion of these stocks meeting the criteria of having a stock assessment is high compared to the proportion of stocks from the NOAA landings database that are assessed.

2. Comparison with SIS database: We compared our list of assessed stocks with the list of assessed stocks from the US Species Information System (SIS) database. We considered SIS stocks with assessment level 3 or greater (see Appendix C). We found 20 stocks in the SIS database that were not previously included in our list of assessed stocks in (1). Most of these stocks were first assessed after our period of data collection in (1), 2012–2015, which is why many of these were not originally included in our list of stocks in (1). We added these 20 stocks along with their year of first assessment to our dataset.

3. Remaining stocks in NMFS landings database: To ensure that we had not overlooked any U.S. marine stocks with a stock assessment (including stocks managed by state agencies), we systematically searched online for a stock assessment for each species in the NOAA landings database. These searches comprised two types of species: some species in the NOAA landings database were not previously included in our collection of stock management attribute data in (1) or (2); and some species in the NOAA landings database were previously included in (1) or (2) but also had landings recorded in states outside of the defined areas of distribution of those stocks, and thus other assessments of the same species may have been available, for other areas. For both types of species, we searched for any stock assessment corresponding to species:state recorded landings that were unaccounted for in (1) or (2). Online searches consisted of (i) going through assessment archives on the websites of U.S. Fisheries Management Councils, NMFS Science Centers, and state-level fisheries management agencies; and (ii) using the Google search engine with search terms ("Latin name of species" "stock assessment" "Region") to identify available assessments either in the primary literature or that may not have been otherwise available through agency websites. In addition to confirming many of the added assessments in (2), we found 15 stock assessments meeting our criteria for a assessment which were not previously accounted for. Many of these were stocks managed by state agencies so did not appear in the list in (2). These 15 stocks were added to our dataset along with their year of first assessment.

In total, after steps 1–3 we generated a list of 231 U.S. stocks, including 200 stocks with stock assessments that qualified under our defined criteria. The remaining 31 stocks did not meet our assessment criteria. They were excluded from our dataset, although after merging our dataset of assessed stocks with the NMFS landings database, those stocks would later re-enter as unassessed stocks. Of these 200 assessed stocks in our full dataset, 188 assessed stocks were used in our final dataset for analysis (Tables B.1,B.2. The remaining 12 assessed stocks (in Table B.3) were excluded from our final dataset for analysis because they either they did not have any recorded landings in the NMFS landings database, or the year of first assessment preceded the year in which landings data first began in the NMFS landings database.

B Dataset

Table B.1: Dataset used for time-to-event analysis. The assessment year is the year of first stock assessment, the initial year is the year of first landings or 1960, whichever is earlier (used to calculate time-to-assessment), price is mean ex-vessel price and landings are maximum recorded landings prior to the first assessment, length and habitat were derived from Fishbase. FMP indicates whether or not the stock is included in a federal management plan. SIS cat. is the SIS assessment database category.

Stock	Assessment year	Initial year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	FMP	SIS cat.
USWC-48 STURGEON, GREEN		1981	USWC-48	demersal	1.14	109	270		
USWC-48 STURGEON, WHITE		1981	USWC-48	demersal	3.55	349	610		
USEC-NE EEL, AMERICAN		1960	USEC-NE	demersal	4.33	1184	152		
USEC-SE EEL, AMERICAN		1960	USEC-SE	demersal	1.75	586	152		
USEC-NE EEL, CONGER		1960	USEC-NE	demersal	0.69	108	230		
USEC-SE EEL, CONGER		1984	USEC-SE	demersal	0.89	6	230		
USEC-NE NEEDLEFISH, ATLANTIC		1963	USEC-NE	reef	0.29	3	111		
USEC-NE HOUNDFISH		2007	USEC-NE	reef	0.33	1	150		
USEC-SE BALLYHOO		1960	USEC-SE	reef	1.22	625	55		
GoMex Gulf menhaden	1972	1960	USEC-SE	pelagic	0.03	729920	35	No	
USEC Atlantic menhaden	1986	1960	USEC-NE	pelagic	0.05	697362	50	No	
GeBank/GoMaine Atlantic herring	1968	1960	USEC-NE	benthopelagic	0.03	89147	45	Yes	
Alaska Kodiak herring	1978	1960	USWC-AK	pelagic	0.05	7336	34	No	
Alaska Sitka herring	1976	1960	USWC-AK	pelagic	0.04	26843	34	No	
Alaska Togiak herring	1978	1960	USWC-AK	pelagic	0.05	40831	34	No	
USWC-48 HERRING, PACIFIC		1960	USWC-48	pelagic	0.74	11784	34		
USEC-NE SHAD, GIZZARD		1960	USEC-NE	pelagic	0.25	1390	57		
USEC-SE SHAD, GIZZARD		1960	USEC-SE	pelagic	0.33	939	57		
USEC-NE HERRING, ATLANTIC THREAD		1960	USEC-NE	reef	0.03	2321	38		
USEC-SE HERRING, ATLANTIC THREAD		1960	USEC-SE	reef	0.12	10083	38		
USEC-SE SARDINE, SPANISH		1960	USEC-SE	reef	0.30	2922	30		
USWC Pacific sardine	1966	1960	USWC-48	pelagic	0.05	324105	40	Yes	
USEC-SE HERRING, ROUND		2001	USEC-SE	pelagic	1.92	1	33		
USWC-48 HERRING, ROUND		1992	USWC-48	pelagic	0.21	78	33		
USEC-NE ANCHOVY, BAY		2013	USEC-NE	pelagic	2.04	0	10		
USWC-48 ANCHOVY, NORTHERN		1981	USWC-48	pelagic	0.11	52309	25		
USWC-48 SACRAMENTO BLACKFISH		1973	USWC-48	benthopelagic	0.84	137	55		
USWC-48 SPLITTAIL		1960	USWC-48	benthopelagic	0.57	2	44		
USEC-NE MUMMICHOG		1979	USEC-NE	benthopelagic	7.82	2	15		
USEC-SE LADYFISH		1960	USEC-SE	reef	0.52	2722	100		
USEC-NE TARPON		1960	USEC-NE	reef	0.52	0	250		
BSAI Pacific cod	1987	1960	USWC-AK	demersal	0.32	53463	119	Yes	
GOA Pacific cod	1988	1960	USWC-AK	demersal	0.32	32985	119	Yes	
USWC-48 COD, PACIFIC		1960	USWC-48	demersal	0.35	15995	119		
GeBank Atlantic cod	1977	1960	USEC-NE	benthopelagic	0.27	3271	200	Yes	
GoMaine Atlantic cod	1989	1960	USEC-NE	benthopelagic	0.54	51321	200	Yes	
GeBank haddock	1968	1960	USEC-NE	demersal	0.18	70484	112	Yes	

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Initial year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	FMP	SIS cat.
GoMaine haddock	1982	1960	USEC-NE	demersal	0.47	4306	112	Yes	
USWC-48 TOMCOD, PACIFIC		1960	USWC-48	demersal	0.04	268	30		
USWC-AK TOMCOD, PACIFIC		1979	USWC-AK	demersal	0.35	0	30		
USEC-NE TOMCOD, ATLANTIC		1960	USEC-NE	demersal	0.77	1	38		
GeBank/GoMaine Atlantic pollock	1978	1960	USEC-NE	demersal	0.15	17947	130	Yes	
AI walleye pollock	2003	1976	USWC-AK	benthopelagic	0.17	2003	91	Yes	
EBS walleye pollock	1987	1967	USWC-AK	benthopelagic	0.16	238409	91	Yes	
GOA walleye pollock	1990	1976	USWC-AK	benthopelagic	0.18	91573	91	Yes	
USWC-48 POLLOCK, WALLEYE		1965	USWC-48	benthopelagic	0.20	3912	91		
USEC-NE CUSK		1960	USEC-NE	demersal	0.51	2363	120		
USEC-SE CUSK		1990	USEC-SE	demersal	2.25	3	120		
USEC-NE HAKE, OFFSHORE SILVER		1991	USEC-NE	bathy-	1.25	119	41		
nGeBank/GoMaine silver hake	1978	1960	USEC-NE	demersal	0.06	23779	76	Yes	
sGeBank/midAtl silver hake	1978	1960	USEC-NE	demersal	0.09	36850	76	Yes	
USWC/BC Pacific hake	1982	1960	USWC-48	pelagic	0.04	13072	91	Yes	
USEC-NE HAKE, RED		1960	USEC-NE	demersal	0.26	4746	66		
USEC-SE HAKE, RED		1983	USEC-SE	demersal	0.23	1	66		
USEC-NE HAKE, SOUTHERN		2009	USEC-NE	demersal	0.64	0	35		
GeBank/GoMaine white hake	1995	1960	USEC-NE	demersal	0.44	8444	133	Yes	
USEC-SE HAKE, WHITE		1985	USEC-SE	demersal	0.74	3	133		
USEC-NE OPAH		1992	USEC-NE	bathy-	3.20	1	200		
USEC-SE OPAH		1996	USEC-SE	bathy-	2.90	1	200		
USWC-48 OPAH		1980	USWC-48	bathy-	1.91	0	200		
USEC-NE DEALFISH		1994	USEC-NE	bathy-	1.14	41	300		
nGeBank/GoMaine monkfish	2002	1960	USEC-NE	demersal	1.38	19094	120	Yes	
sGeBank/midAtl monkfish	2002	1960	USEC-NE	demersal	1.41	11516	120	Yes	
USEC-NE GOOSEFISH, BLACKFIN		2004	USEC-NE	bathy-	3.41	0	60		
East Florida striped mullet	2005	1960	USEC-SE	benthopelagic	0.44	3214	100	No	
USEC-NE MULLET, STRIPED (LIZA)		1960	USEC-NE	benthopelagic	0.29	91	100		
USEC-SE MULLET, STRIPED (LIZA)		1960	USEC-SE	benthopelagic	0.81	8474	100		
USWC-48 MULLET, STRIPED (LIZA)		1960	USWC-48	benthopelagic	0.32	109	100		
West Florida striped mullet	2005	1960	USEC-SE	benthopelagic	0.44	15874	100	No	
USEC-SE MULLET, WHITE		1960	USEC-SE	reef	0.39	2685	90		
USEC-SE BROTULA, BEARDED		1986	USEC-SE	reef	1.70	37	94		
USEC-SE AUSTRALIAN ROCKLING		2007	USEC-SE	bathy-	1.50	3	200		
USWC-48 SMELT, WHITEBAIT		1960	USWC-48	demersal	0.21	152	23		
USWC-AK CAPELIN		1991	USWC-AK	pelagic	1.10	18	20		
USEC-NE SMELT, RAINBOW		1960	USEC-NE	pelagic	0.72	163	36		
USWC-48 SMELT, EULACHON		1960	USWC-48	pelagic	0.22	1772	34		
USWC-AK SMELT, EULACHON		1965	USWC-AK	pelagic	0.58	156	34		
USEC-NE LAUNCE, AMERICAN SAND		1960	USEC-NE	demersal	0.52	218	24		
USWC-48 LAUNCE, AMERICAN SAND		1973	USWC-48	demersal	1.45	0	24		
USNE Atlantic wolffish	2008	1960	USEC-NE	demersal	0.40	1205	150	Yes	
USWC-48 WOLF-EEL		1976	USWC-48	demersal	0.99	8	240		

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Initial year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	FMP	SIS cat.
USEC-SE POMPANO, AFRICAN		1991	USEC-SE	reef	3.79	6	150		
USEC-NE RUNNER, BLUE		1997	USEC-NE	reef	1.29	0	70		
USEC-SE RUNNER, BLUE		1960	USEC-SE	reef	0.38	1156	70		
USEC-NE JACK, CREVALLE		1960	USEC-NE	reef	1.00	7	124		
USEC-SE JACK, CREVALLE		1960	USEC-SE	reef	0.48	2052	124		
USEC-SE JACK, HORSE-EYE		1992	USEC-SE	reef	1.11	2	101		
USEC-SE JACK, BLACK		1996	USEC-SE	benthopelagic	1.41	1	100		
USEC-SE JACK, BAR		1994	USEC-SE	reef	1.98	42	59		
USEC-SE RUNNER, RAINBOW		1996	USEC-SE	reef	1.50	2	180		
USEC-SE SCAD, BIGEYE		1991	USEC-SE	reef	2.35	181	70		
USEC-SE MOONFISH, ATLANTIC		1960	USEC-SE	benthopelagic	1.81	29	60		
USEC-SE LOOKDOWN		1993	USEC-SE	demersal	1.78	19	48		
GoMex greater amberjack	1995	1984	USEC-SE	reef	1.84	785	190	Yes	
sAtl greater amberjack	1999	1987	USEC-SE	reef	1.77	438	190	Yes	
USWC-48 YELLOWTAIL JACK		1960	USWC-48	benthopelagic	0.37	4285	250		
USEC-SE JACK, ALMACO		1991	USEC-SE	reef	2.01	125	160		
USEC-SE RUDDERFISH, BANDED		1991	USEC-SE	benthopelagic	1.53	50	75		
East Florida pompano	2002	1960	USEC-SE	benthopelagic	3.83	266	64	No	
USEC-NE POMPANO, FLORIDA		1960	USEC-NE	benthopelagic	2.30	2	64		
USEC-SE POMPANO, FLORIDA		1960	USEC-SE	benthopelagic	4.47	70	64		
USWC-48 POMPANO, FLORIDA		1962	USWC-48	benthopelagic	0.70	122	64		
West Florida pompano	2002	1960	USEC-SE	benthopelagic	3.52	546	64	No	
USEC-SE PERMIT		1960	USEC-SE	reef	1.36	97	122		
USEC-NE SCAD, ROUGH		1999	USEC-NE	reef	0.66	1	40		
USWC-48 JACK MACKEREL		1960	USWC-48	pelagic	0.09	66462	81		
USEC-NE BASS, ROCK		1960	USEC-NE	demersal	0.40	11	43		
USEC-SE BLACK DRIFTFISH		1987	USEC-SE	pelagic	2.95	14	60		
USEC-NE BARRELFISH		2000	USEC-NE	pelagic	2.79	0	91		
USEC-SE BARRELFISH		1991	USEC-SE	pelagic	4.19	15	91		
USEC-NE DOLPHINFISH		1960	USEC-NE	pelagic	3.93	96	210		
USEC-SE DOLPHINFISH		1960	USEC-SE	pelagic	2.99	1062	210		
USWC-48 DOLPHINFISH		1972	USWC-48	pelagic	1.96	43	210		
USEC-NE ESCOLAR		1991	USEC-NE	benthopelagic	3.10	4	200		
USEC-SE ESCOLAR		1991	USEC-SE	benthopelagic	2.04	101	200		
USEC-SE OILFISH		1989	USEC-SE	benthopelagic	2.02	85	300		
USWC-48 MUDSUCKER, LONGJAW		1973	USWC-48	demersal	3.38	6	21		
USEC-SE MARGATE		1994	USEC-SE	reef	1.50	24	79		
USEC-SE GRUNT, TOMTATE		2010	USEC-SE	reef	0.79	0	25		
USEC-SE GRUNT, WHITE		1995	USEC-SE	reef	2.37	19	53		
USEC-NE PIGFISH		1960	USEC-NE	demersal	0.19	15	46		
USEC-SE PIGFISH		1960	USEC-SE	demersal	0.40	187	46		
USWC-48 OPALEYE		1960	USWC-48	benthopelagic	0.49	11	66		
USWC-48 HALFMOON		1960	USWC-48	demersal	0.58	22	48		
East Florida hogfish	2013	1960	USEC-SE	reef	2.88	13	91	Yes	

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Initial year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	FMP	SIS cat.
Northern sAtl hogfish	2013	1960	USEC-SE	reef	4.65	19	91	Yes	
West Florida hogfish	2013	1960	USEC-SE	reef	3.13	53	91	Yes	
USWC California sheephead	2004	1960	USWC-48	reef	5.30	143	91	No	
USEC tautog	1996	1960	USEC-NE	reef	0.78	525	91	No	
USEC-NE CUNNER		1960	USEC-NE	reef	3.51	12	38		
USEC-SE TRIPLETAIL		1960	USEC-SE	benthopelagic	1.80	22	110		
USEC-SE SNAPPER, BLACK		1985	USEC-SE	reef	3.72	21	65		
USEC-SE SNAPPER, QUEEN		1986	USEC-SE	bathy-	4.44	31	100		
USSE mutton snapper	2008	1960	USEC-SE	reef	2.72	251	94	Yes	
USEC-SE SNAPPER, SCHOOLMASTER		1997	USEC-SE	reef	2.99	0	67		
USEC-SE SNAPPER, BLACKFIN		1984	USEC-SE	reef	4.44	7	75		
GoMex red snapper	1988	1960	USEC-SE	reef	1.32	6072	100	Yes	
sAtl red snapper	1998	1960	USEC-SE	reef	2.07	473	100	Yes	
USEC-SE SNAPPER, CUBERA		1982	USEC-SE	reef	3.10	5	160		
USEC-SE SNAPPER, GRAY		1960	USEC-SE	reef	2.11	460	89		
USEC-NE SNAPPER, DOG		1988	USEC-NE	reef	2.72	0	128		
USEC-SE SNAPPER, DOG		1991	USEC-SE	reef	2.67	2	128		
USEC-SE SNAPPER, MAHOGANY		1992	USEC-SE	reef	3.52	0	48		
USEC-SE SNAPPER CARIBBEAN RED		2000	USEC-SE	demersal	2.53	0	100		
USEC-SE SNAPPER, LANE		1960	USEC-SE	reef	2.62	69	60		
USEC-SE SNAPPER, SILK		1981	USEC-SE	reef	4.69	147	83		
USSE yellowtail snapper	2003	1960	USEC-SE	reef	2.96	1079	86	Yes	
USEC-SE WENCHMAN		1995	USEC-SE	demersal	2.55	19	56		
GoMex vermilion snapper	1998	1960	USEC-SE	demersal	3.38	1200	60	Yes	
sAtl vermilion snapper	1998	1960	USEC-SE	demersal	3.93	640	60	Yes	
USEC-SE TILEFISH, GOLDFACE		1986	USEC-SE	demersal	3.13	41	60		
USEC-SE TILEFISH, BLACKLINE		1985	USEC-SE	demersal	1.56	1	60		
sAtl blueline tilefish	2004	1985	USEC-SE	demersal	2.05	117	90	Yes	
USEC-SE TILEFISH, BLUELINE		1988	USEC-SE	demersal	2.06	98	90		
USWC-48 WHITEFISH, OCEAN		1960	USWC-48	reef	0.28	9	102		
USWC-AK WHITEFISH, OCEAN		1963	USWC-AK	reef	0.59	43	102		
GoMex golden tilefish	2011	1960	USEC-SE	demersal	2.74	487	125	Yes	
sAtl golden tilefish	2004	1960	USEC-SE	demersal	2.74	1683	125	Yes	
USNE golden tilefish	1993	1960	USEC-NE	demersal	1.53	3968	125	Yes	
USEC-NE TILEFISH, SAND		2005	USEC-NE	reef	4.65	0	70		
USEC-SE TILEFISH, SAND		1992	USEC-SE	reef	1.98	2	70		
USEC striped bass	1997	1960	USEC-NE	demersal	1.00	6686	200	No	
USWC-48 BASS, STRIPED		1960	USWC-48	demersal	0.30	31	200		
USEC-NE WRECKFISH		1993	USEC-NE	demersal	5.06	1	210		
USEC-SE WRECKFISH		1988	USEC-SE	demersal	2.95	1729	210		
USWC-48 SEA BASS, GIANT		1960	USWC-48	demersal	0.51	202	250		
USWC-48 BLACKSMITH		1973	USWC-48	reef	0.12	16	25		
USEC bluefish	1994	1960	USEC-NE	pelagic	0.37	7466	130	Yes	
USEC-SE BLUEFISH		1960	USEC-SE	pelagic	0.33	704	130		

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Initial year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	FMP	SIS cat.
USEC-SE BIGEYE		1994	USEC-SE	reef	1.97	4	50		
GoMex cobia	2001	1960	USEC-SE	reef	2.36	167	200	Yes	
sAtl cobia	2013	1960	USEC-SE	reef	2.06	31	200	Yes	
USWC California white seabass	2016	1960	USWC-48	demersal	1.55	1554	166	No	
USEC-SE SEATROUT, SAND		1960	USEC-SE	demersal	0.41	1176	64		
Mississippi spotted sea trout	2016	1960	USEC-SE	demersal	1.10	571	100	No	
USEC-NE SEATROUT, SPOTTED		1960	USEC-NE	demersal	1.42	89	100		
USEC-SE SEATROUT, SPOTTED		1960	USEC-SE	demersal	1.07	3803	100		
USEC weakfish	1991	1960	USEC-NE	demersal	0.53	16312	98	No	
USWC-48 CROAKER, PACIFIC WHITE		1960	USWC-48	benthopelagic	0.61	1485	41		
USEC-NE SPOT		1960	USEC-NE	demersal	0.70	3069	36		
USEC-SE SPOT		1960	USEC-SE	demersal	0.41	4924	36		
USEC-NE KINGFISH, NORTHERN		2007	USEC-NE	demersal	1.60	0	46		
USEC Atlantic croaker	2003	1960	USEC-NE	demersal	0.52	13532	55	No	
USEC-SE CROAKER, ATLANTIC		1960	USEC-SE	demersal	0.29	18266	55		
USEC-NE DRUM, BLACK		1960	USEC-NE	demersal	0.69	220	170		
USEC-SE DRUM, BLACK		1960	USEC-SE	demersal	1.05	4877	170		
GoMex red drum	2000	1960	USEC-SE	demersal	0.90	6408	155	Yes	
USNE midAtl red drum	2009	1960	USEC-NE	demersal	1.21	175	155	No	
USSE sAtl red drum	2009	1960	USEC-SE	demersal	0.67	125	155	No	
USWC-48 QUEENFISH		1974	USWC-48	demersal	0.50	47	30		
USEC-NE WAHOO		1983	USEC-NE	pelagic	4.02	9	250		
USEC-SE WAHOO		1974	USEC-SE	pelagic	2.98	163	250		
USWC-48 WAHOO		1960	USWC-48	pelagic	0.76	15	250		
USEC-NE MACKEREL, FRIGATE		1960	USEC-NE	pelagic	0.29	75	65		
USEC-NE MACKEREL, CHUB		1960	USEC-NE	pelagic	0.30	1984	64		
USEC-SE MACKEREL, CHUB		1995	USEC-SE	pelagic	1.18	122	64		
USWC Pacific mackerel	2004	1960	USWC-48	pelagic	0.13	35256	64	Yes	
GoMex Spanish mackerel	1996	1960	USEC-SE	pelagic	0.39	3880	91	Yes	
sAtl Spanish mackerel	1996	1960	USEC-SE	pelagic	0.48	5015	91	Yes	
USWC-48 PACIFIC SIERRA		1960	USWC-48	pelagic	0.21	2	99		
USNE Atlantic mackerel	1977	1960	USEC-NE	pelagic	0.21	10021	60	Yes	
USEC-SE SEA BASS, BANK		1991	USEC-SE	demersal	1.83	1	30		
USEC-SE SEA BASS, ROCK		1992	USEC-SE	reef	2.03	26	30		
sAtl black sea bass	1995	1960	USEC-SE	reef	1.22	740	66	Yes	
USEC-SE SEA BASS, BLACK		1960	USEC-SE	reef	1.30	292	66		
USNE black sea bass	1994	1960	USEC-NE	reef	0.65	9899	66	Yes	
USEC-SE GRAYSBY		1991	USEC-SE	reef	4.74	8	43		
USEC-NE SAND PERCH		1960	USEC-NE	reef	0.14	12	30		
USEC-SE SAND PERCH		1960	USEC-SE	reef	0.97	127	30		
USWC-48 SAND PERCH		1973	USWC-48	reef	0.61	137	30		
USEC-SE HIND, ROCK		1984	USEC-SE	demersal	6.35	14	61		
USWC-48 SPOTTED CABRILLA		1960	USWC-48	reef	0.33	260	114		
USEC-SE HIND, SPECKLED		1980	USEC-SE	demersal	4.30	47	110		

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Initial year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	FMP	SIS cat.
GoMex yellowedge grouper	2011	1981	USEC-SE	demersal	5.12	716	115	Yes	
USEC-SE CONEY		1996	USEC-SE	reef	0.44	12	41		
USEC-SE HIND, RED		1984	USEC-SE	reef	4.54	35	76		
USEC-SE GROUPER, MARBLED		1986	USEC-SE	reef	3.56	20	91		
USEC-SE GROUPER, GOLIATH		1960	USEC-SE	reef	0.46	129	250		
GoMex red grouper	1991	1960	USEC-SE	reef	3.55	4002	125	Yes	
sAtl red grouper	2010	1960	USEC-SE	reef	5.00	293	125	Yes	
USEC-SE GROUPER, MISTY		1990	USEC-SE	bathy-	4.84	2	160		
USEC-SE GROUPER, WARSAW		1960	USEC-SE	demersal	1.64	163	230		
sAtl snowy grouper	2004	1974	USEC-SE	demersal	3.78	255	122	Yes	
USEC-NE GROUPER, SNOWY		1999	USEC-NE	demersal	4.99	1	122		
USEC-SE GROUPER, SNOWY		1985	USEC-SE	demersal	4.78	128	122		
USEC-SE GROUPER, NASSAU		1986	USEC-SE	reef	3.66	7	122		
USEC-SE BASS, LONGTAIL		1994	USEC-SE	demersal	2.39	1	50		
USSE black grouper	2010	1960	USEC-SE	reef	4.72	763	150	Yes	
USEC-SE GROUPER, YELLOWMOUTH		1999	USEC-SE	reef	5.12	0	84		
GoMex gag grouper	1994	1960	USEC-SE	reef	4.56	794	145	Yes	
sAtl gag grouper	1994	1960	USEC-SE	reef	4.12	445	145	Yes	
USEC-SE SCAMP		1980	USEC-SE	reef	5.61	356	107		
USEC-SE GROUPER, YELLOWFIN		1984	USEC-SE	reef	4.36	196	100		
USEC-SE CREOLE-FISH		1998	USEC-SE	reef	2.15	2	30		
USEC-NE SHEEPSHEAD		1960	USEC-NE	reef	0.80	12	91		
USEC-SE SHEEPSHEAD		1960	USEC-SE	reef	0.63	2280	91		
USEC-SE PORGY, JOLTHEAD		1993	USEC-SE	reef	1.86	10	76		
USEC-SE PORGY, WHITEBONE		1988	USEC-SE	demersal	1.98	5	46		
USEC-SE PORGY, KNOBBED		1985	USEC-SE	reef	1.51	40	54		
USEC-SE PINFISH, SPOTTAIL		1986	USEC-SE	demersal	1.13	18	46		
USEC-SE PINFISH		1960	USEC-SE	demersal	1.93	464	40		
sAtl red porgy	1992	1978	USEC-SE	benthopelagic	2.40	350	91	Yes	
USEC-SE PORGY, RED		1992	USEC-SE	benthopelagic	2.50	176	91		
USEC-SE PORGY, LONGSPINE		2011	USEC-SE	demersal	2.58	0	30		
USNE scup	1995	1960	USEC-NE	demersal	1.09	166	46	Yes	
USWC-48 PRICKLEBACK, MONKEYFACE		1991	USWC-48	demersal	6.29	0	76		
USEC-NE HARVESTFISH		1960	USEC-NE	benthopelagic	0.75	244	30		
USEC-SE HARVESTFISH		1960	USEC-SE	benthopelagic	0.87	333	30		
USWC-48 POMPANO, PACIFIC		1960	USWC-48	benthopelagic	0.91	83	28		
USNE butterfish	1983	1960	USEC-NE	benthopelagic	0.34	8837	30	Yes	
USEC-SE CUTLASSFISH, ATLANTIC		1960	USEC-SE	benthopelagic	1.60	375	234		
USEC-NE STARGAZER, NOTHERN		2009	USEC-NE	demersal	0.57	0	59		
USEC-NE POUT, OCEAN		1960	USEC-NE	demersal	0.19	2195	110		
USEC-NE HOGCHOKER		1960	USEC-NE	demersal	0.09	9	20		
USWC-48 SOLE, ROCK		1976	USWC-48	demersal	0.72	244	30		
Pacific sanddab - Pacific Coast	2013	1960	USWC-48	demersal	0.64	1269	41	Yes	
USWC-48 HALIBUT, CALIFORNIA		1960	USWC-48	demersal	3.90	607	152		

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Initial year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	FMP	SIS cat.
USNE summer flounder	1990	1960	USEC-NE	demersal	1.25	18078	94	Yes	
North Carolina southern flounder	2009	1978	USEC-SE	demersal	3.20	2213	83	No	
USEC-NE FLOUNDER, SOUTHERN		2003	USEC-NE	demersal	3.08	1	83		
USEC-SE FLOUNDER, SOUTHERN		1978	USEC-SE	demersal	2.25	85	83		
USEC-NE FLOUNDER, FOURSPOT		2006	USEC-NE	demersal	0.93	13	41		
USWC-48 SOLE, FANTAIL		1979	USWC-48	demersal	1.14	2	64		
BSAI arrowtooth flounder	1988	1981	USWC-AK	demersal	0.17	476	84	Yes	
GOA arrowtooth flounder	1996	1973	USWC-AK	demersal	0.13	2330	84	Yes	
USWC arrowtooth flounder	2007	1960	USWC-48	demersal	0.23	5804	84	Yes	
USWC-AK SOLE, PETRALE		1985	USWC-AK	demersal	0.87	116	53		
USWC petrale sole	1984	1960	USWC-48	demersal	0.60	4209	53	Yes	
GoMaine witch flounder	1994	1960	USEC-NE	demersal	1.24	6653	60	Yes	
GOA rex sole	2004	1982	USWC-AK	demersal	0.43	5741	60	Yes	
Rex sole - Pacific Coast	2013	1960	USWC-48	demersal	0.55	4620	60	Yes	
BSAI flathead sole	1998	1984	USWC-AK	demersal	0.23	17021	52	Yes	
GOA flathead sole	2003	1960	USWC-AK	demersal	0.15	2556	52	Yes	
USWC-48 SOLE, FLATHEAD		1978	USWC-48	demersal	0.70	36	52		
GeBank/GoMaine American plaice	1992	1960	USEC-NE	demersal	0.96	15132	83	Yes	
GeBank/GoMaine Atlantic halibut	2008	1960	USEC-NE	demersal	1.83	244	470	Yes	
Pacific halibut (coastwide)	1960	1960	USWC-AK	demersal	0.31	27540	258	Yes	
USWC-48 SOLE, BUTTER		1981	USWC-48	demersal	0.45	44	55		
GOA southern rock sole	2012	1981	USWC-AK	demersal	0.39	1267	58	Yes	
BSAI northern rock sole	1992	1981	USWC-AK	demersal	0.30	42708	69	Yes	
GOA northern rock sole	2012	1981	USWC-AK	demersal	0.39	2721	69	Yes	
BSAI yellowfin sole	1987	1977	USWC-AK	demersal	0.37	33	49	Yes	
CCod/GoMaine yellowtail flounder	1999	1960	USEC-NE	demersal	0.72	10734	64	Yes	
GeBank yellowtail flounder	1989	1960	USEC-NE	demersal	0.58	12602	64	Yes	
sNEng/midAtl yellowtail flounder	1989	1960	USEC-NE	demersal	0.57	14791	64	Yes	
USWC-48 SOLE, DEEPSEA		2011	USWC-48	bathy-	1.13	0	47		
GOA dover sole	2003	1983	USWC-AK	demersal	0.26	2222	76	Yes	
USWC dover sole	1984	1960	USWC-48	demersal	0.33	20944	76	Yes	
USWC-AK SOLE, ENGLISH		1985	USWC-AK	demersal	0.30	40	49		
USWC English sole	1985	1960	USWC-48	demersal	0.36	8082	49	Yes	
USWC-AK FLOUNDER, STARRY		1981	USWC-AK	demersal	0.35	877	91		
USWC starry flounder (northern)	2005	1970	USWC-48	demersal	0.55	1096	91	Yes	
USWC starry flounder (southern)	2005	1970	USWC-48	demersal	0.96	213	91	Yes	
BSAI Alaska plaice	1996	1984	USWC-AK	demersal	0.17	61638	87	Yes	
USWC-48 SOLE, C-O		1976	USWC-48	demersal	0.29	1	36		
USWC-48 SOLE, CURLFIN		1981	USWC-48	demersal	0.74	8	37		
USWC-48 TURBOT, HORNYHEAD		2010	USWC-48	demersal	3.76	5	37		
USWC-48 SOLE, SAND		1960	USWC-48	demersal	1.08	920	63		
USWC-AK SOLE, SAND		1996	USWC-AK	demersal	0.65	4	63		
GeBank winter flounder	1999	1960	USEC-NE	demersal	1.08	6716	64	Yes	
GoMaine winter flounder	2003	1960	USEC-NE	demersal	1.06	2380	64	Yes	

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Initial year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	FMP	SIS cat.
sNEng/midAtl winter flounder	1996	1960	USEC-NE	demersal	0.83	9245	64	Yes	
BSAI Greenland halibut	1987	1964	USWC-AK	benthopelagic	0.51	8544	80	Yes	
USEC-NE HALIBUT, GREENLAND		1969	USEC-NE	benthopelagic	0.57	11	80		
USEC-NE FLOUNDER, WINDOWPANE		1964	USEC-NE	demersal	0.94	4206	46		
Alaska sablefish	1987	1960	USWC-AK	bathy-	1.04	33960	120	Yes	
USWC sablefish	1984	1960	USWC-48	bathy-	0.39	23555	120	Yes	
USWC cabezon (nCal)	2003	1960	USWC-48	demersal	6.09	149	99	Yes	
USWC cabezon (OR)	2009	1979	USWC-48	demersal	5.31	46	99	Yes	
USWC cabezon (sCal)	2003	1960	USWC-48	demersal	6.09	21	99	Yes	
USEC-NE LUMPFISH		1989	USEC-NE	benthopelagic	0.33	4	61		
USEC-NE SEA RAVEN		1991	USEC-NE	demersal	1.52	6	64		
USWC-48 GREENLING, KELP		1981	USWC-48	demersal	9.32	23	61		
USWC kelp greenling (OR)	2005	1968	USWC-48	demersal	7.60	54	61	Yes	
USEC-SE LINGCOD		1978	USEC-SE	demersal	0.41	124	152		
USWC-AK LINGCOD		1960	USWC-AK	demersal	1.01	1096	152		
USWC lingcod (northern)	1994	1960	USWC-48	demersal	0.33	3570	152	Yes	
USWC lingcod (southern)	1999	1960	USWC-48	demersal	0.47	1734	152	Yes	
BSAI atka mackerel	1986	1970	USWC-AK	demersal	0.38	30	56	Yes	
USEC-SE SCORPIONFISH, SPINYCHEEK		1994	USEC-SE	demersal	2.36	1	40		
USEC-SE LIONFISH		2011	USEC-SE	reef	9.92	6	38		
USWC California scorpionfish (southern)	2005	1979	USWC-48	demersal	3.38	101	43	Yes	
USEC-SE SCORPIONFISH, SPOTTED		2001	USEC-SE	reef	3.46	1	45		
USEC-NE ROSEFISH, BLACKBELLY		1994	USEC-NE	bathy-	1.26	1	47		
USEC-SE ROSEFISH, BLACKBELLY		1989	USEC-SE	bathy-	2.08	67	47		
BSAI rougheye rockfish	2003	1960	USWC-AK	bathy-	0.54	3553	97	Yes	
GOA rougheye rockfish	2005	1960	USWC-AK	bathy-	0.70	2418	97	Yes	
Rougheye Rockfish - Pacific Coast	2013	1960	USWC-48	bathy-	0.51	760	97	Yes	
BSAI Pacific ocean perch	1985	1963	USWC-AK	bathy-	0.28	925	53	Yes	
GOA Pacific ocean perch	1990	1963	USWC-AK	bathy-	0.38	2183	53	Yes	
USWC Pacific ocean perch	1972	1960	USWC-48	bathy-	0.11	12860	53	Yes	
USWC-48 ROCKFISH, KELP		1985	USWC-48	demersal	6.60	3	42		
Brown rockfish - Pacific Coast	2013	1960	USWC-48	demersal	3.24	644	56	Yes	
Aurora rockfish - Pacific Coast	2013	1982	USWC-48	bathy-	1.75	5	41	Yes	
USWC-48 ROCKFISH, REDBANDED		1992	USWC-48	demersal	2.11	5	64		
USWC-AK ROCKFISH, REDBANDED		1986	USWC-AK	demersal	0.63	44	64		
BSAI shortraker rockfish	2003	1960	USWC-AK	bathy-	0.37	3286	108	Yes	
USWC-AK ROCKFISH, SILVERGRAY		1985	USWC-AK	demersal	0.62	23	71		
USWC gopher rockfish	2005	1975	USWC-48	demersal	6.77	54	39	Yes	
Copper rockfish - Pacific Coast	2013	1966	USWC-48	demersal	3.87	65	58	Yes	
USWC-AK ROCKFISH, COPPER		1991	USWC-AK	demersal	0.58	3	58		
USWC greenspotted rockfish (northern)	2011	1976	USWC-48	demersal	1.84	1	50	Yes	
USWC greenspotted rockfish (southern)	2011	1970	USWC-48	demersal	1.84	19	50	Yes	
USWC-48 ROCKFISH, BLACK-AND-YELLOW		1987	USWC-48	demersal	13.89	15	39		
USWC-48 ROCKFISH, STARRY		1982	USWC-48	reef	3.54	15	46		

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Initial year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	FMP	SIS cat.
USWC-AK ROCKFISH, STARRY		1997	USWC-AK	reef	0.20	446	46		
USWC-AK ROCKFISH, DARKBLOTCHED		1986	USWC-AK	demersal	0.38	16	58		
USWC darkblotched rockfish	2000	1966	USWC-48	demersal	0.91	12	58	Yes	
USWC splitnose rockfish	2009	1978	USWC-48	bathy-	0.61	111	46	Yes	
USWC-AK ROCKFISH, GREENSTRIPED		1993	USWC-AK	demersal	0.57	0	39		
USWC greenstriped rockfish	2009	1978	USWC-48	demersal	1.19	3	39	Yes	
USWC-48 ROCKFISH, SWORDSPINE		1999	USWC-48	demersal	1.92	0	30		
USWC-AK ROCKFISH, WIDOW		1984	USWC-AK	pelagic	0.49	10	60		
USWC widow rockfish	1983	1979	USWC-48	pelagic	0.35	10276	60	Yes	
GeBank/GoMaine Acadian redfish	1975	1960	USEC-NE	demersal	0.10	117173	30	Yes	
USWC-AK ROCKFISH, YELLOWTAIL		1984	USWC-AK	reef	0.42	25	66		
USWC yellowtail rockfish (northern)	1984	1967	USWC-48	reef	0.61	220	66	Yes	
USWC-48 ROCKFISH, BRONZESPOTTED		1998	USWC-48	demersal	3.04	0	71		
USWC chilipepper (southern)	1985	1960	USWC-48	demersal	0.68	31	56	Yes	
USWC-48 ROCKFISH, SQUARESPOT		1994	USWC-48	reef	3.62	1	29		
USWC shortbelly rockfish	2007	1967	USWC-48	demersal	0.27	28	32	Yes	
USWC cowcod	1999	1960	USWC-48	bathy-	1.75	63	100	Yes	
USWC-AK ROCKFISH, BLACK		1983	USWC-AK	reef	0.77	518	63		
USWC black rockfish (California)	2003	1960	USWC-48	reef	1.35	129	63	Yes	
USWC black rockfish (Oregon)	2016	1994	USWC-48	reef	2.49	197	63	Yes	
USWC blackgill rockfish	2005	1978	USWC-48	bathy-	1.47	312	61	Yes	
USWC-48 ROCKFISH, VERMILION		1981	USWC-48	reef	4.05	26	91		
USWC-AK ROCKFISH, VERMILION		1996	USWC-AK	reef	0.70	1	91		
USWC-48 ROCKFISH, BLUE		2000	USWC-48	reef	2.29	6	61		
USWC-AK ROCKFISH, BLUE		1993	USWC-AK	reef	0.65	0	61		
USWC blue rockfish	2007	1960	USWC-48	reef	1.29	43	61	Yes	
USWC-48 ROCKFISH, CHINA		1979	USWC-48	reef	5.55	31	45		
USWC-AK ROCKFISH, CHINA		1991	USWC-AK	reef	1.09	2	45		
USWC-48 ROCKFISH, SPECKLED		1981	USWC-48	demersal	2.32	2	56		
USWC-AK ROCKFISH, BOCACCIO		1989	USWC-AK	reef	0.67	50	91		
USWC bocaccio (southern)	1990	1960	USWC-48	reef	0.46	4538	91	Yes	
USWC-AK ROCKFISH, CANARY		1984	USWC-AK	demersal	0.82	20	76		
USWC canary rockfish	1990	1960	USWC-48	reef	1.51	47	76	Yes	
BSAI northern rockfish	2003	1960	USWC-AK	demersal	0.17	6724	41	Yes	
GOA northern rockfish	2000	1960	USWC-AK	demersal	0.17	17430	41	Yes	
USWC-AK ROCKFISH, REDSTRIPE		1989	USWC-AK	bathy-	0.48	22	61		
USWC-48 ROCKFISH, GRASS		1981	USWC-48	demersal	14.23	50	56		
USWC-AK ROCKFISH, YELLOWMOUTH		1988	USWC-AK	bathy-	0.75	1	58		
USWC-48 ROCKFISH, ROSY		1985	USWC-48	demersal	1.70	4	36		
USWC-48 ROCKFISH, GREENBLOTCHED		2000	USWC-48	demersal	3.55	1	48		
USWC-AK ROCKFISH, YELLOWEYE		1984	USWC-AK	reef	1.30	993	104		
USWC yelloweye rockfish	2001	1972	USWC-48	reef	1.47	344	104	Yes	
USWC-48 ROCKFISH, FLAG		1993	USWC-48	demersal	4.91	1	51		
USWC-48 ROCKFISH, BANK		1983	USWC-48	demersal	1.16	205	54		

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Initial year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	FMP	SIS cat.
USWC-48 ROCKFISH, OLIVE		1981	USWC-48	reef	3.66	2	61		
USWC-48 ROCKFISH, TREEFISH		1994	USWC-48	demersal	15.12	2	41		
USWC-48 ROCKFISH, PINKROSE		1992	USWC-48	demersal	0.77	0	30		
GOA dusky rockfish	2003	1960	USWC-AK	demersal	0.33	4476	43	Yes	
USWC-AK ROCKFISH, SHARPCHIN		1991	USWC-AK	bathy-	0.53	0	39		
USWC shortspine thornyhead	1990	1967	USWC-48	bathy-	0.84	202	80	Yes	
GoMex gray triggerfish	2001	1988	USEC-SE	reef	2.08	44	60	Yes	
USEC-NE TRIGGERFISH, GRAY		2009	USEC-NE	reef	0.84	0	60		
USEC-SE TRIGGERFISH, GRAY		2011	USEC-SE	reef	4.24	16	60		
USEC-SE TRIGGERFISH, QUEEN		2002	USEC-SE	reef	4.40	2	60		
USEC-SE TRIGGERFISH, OCEAN		1999	USEC-SE	reef	2.81	1	65		
USEC-NE PUFFER, NOTHERN		1960	USEC-NE	demersal	0.18	5893	36		
USEC-SE PUFFER, NOTHERN		1960	USEC-SE	demersal	0.20	222	36		
USEC-NE DORY, AMERICAN JOHN		1988	USEC-NE	benthopelagic	1.38	137	80		
USEC-SE DORY, AMERICAN JOHN		2003	USEC-SE	benthopelagic	1.31	2	80		
USEC-NE CLAM, ARC, BLOOD		1993	USEC-NE	benthic	4.91	71	8		
USEC-SE CLAM, ARC, BLOOD		2009	USEC-SE	benthic	12.87	5	8		
SE Alaska geoduck	1985	1980	USWC-AK	benthic	2.10	0	18	No	
WA geoduck clam	1997	1970	USWC-48	benthic	4.64	1294	18	No	
USEC-NE CLAM, SOFTSHELL		1960	USEC-NE	benthic	3.98	6115	10		
USWC-48 CLAM, SOFTSHELL		1972	USWC-48	benthic	1.85	416	10		
USWC-48 MUSSEL, CALIFORNIA		1960	USWC-48	reef	6.69	52	26		
USEC-NE MUSSEL, BLUE		1960	USEC-NE	reef	1.00	4801	11		
USEC-SE MUSSEL, BLUE		2008	USEC-SE	reef	2.71	2	11		
USWC-48 MUSSEL, BLUE		1962	USWC-48	reef	17.58	351	11		
USWC-AK MUSSEL, BLUE		1989	USWC-AK	reef	3.59	76	11		
USWC-48 OYSTER, PACIFIC		1960	USWC-48	reef	3.83	8914	45		
USWC-AK OYSTER, PACIFIC		1960	USWC-AK	reef	9.41	46	45		
USEC-NE OYSTER, EASTERN		1960	USEC-NE	reef	2.90	25265	30		
USEC-SE OYSTER, EASTERN		1960	USEC-SE	reef	3.29	14413	30		
USWC-48 OYSTER, EASTERN		1960	USWC-48	reef	15.79	170	30		
USEC-NE OYSTER, EUROPEAN FLAT		1987	USEC-NE	reef	2.60	307	12		
USWC-48 OYSTER, EUROPEAN FLAT		1979	USWC-48	reef	34.09	17	12		
USWC-48 OYSTER, OLYMPIA		1960	USWC-48	benthic	11.00	65	8		
USWC-AK OYSTER, OLYMPIA		1965	USWC-AK	benthic	2.22	1	8		
USEC-NE SCALLOP, CALICO		2005	USEC-NE	benthic	18.61	0	5		
USEC-SE SCALLOP, CALICO		1960	USEC-SE	benthic	1.80	19388	5		
USEC-NE SCALLOP, BAY		1960	USEC-NE	benthic	5.57	1260	8		
USEC-SE SCALLOP, BAY		1960	USEC-SE	benthic	2.57	354	8		
USEC-NE SCALLOP, ICELAND		1983	USEC-NE	benthic	8.98	191	11		
USWC-AK SCALLOP, WEATHERVANE		1967	USWC-AK	benthic	7.24	856	28		
GeBank/midAtl sea scallop	1978	1960	USEC-NE	benthic	1.84	14587	20	Yes	
USWC-AK SCALLOP, SEA		2009	USWC-AK	benthic	20.61	218	20		
USEC ocean quahog	1978	1960	USEC-NE	benthic	0.58	10349	13	Yes	

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Initial year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	FMP	SIS cat.
USWC-48 COCKLE, NUTTALL		1972	USWC-48	benthic	2.58	45	14		
USWC-AK COCKLE, NUTTALL		1960	USWC-AK	benthic	0.30	33	14		
USWC-48 CLAM, VARIABLE COQUINA		1964	USWC-48	demersal	1.38	0	2		
USEC-NE CLAM, ARCTIC SURF (STIMPSON)		1990	USEC-NE	benthic	1.97	138	14		
USEC-SE CLAM, ATLANTIC RANGIA		1966	USEC-SE	benthic	0.68	39	5		
USEC Atlantic surfclam	1978	1960	USEC-NE	benthic	0.35	43596	20	Yes	
USEC-NE CLAM, ATLANTIC JACKKNIFE		1960	USEC-NE	benthic	6.84	150	26		
USWC-AK CLAM, ATLANTIC JACKKNIFE		2012	USWC-AK	benthic	1.39	139	26		
USWC-48 CLAM, CALIFORNIA JACKKNIFE		1981	USWC-48	demersal	15.92	1	13		
USWC-48 CLAM, PACIFIC RAZOR		1960	USWC-48	benthic	2.61	213	18		
USWC-AK CLAM, PACIFIC RAZOR		1960	USWC-AK	benthic	0.44	1068	18		
USEC-SE CLAM, SUNRAY VENUS		1967	USEC-SE	benthic	0.35	345	15		
USEC-NE CLAM, NORTHERN QUAHOG		1981	USEC-NE	benthic	13.82	4428	13		
USEC-SE CLAM, NORTHERN QUAHOG		2005	USEC-SE	benthic	11.17	79	13		
USWC-48 CLAM, PACIFIC LITTLENECK		1960	USWC-48	benthic	2.61	213	8		
USWC-AK CLAM, PACIFIC LITTLENECK		1999	USWC-AK	benthic	16.83	10	8		
USWC-48 CLAM, BUTTER		1960	USWC-48	benthic	1.17	69	13		
USWC-AK CLAM, BUTTER		1960	USWC-AK	benthic	0.19	72	13		
USWC-48 SHRIMP, BRINE		1975	USWC-48	pelagic	1.38	843	2		
USWC-48 LAMPREY, PACIFIC		1981	USWC-48	demersal	1.24	18	76		
USEC-NE LAMPREY, SEA		1960	USEC-NE	demersal	0.20	0	120		
USEC-SE LAMPREY, SEA		1996	USEC-SE	demersal	1.37	0	120		
USWC-48 LAMPREY, SEA		1960	USWC-48	demersal	0.11	119	120		
USWC market squid	2001	1981	USWC-48	pelagic	0.25	118903	19	Yes	
USNE longfin inshore squid	1976	1969	USEC-NE	pelagic	0.36	141	50	Yes	
USWC-AK SQUID, JUMBO		1999	USWC-AK	pelagic	0.08	2160	400		
USNE northern shortfin squid	1986	1971	USEC-NE	pelagic	0.29	3605	27	Yes	
SE Alaska red sea urchin	1990	1980	USWC-AK	benthic	0.71	404	19	No	
WA red sea urchin	1994	1971	USWC-48	benthic	0.59	4024	19	No	
sAtl blacknose shark	2002	1989	USEC-SE	reef	1.06	100	200	Yes	
USEC-SE SHARK, BLACKNOSE		1995	USEC-SE	reef	0.90	23	200		
USEC-NE SHARK, BIGNOSE		1992	USEC-NE	reef	0.63	8	300		
USEC-SE SHARK, SPINNER		1997	USEC-SE	reef	0.79	40	300		
USEC-NE SHARK, SILKY		1994	USEC-NE	reef	0.51	2	350		
USEC-SE SHARK, SILKY		1994	USEC-SE	reef	0.89	11	350		
USSE finetooth shark	2002	1965	USEC-SE	demersal	0.81	168	190	Yes	
USEC-NE SHARK, BULL		1991	USEC-NE	reef	1.13	5	360		
USEC-SE SHARK, BULL		1991	USEC-SE	reef	0.70	136	360		
GoMex blacktip shark	1998	1986	USEC-SE	reef	0.74	157	275	Yes	
USEC-NE SHARK, BLACKTIP		1987	USEC-NE	reef	1.07	91	275		
USEC-SE SHARK, BLACKTIP		1991	USEC-SE	reef	0.87	282	275		
USEC dusky shark	2006	1988	USEC-SE	reef	0.74	91	420	Yes	
Sandbar shark Atlantic	1998	1981	USEC-SE	benthopelagic	0.79	1228	180	Yes	
USEC-NE SHARK, NIGHT		1995	USEC-NE	benthopelagic	1.15	0	280		

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Initial year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	FMP	SIS cat.
USEC-NE SHARK, TIGER		1990	USEC-NE	benthopelagic	0.83	2	750		
USEC-SE SHARK, TIGER		1991	USEC-SE	benthopelagic	0.69	33	750		
USEC-NE SHARK, LEMON		1990	USEC-NE	reef	0.11	0	340		
USEC-SE SHARK, LEMON		1991	USEC-SE	reef	0.70	48	340		
USSE Atlantic sharpnose shark	2002	1991	USEC-SE	demersal	0.61	149	110	Yes	
USEC-SE SHARK, GREAT HAMMERHEAD		2013	USEC-SE	pelagic	0.46	17	610		
USSE bonnethead shark	2002	1989	USEC-SE	reef	0.76	96	150	Yes	
USWC-48 SHARK, SOUPFIN		1960	USWC-48	benthopelagic	1.31	135	193		
USEC smooth dogfish shark	2016	1981	USEC-NE	demersal	0.68	4116	150	Yes	
USWC-48 SHARK, LEOPARD		1978	USWC-48	demersal	1.40	48	198		
USEC-NE SHARK, BIGEYE THRESHER		1988	USEC-NE	pelagic	0.78	2	488		
USEC-SE SHARK, BIGEYE THRESHER		1988	USEC-SE	pelagic	1.02	4	488		
USWC-48 SHARK, BIGEYE THRESHER		1980	USWC-48	pelagic	0.94	96	488		
USEC-NE SHARK, WHITE		1992	USEC-NE	pelagic	1.34	0	541		
USWC-48 SHARK, WHITE		1979	USWC-48	pelagic	0.79	1	541		
USEC-NE SHARK, LONGFIN MAKO		1988	USEC-NE	pelagic	1.80	12	417		
USEC-SE SHARK, LONGFIN MAKO		1987	USEC-SE	pelagic	2.25	11	417		
USEC-NE SHARK, SAND TIGER		1988	USEC-NE	reef	0.63	12	330		
USEC-SE SHARK, SAND TIGER		1993	USEC-SE	reef	0.60	4	330		
USEC-NE RAY,COWNOSE		2007	USEC-NE	benthopelagic	3.03	80	213		
USEC-NE SHARK, NURSE		1991	USEC-NE	reef	1.07	1	430		
USEC-SE SAWFISH, SMALLTOOTH		1960	USEC-SE	demersal	0.13	9	760		
USEC-NE SKATE, LITTLE		2006	USEC-NE	demersal	0.22	5007	54		
USWC-48 SKATE, BIG		1999	USWC-48	demersal	0.79	20	244		
USWC-48 SKATE, CALIFORNIA		1999	USWC-48	demersal	0.70	1	76		
USWC longnose skate	2007	1960	USWC-48	bathy-	0.25	1721	180	Yes	
USEC spiny dogfish	1994	1960	USEC-NE	benthopelagic	0.22	20763	160	Yes	
USWC spiny dogfish	2011	1960	USWC-48	benthopelagic	0.33	16876	160	Yes	
USWC-48 SHARK, PACIFIC ANGEL		1979	USWC-48	demersal	0.58	1133	152		
USEC-NE SHARK, ATLANTIC ANGEL		2004	USEC-NE	bathy-	1.12	0	152		
USEC-SE SHARK, ATLANTIC ANGEL		1994	USEC-SE	bathy-	0.41	1	152		
USEC-NE WHELK, KNOBBED		2006	USEC-NE	demersal	2.40	799	25		
USEC-SE WHELK, KNOBBED		2005	USEC-SE	demersal	0.76	17	25		
USEC-NE WHELK, LIGHTNING		2011	USEC-NE	benthic	4.70	2	40		
USEC-NE WHELK, CHANNELED		2006	USEC-NE	demersal	9.39	1015	20		
USWC-48 RATFISH SPOTTED		1960	USWC-48	demersal	0.02	1297	100		
USEC-NE CRAB, JONAH		1974	USEC-NE	demersal	1.21	6929	16		
USEC-NE CRAB, ATLANTIC ROCK		1960	USEC-NE	demersal	0.52	2178	13		
USWC-48 CRAB, DUNGENESS		1960	USWC-48	demersal	2.77	38564	22		
USWC-AK CRAB, DUNGENESS		1960	USWC-AK	demersal	1.80	7115	22		
USWC-48 CRAB, RED ROCK		1960	USWC-48	benthic	2.03	875	20		
USEC-SE CRAB, DEEPSEA GOLDEN		1995	USEC-SE	benthic	3.16	759	18		
USNE deep sea red crab	1977	1972	USEC-NE	benthic	0.65	665	18	Yes	
Bristol Bay red king crab	1994	1960	USWC-AK	benthic	2.50	58944	22	Yes	

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Initial year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	FMP	SIS cat.
Norton Sound red king crab	1996	1960	USWC-AK	benthic	2.74	1329	22	Yes	
St-Matthews blue king crab	1997	1960	USWC-AK	benthic	2.83	4288	25	Yes	
USEC-NE CRAB, FLORIDA STONE CLAWS		1980	USEC-NE	demersal	0.72	3	12		
USEC-SE CRAB, FLORIDA STONE CLAWS		1960	USEC-SE	demersal	5.96	3214	12		
GeBank American lobster	1992	1960	USEC-NE	benthic	4.40	3652	64	No	
GoMaine American lobster	1992	1960	USEC-NE	benthic	3.22	19509	64	No	
sNEng American lobster	1992	1960	USEC-NE	benthic	4.82	5226	64	No	
USEC-NE LOBSTER, AMERICAN		1960	USEC-NE	benthic	4.94	1028	64		
USEC-SE LOBSTER, AMERICAN		1967	USEC-SE	benthic	1.39	14	64		
EBS tanner crab	2012	1967	USWC-AK	benthic	3.87	24871	15	Yes	
USWC-48 CRAB, SOUTHERN TANNER		1993	USWC-48	benthic	2.77	209	15		
EBS snow crab	2000	1968	USWC-AK	benthic	1.67	147502	9	Yes	
USEC-SE LOBSTER, CARIBBEAN SPINY		1960	USEC-SE	demersal	5.87	5358	45		
CA spiny lobster	2011	1960	USWC-48	benthic	10.37	423	60	No	
USWC-48 SHRIMP, OCEAN		1960	USWC-48	benthic	0.85	37566	3		
USWC-AK SHRIMP, OCEAN		1968	USWC-AK	benthic	0.10	19086	3		
USWC-48 SHRIMP, SPOT		1979	USWC-48	benthic	15.84	375	30		
USEC-NE SHRIMP, BROWN		1995	USEC-NE	benthic	7.23	3	20		
USEC-SE SHRIMP, BROWN		1978	USEC-SE	benthic	4.38	7414	20		
GoMex pink shrimp	1984	1960	USEC-SE	benthic	1.95	25106	27	Yes	
USEC-SE SHRIMP, PINK		1978	USEC-SE	demersal	3.83	1531	27		
GoMex white shrimp	1984	1960	USEC-SE	benthic	2.53	39185	18	Yes	
USEC-SE SHRIMP, WHITE		1960	USEC-SE	demersal	1.59	128449	18		
GoMex brown shrimp	1984	1960	USEC-SE	benthic	2.16	72673	20	Yes	
USEC-SE SHRIMP, SEABOB		1962	USEC-SE	demersal	1.01	6592	12		
Chesapeake Bay blue crab	1997	1960	USEC-NE	benthic	0.59	52076	23	No	
Eastern Gulf of Mexico blue crab	2007	1960	USEC-SE	demersal	0.65	9348	23	No	
Florida South Atlantic blue crab	2007	1960	USEC-SE	demersal	0.68	4228	23	No	
North Carolina blue crab	2004	1960	USEC-SE	demersal	0.85	30427	23	No	
USEC-NE CRAB, BLUE		1960	USEC-NE	demersal	1.55	7922	23		
USEC-SE CRAB, BLUE		1960	USEC-SE	demersal	0.67	10587	23		
USWC-AK CRAB, BLUE		1982	USWC-AK	demersal	0.53	41	23		
Western Gulf of Mexico blue crab	2013	1960	USEC-SE	demersal	1.05	31243	23	No	
USEC-NE CRAB, GREEN		1960	USEC-NE	benthic	1.02	128	6		
USWC-48 CRAB, RED PA		1973	USWC-48	benthic	0.31	63	15		
USWC-48 SHRIMP, PACIFIC ROCK		1974	USWC-48	demersal	2.60	740	7		
USEC-NE SHRIMP, ROYAL RED		2001	USEC-NE	demersal	7.61	24	18		
USEC-SE SHRIMP, ROYAL RED		1962	USEC-SE	demersal	4.42	588	18		
USWC-48 SHRIMP, BLUE MUD		1985	USWC-48	demersal	2.38	25	15		
Delaware Bay horseshoe crab	1998	1960	USEC-NE	benthic	0.34	3100	60	No	

Table B.2: Taxonomic variables used for time-to-event analysis.

Stock	Species	Family	Order	Class
USWC-48 STURGEON, GREEN	Acipenser medirostris	Acipenseridae	Acipenseriformes	Actinopterygii
USWC-48 STURGEON, WHITE	Acipenser transmontanus	Acipenseridae	Acipenseriformes	Actinopterygii
USEC-NE EEL, AMERICAN	Anguilla rostrata	Anguillidae	Anguilliformes	Actinopterygii
USEC-SE EEL, AMERICAN	Anguilla rostrata	Anguillidae	Anguilliformes	Actinopterygii
USEC-NE EEL, CONGER	Conger oceanicus	Congridae	Anguilliformes	Actinopterygii
USEC-SE EEL, CONGER	Conger oceanicus	Congridae	Anguilliformes	Actinopterygii
USEC-NE NEEDLEFISH, ATLANTIC	Strongylura marina	Belonidae	Beloniformes	Actinopterygii
USEC-NE HOUNDFISH	Tylosurus crocodilus	Belonidae	Beloniformes	Actinopterygii
USEC-SE BALLYHOO	Hemiramphus brasiliensis	Hemiramphidae	Beloniformes	Actinopterygii
GoMex Gulf menhaden	Brevoortia patronus	Clupeidae	Clupeiformes	Actinopterygii
USEC Atlantic menhaden	Brevoortia tyrannus	Clupeidae	Clupeiformes	Actinopterygii
GeBank/GoMaine Atlantic herring	Clupea harengus	Clupeidae	Clupeiformes	Actinopterygii
Alaska Kodiak herring	Clupea pallasii	Clupeidae	Clupeiformes	Actinopterygii
Alaska Sitka herring	Clupea pallasii	Clupeidae	Clupeiformes	Actinopterygii
Alaska Togiak herring	Clupea pallasii	Clupeidae	Clupeiformes	Actinopterygii
USWC-48 HERRING, PACIFIC	Clupea pallasii	Clupeidae	Clupeiformes	Actinopterygii
USEC-NE SHAD, GIZZARD	Dorosoma cepedianum	Clupeidae	Clupeiformes	Actinopterygii
USEC-SE SHAD, GIZZARD	Dorosoma cepedianum	Clupeidae	Clupeiformes	Actinopterygii
USEC-NE HERRING, ATLANTIC THREAD	Opisthonema oglinum	Clupeidae	Clupeiformes	Actinopterygii
USEC-SE HERRING, ATLANTIC THREAD	Opisthonema oglinum	Clupeidae	Clupeiformes	Actinopterygii
USEC-SE SARDINE, SPANISH	Sardinella aurita	Clupeidae	Clupeiformes	Actinopterygii
USWC Pacific sardine	Sardinops sagax	Clupeidae	Clupeiformes	Actinopterygii
USEC-SE HERRING, ROUND	Etrumeus teres	Dussumieriidae	Clupeiformes	Actinopterygii
USWC-48 HERRING, ROUND	Etrumeus teres	Dussumieriidae	Clupeiformes	Actinopterygii
USEC-NE ANCHOVY, BAY	Anchoa mitchilli	Engraulidae	Clupeiformes	Actinopterygii
USWC-48 ANCHOVY, NORTHERN	Engraulis mordax	Engraulidae	Clupeiformes	Actinopterygii
USWC-48 SACRAMENTO BLACKFISH	Orthodon microlepidotus	Cyprinidae	Cypriniformes	Actinopterygii
USWC-48 SPLITTAIL	Pogonichthys macrolepidotus	Cyprinidae	Cypriniformes	Actinopterygii
USEC-NE MUMMICHOG	Fundulus heteroclitus	Fundulidae	Cyprinodontiformes	Actinopterygii
USEC-SE LADYFISH	Elops saurus	Elopidae	Elopiformes	Actinopterygii
USEC-NE TARPON	Megalops atlanticus	Megalopidae	Elopiformes	Actinopterygii
BSAI Pacific cod	Gadus macrocephalus	Gadidae	Gadiformes	Actinopterygii
GOA Pacific cod	Gadus macrocephalus	Gadidae	Gadiformes	Actinopterygii
USWC-48 COD, PACIFIC	Gadus macrocephalus	Gadidae	Gadiformes	Actinopterygii
GeBank Atlantic cod	Gadus morhua	Gadidae	Gadiformes	Actinopterygii
GoMaine Atlantic cod	Gadus morhua	Gadidae	Gadiformes	Actinopterygii
GeBank haddock	Melanogrammus aeglefinus	Gadidae	Gadiformes	Actinopterygii
GoMaine haddock	Melanogrammus aeglefinus	Gadidae	Gadiformes	Actinopterygii
USWC-48 TOMCOD, PACIFIC	Microgadus proximus	Gadidae	Gadiformes	Actinopterygii
USWC-AK TOMCOD, PACIFIC	Microgadus proximus	Gadidae	Gadiformes	Actinopterygii
USEC-NE TOMCOD, ATLANTIC	Microgadus tomcod	Gadidae	Gadiformes	Actinopterygii
GeBank/GoMaine Atlantic pollock	Pollachius virens	Gadidae	Gadiformes	Actinopterygii
AI walleye pollock	Theragra chalcogramma	Gadidae	Gadiformes	Actinopterygii

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
EBS walleye pollock	Theragra chalcogramma	Gadidae	Gadiformes	Actinopterygii
GOA walleye pollock	Theragra chalcogramma	Gadidae	Gadiformes	Actinopterygii
USWC-48 POLLOCK, WALLEYE	Theragra chalcogramma	Gadidae	Gadiformes	Actinopterygii
USEC-NE CUSK	Brosme brosme	Lotidae	Gadiformes	Actinopterygii
USEC-SE CUSK	Brosme brosme	Lotidae	Gadiformes	Actinopterygii
USEC-NE HAKE, OFFSHORE SILVER	Merluccius albidus	Merlucciidae	Gadiformes	Actinopterygii
nGeBank/GoMaine silver hake	Merluccius bilinearis	Merlucciidae	Gadiformes	Actinopterygii
sGeBank/midAtl silver hake	Merluccius bilinearis	Merlucciidae	Gadiformes	Actinopterygii
USWC/BC Pacific hake	Merluccius productus	Merlucciidae	Gadiformes	Actinopterygii
USEC-NE HAKE, RED	Urophycis chuss	Phycidae	Gadiformes	Actinopterygii
USEC-SE HAKE, RED	Urophycis chuss	Phycidae	Gadiformes	Actinopterygii
USEC-NE HAKE, SOUTHERN	Urophycis floridana	Phycidae	Gadiformes	Actinopterygii
GeBank/GoMaine white hake	Urophycis tenuis	Phycidae	Gadiformes	Actinopterygii
USEC-SE HAKE, WHITE	Urophycis tenuis	Phycidae	Gadiformes	Actinopterygii
USEC-NE OPAH	Lampris guttatus	Lampridae	Lampriformes	Actinopterygii
USEC-SE OPAH	Lampris guttatus	Lampridae	Lampriformes	Actinopterygii
USWC-48 OPAH	Lampris guttatus	Lampridae	Lampriformes	Actinopterygii
USEC-NE DEALFISH	Trachipterus arcticus	Trachipteridae	Lampriformes	Actinopterygii
nGeBank/GoMaine monkfish	Lophius americanus	Lophiidae	Lophiiformes	Actinopterygii
sGeBank/midAtl monkfish	Lophius americanus	Lophiidae	Lophiiformes	Actinopterygii
USEC-NE GOOSEFISH, BLACKFIN	Lophius gastrophysus	Lophiidae	Lophiiformes	Actinopterygii
East Florida striped mullet	Mugil cephalus	Mugilidae	Mugiliformes	Actinopterygii
USEC-NE MULLET, STRIPED (LIZA)	Mugil cephalus	Mugilidae	Mugiliformes	Actinopterygii
USEC-SE MULLET, STRIPED (LIZA)	Mugil cephalus	Mugilidae	Mugiliformes	Actinopterygii
USWC-48 MULLET, STRIPED (LIZA)	Mugil cephalus	Mugilidae	Mugiliformes	Actinopterygii
West Florida striped mullet	Mugil cephalus	Mugilidae	Mugiliformes	Actinopterygii
USEC-SE MULLET, WHITE	Mugil curema	Mugilidae	Mugiliformes	Actinopterygii
USEC-SE BROTULA, BEARDED	Brotula barbata	Ophidiidae	Ophidiiformes	Actinopterygii
USEC-SE AUSTRALIAN ROCKLING	Genypterus blacodes	Ophidiidae	Ophidiiformes	Actinopterygii
USWC-48 SMELT, WHITEBAIT	Allosmerus elongatus	Osmeridae	Osmeriformes	Actinopterygii
USWC-AK CAPELIN	Mallotus villosus	Osmeridae	Osmeriformes	Actinopterygii
USEC-NE SMELT, RAINBOW	Osmerus mordax	Osmeridae	Osmeriformes	Actinopterygii
USWC-48 SMELT, EULACHON	Thaleichthys pacificus	Osmeridae	Osmeriformes	Actinopterygii
USWC-AK SMELT, EULACHON	Thaleichthys pacificus	Osmeridae	Osmeriformes	Actinopterygii
USEC-NE LAUNCE, AMERICAN SAND	Ammodytes americanus	Ammodytidae	Perciformes	Actinopterygii
USWC-48 LAUNCE, AMERICAN SAND	Ammodytes americanus	Ammodytidae	Perciformes	Actinopterygii
USNE Atlantic wolffish	Anarhichas lupus	Anarhichadidae	Perciformes	Actinopterygii
USWC-48 WOLF-EEL	Anarrhichthys ocellatus	Anarhichadidae	Perciformes	Actinopterygii
USEC-SE POMPANO, AFRICAN	Alectis ciliaris	Carangidae	Perciformes	Actinopterygii
USEC-NE RUNNER, BLUE	Caranx crysos	Carangidae	Perciformes	Actinopterygii
USEC-SE RUNNER, BLUE	Caranx crysos	Carangidae	Perciformes	Actinopterygii
USEC-NE JACK, CREVALLE	Caranx hippos	Carangidae	Perciformes	Actinopterygii
USEC-SE JACK, CREVALLE	Caranx hippos	Carangidae	Perciformes	Actinopterygii
USEC-SE JACK, HORSE-EYE	Caranx latus	Carangidae	Perciformes	Actinopterygii

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
USEC-SE JACK, BLACK	Caranx lugubris	Carangidae	Perciformes	Actinopterygii
USEC-SE JACK, BAR	Caranx ruber	Carangidae	Perciformes	Actinopterygii
USEC-SE RUNNER, RAINBOW	Elagatis bipinnulata	Carangidae	Perciformes	Actinopterygii
USEC-SE SCAD, BIGEYE	Selar crumenophthalmus	Carangidae	Perciformes	Actinopterygii
USEC-SE MOONFISH, ATLANTIC	Selene setapinnis	Carangidae	Perciformes	Actinopterygii
USEC-SE LOOKDOWN	Selene vomer	Carangidae	Perciformes	Actinopterygii
GoMex greater amberjack	Seriola dumerili	Carangidae	Perciformes	Actinopterygii
sAtl greater amberjack	Seriola dumerili	Carangidae	Perciformes	Actinopterygii
USWC-48 YELLOWTAIL JACK	Seriola lalandi	Carangidae	Perciformes	Actinopterygii
USEC-SE JACK, ALMACO	Seriola rivoliana	Carangidae	Perciformes	Actinopterygii
USEC-SE RUDDERFISH, BANDED	Seriola zonata	Carangidae	Perciformes	Actinopterygii
East Florida pompano	Trachinotus carolinus	Carangidae	Perciformes	Actinopterygii
USEC-NE POMPANO, FLORIDA	Trachinotus carolinus	Carangidae	Perciformes	Actinopterygii
USEC-SE POMPANO, FLORIDA	Trachinotus carolinus	Carangidae	Perciformes	Actinopterygii
USWC-48 POMPANO, FLORIDA	Trachinotus carolinus	Carangidae	Perciformes	Actinopterygii
West Florida pompano	Trachinotus carolinus	Carangidae	Perciformes	Actinopterygii
USEC-SE PERMIT	Trachinotus falcatus	Carangidae	Perciformes	Actinopterygii
USEC-NE SCAD, ROUGH	Trachurus lathami	Carangidae	Perciformes	Actinopterygii
USWC-48 JACK MACKEREL	Trachurus symmetricus	Carangidae	Perciformes	Actinopterygii
USEC-NE BASS, ROCK	Ambloplites rupestris	Centrarchidae	Perciformes	Actinopterygii
USEC-SE BLACK DRIFTFISH	Hyperoglyphe bythites	Centrolophidae	Perciformes	Actinopterygii
USEC-NE BARRELFISH	Hyperoglyphe perciformis	Centrolophidae	Perciformes	Actinopterygii
USEC-SE BARRELFISH	Hyperoglyphe perciformis	Centrolophidae	Perciformes	Actinopterygii
USEC-NE DOLPHINFISH	Coryphaena hippurus	Coryphaenidae	Perciformes	Actinopterygii
USEC-SE DOLPHINFISH	Coryphaena hippurus	Coryphaenidae	Perciformes	Actinopterygii
USWC-48 DOLPHINFISH	Coryphaena hippurus	Coryphaenidae	Perciformes	Actinopterygii
USEC-NE ESCOLAR	Lepidocybium flavobrunneum	Gempylidae	Perciformes	Actinopterygii
USEC-SE ESCOLAR	Lepidocybium flavobrunneum	Gempylidae	Perciformes	Actinopterygii
USEC-SE OILFISH	Ruvettus pretiosus	Gempylidae	Perciformes	Actinopterygii
USWC-48 MUDSUCKER, LONGJAW	Gillichthys mirabilis	Gobiidae	Perciformes	Actinopterygii
USEC-SE MARGATE	Haemulon album	Haemulidae	Perciformes	Actinopterygii
USEC-SE GRUNT, TOMTATE	Haemulon aurolineatum	Haemulidae	Perciformes	Actinopterygii
USEC-SE GRUNT, WHITE	Haemulon plumieri	Haemulidae	Perciformes	Actinopterygii
USEC-NE PIGFISH	Orthopristis chrysoptera	Haemulidae	Perciformes	Actinopterygii
USEC-SE PIGFISH	Orthopristis chrysoptera	Haemulidae	Perciformes	Actinopterygii
USWC-48 OPALEYE	Girella nigricans	Kyphosidae	Perciformes	Actinopterygii
USWC-48 HALFMOON	Medialuna californiensis	Kyphosidae	Perciformes	Actinopterygii
East Florida hogfish	Lachnolaimus maximus	Labridae	Perciformes	Actinopterygii
Northern sAtl hogfish	Lachnolaimus maximus	Labridae	Perciformes	Actinopterygii
West Florida hogfish	Lachnolaimus maximus	Labridae	Perciformes	Actinopterygii
USWC California sheephead	Semicossyphus pulcher	Labridae	Perciformes	Actinopterygii
USEC tautog	Tautoga onitis	Labridae	Perciformes	Actinopterygii
USEC-NE CUNNER	Tautogolabrus adspersus	Labridae	Perciformes	Actinopterygii
USEC-SE TRIPLETAIL	Lobotes surinamensis	Lobotidae	Perciformes	Actinopterygii

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
USEC-SE SNAPPER, BLACK	Apsilus dentatus	Lutjanidae	Perciformes	Actinopterygii
USEC-SE SNAPPER, QUEEN	Etelis oculatus	Lutjanidae	Perciformes	Actinopterygii
USSE mutton snapper	Lutjanus analis	Lutjanidae	Perciformes	Actinopterygii
USEC-SE SNAPPER, SCHOOLMASTER	Lutjanus apodus	Lutjanidae	Perciformes	Actinopterygii
USEC-SE SNAPPER, BLACKFIN	Lutjanus buccanella	Lutjanidae	Perciformes	Actinopterygii
GoMex red snapper	Lutjanus campechanus	Lutjanidae	Perciformes	Actinopterygii
sAtl red snapper	Lutjanus campechanus	Lutjanidae	Perciformes	Actinopterygii
USEC-SE SNAPPER, CUBERA	Lutjanus cyanopterus	Lutjanidae	Perciformes	Actinopterygii
USEC-SE SNAPPER, GRAY	Lutjanus griseus	Lutjanidae	Perciformes	Actinopterygii
USEC-NE SNAPPER, DOG	Lutjanus jocu	Lutjanidae	Perciformes	Actinopterygii
USEC-SE SNAPPER, DOG	Lutjanus jocu	Lutjanidae	Perciformes	Actinopterygii
USEC-SE SNAPPER, MAHOGANY	Lutjanus mahogoni	Lutjanidae	Perciformes	Actinopterygii
USEC-SE SNAPPER CARIBBEAN RED	Lutjanus purpureus	Lutjanidae	Perciformes	Actinopterygii
USEC-SE SNAPPER, LANE	Lutjanus synagris	Lutjanidae	Perciformes	Actinopterygii
USEC-SE SNAPPER, SILK	Lutjanus vivanus	Lutjanidae	Perciformes	Actinopterygii
USSE yellowtail snapper	Ocyurus chrysurus	Lutjanidae	Perciformes	Actinopterygii
USEC-SE WENCHMAN	Pristipomoides aquilonaris	Lutjanidae	Perciformes	Actinopterygii
GoMex vermilion snapper	Rhomboplites aurorubens	Lutjanidae	Perciformes	Actinopterygii
sAtl vermilion snapper	Rhomboplites aurorubens	Lutjanidae	Perciformes	Actinopterygii
USEC-SE TILEFISH, GOLDFACE	Caulolatilus chrysops	Malacanthidae	Perciformes	Actinopterygii
USEC-SE TILEFISH, BLACKLINE	Caulolatilus cyanops	Malacanthidae	Perciformes	Actinopterygii
sAtl blueline tilefish	Caulolatilus microps	Malacanthidae	Perciformes	Actinopterygii
USEC-SE TILEFISH, BLUELINE	Caulolatilus microps	Malacanthidae	Perciformes	Actinopterygii
USWC-48 WHITEFISH, OCEAN	Caulolatilus princeps	Malacanthidae	Perciformes	Actinopterygii
USWC-AK WHITEFISH, OCEAN	Caulolatilus princeps	Malacanthidae	Perciformes	Actinopterygii
GoMex golden tilefish	Lopholatilus chamaeleonticeps	Malacanthidae	Perciformes	Actinopterygii
sAtl golden tilefish	Lopholatilus chamaeleonticeps	Malacanthidae	Perciformes	Actinopterygii
USNE golden tilefish	Lopholatilus chamaeleonticeps	Malacanthidae	Perciformes	Actinopterygii
USEC-NE TILEFISH, SAND	Malacanthus plumieri	Malacanthidae	Perciformes	Actinopterygii
USEC-SE TILEFISH, SAND	Malacanthus plumieri	Malacanthidae	Perciformes	Actinopterygii
USEC striped bass	Morone saxatilis	Moronidae	Perciformes	Actinopterygii
USWC-48 BASS, STRIPED	Morone saxatilis	Moronidae	Perciformes	Actinopterygii
USEC-NE WRECKFISH	Polyprion americanus	Polyprionidae	Perciformes	Actinopterygii
USEC-SE WRECKFISH	Polyprion americanus	Polyprionidae	Perciformes	Actinopterygii
USWC-48 SEA BASS, GIANT	Stereolepis gigas	Polyprionidae	Perciformes	Actinopterygii
USWC-48 BLACKSMITH	Chromis punctipinnis	Pomacentridae	Perciformes	Actinopterygii
USEC bluefish	Pomatomus saltatrix	Pomatomidae	Perciformes	Actinopterygii
USEC-SE BLUEFISH	Pomatomus saltatrix	Pomatomidae	Perciformes	Actinopterygii
USEC-SE BIGEYE	Priacanthus arenatus	Priacanthidae	Perciformes	Actinopterygii
GoMex cobia	Rachycentron canadum	Rachycentridae	Perciformes	Actinopterygii
sAtl cobia	Rachycentron canadum	Rachycentridae	Perciformes	Actinopterygii
USWC California white seabass	Atractoscion nobilis	Sciaenidae	Perciformes	Actinopterygii
USEC-SE SEATROUT, SAND	Cynoscion arenarius	Sciaenidae	Perciformes	Actinopterygii
Mississippi spotted sea trout	Cynoscion nebulosus	Sciaenidae	Perciformes	Actinopterygii

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
USEC-NE SEATROUT, SPOTTED	Cynoscion nebulosus	Sciaenidae	Perciformes	Actinopterygii
USEC-SE SEATROUT, SPOTTED	Cynoscion nebulosus	Sciaenidae	Perciformes	Actinopterygii
USEC weakfish	Cynoscion regalis	Sciaenidae	Perciformes	Actinopterygii
USWC-48 CROAKER, PACIFIC WHITE	Genyonemus lineatus	Sciaenidae	Perciformes	Actinopterygii
USEC-NE SPOT	Leiostomus xanthurus	Sciaenidae	Perciformes	Actinopterygii
USEC-SE SPOT	Leiostomus xanthurus	Sciaenidae	Perciformes	Actinopterygii
USEC-NE KINGFISH, NORTHERN	Menticirrhus saxatilis	Sciaenidae	Perciformes	Actinopterygii
USEC Atlantic croaker	Micropogonias undulatus	Sciaenidae	Perciformes	Actinopterygii
USEC-SE CROAKER, ATLANTIC	Micropogonias undulatus	Sciaenidae	Perciformes	Actinopterygii
USEC-NE DRUM, BLACK	Pogonias cromis	Sciaenidae	Perciformes	Actinopterygii
USEC-SE DRUM, BLACK	Pogonias cromis	Sciaenidae	Perciformes	Actinopterygii
GoMex red drum	Sciaenops ocellatus	Sciaenidae	Perciformes	Actinopterygii
USNE midAtl red drum	Sciaenops ocellatus	Sciaenidae	Perciformes	Actinopterygii
USSE sAtl red drum	Sciaenops ocellatus	Sciaenidae	Perciformes	Actinopterygii
USWC-48 QUEENFISH	Seriphus politus	Sciaenidae	Perciformes	Actinopterygii
USEC-NE WAHOO	Acanthocybium solandri	Scombridae	Perciformes	Actinopterygii
USEC-SE WAHOO	Acanthocybium solandri	Scombridae	Perciformes	Actinopterygii
USWC-48 WAHOO	Acanthocybium solandri	Scombridae	Perciformes	Actinopterygii
USEC-NE MACKEREL, FRIGATE	Auxis thazard	Scombridae	Perciformes	Actinopterygii
USEC-NE MACKEREL, CHUB	Scomber japonicus	Scombridae	Perciformes	Actinopterygii
USEC-SE MACKEREL, CHUB	Scomber japonicus	Scombridae	Perciformes	Actinopterygii
USWC Pacific mackerel	Scomber japonicus	Scombridae	Perciformes	Actinopterygii
GoMex Spanish mackerel	Scomberomorus maculatus	Scombridae	Perciformes	Actinopterygii
sAtl Spanish mackerel	Scomberomorus maculatus	Scombridae	Perciformes	Actinopterygii
USWC-48 PACIFIC SIERRA	Scomberomorus sierra	Scombridae	Perciformes	Actinopterygii
USNE Atlantic mackerel	Scomber scombrus	Scombridae	Perciformes	Actinopterygii
USEC-SE SEA BASS, BANK	Centropristis ocyurus	Serranidae	Perciformes	Actinopterygii
USEC-SE SEA BASS, ROCK	Centropristis philadelphica	Serranidae	Perciformes	Actinopterygii
sAtl black sea bass	Centropristis striata	Serranidae	Perciformes	Actinopterygii
USEC-SE SEA BASS, BLACK	Centropristis striata	Serranidae	Perciformes	Actinopterygii
USNE black sea bass	Centropristis striata	Serranidae	Perciformes	Actinopterygii
USEC-SE GRAYSBY	Cephalopholis cruentata	Serranidae	Perciformes	Actinopterygii
USEC-NE SAND PERCH	Diplectrum formosum	Serranidae	Perciformes	Actinopterygii
USEC-SE SAND PERCH	Diplectrum formosum	Serranidae	Perciformes	Actinopterygii
USWC-48 SAND PERCH	Diplectrum formosum	Serranidae	Perciformes	Actinopterygii
USEC-SE HIND, ROCK	Epinephelus adscensionis	Serranidae	Perciformes	Actinopterygii
USWC-48 SPOTTED CABRILLA	Epinephelus analogus	Serranidae	Perciformes	Actinopterygii
USEC-SE HIND, SPECKLED	Epinephelus drummondhayi	Serranidae	Perciformes	Actinopterygii
GoMex yellowedge grouper	Epinephelus flavolimbatus	Serranidae	Perciformes	Actinopterygii
USEC-SE CONEY	Epinephelus fulvus	Serranidae	Perciformes	Actinopterygii
USEC-SE HIND, RED	Epinephelus guttatus	Serranidae	Perciformes	Actinopterygii
USEC-SE GROUPER, MARBLED	Epinephelus inermis	Serranidae	Perciformes	Actinopterygii
USEC-SE GROUPER, GOLIATH	Epinephelus itajara	Serranidae	Perciformes	Actinopterygii
GoMex red grouper	Epinephelus morio	Serranidae	Perciformes	Actinopterygii

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
sAtl red grouper	Epinephelus morio	Serranidae	Perciformes	Actinopterygii
USEC-SE GROUPER, MISTY	Epinephelus mystacinus	Serranidae	Perciformes	Actinopterygii
USEC-SE GROUPER, WARSAW	Epinephelus nigritus	Serranidae	Perciformes	Actinopterygii
sAtl snowy grouper	Epinephelus niveatus	Serranidae	Perciformes	Actinopterygii
USEC-NE GROUPER, SNOWY	Epinephelus niveatus	Serranidae	Perciformes	Actinopterygii
USEC-SE GROUPER, SNOWY	Epinephelus niveatus	Serranidae	Perciformes	Actinopterygii
USEC-SE GROUPER, NASSAU	Epinephelus striatus	Serranidae	Perciformes	Actinopterygii
USEC-SE BASS, LONGTAIL	Hemanthias leptus	Serranidae	Perciformes	Actinopterygii
USSE black grouper	Mycteroperca bonaci	Serranidae	Perciformes	Actinopterygii
USEC-SE GROUPER, YELLOWMOUTH	Mycteroperca interstitialis	Serranidae	Perciformes	Actinopterygii
GoMex gag grouper	Mycteroperca microlepis	Serranidae	Perciformes	Actinopterygii
sAtl gag grouper	Mycteroperca microlepis	Serranidae	Perciformes	Actinopterygii
USEC-SE SCAMP	Mycteroperca phenax	Serranidae	Perciformes	Actinopterygii
USEC-SE GROUPER, YELLOWFIN	Mycteroperca venenosa	Serranidae	Perciformes	Actinopterygii
USEC-SE CREOLE-FISH	Paranthias furcifer	Serranidae	Perciformes	Actinopterygii
USEC-NE SHEEPSHEAD	Archosargus probatocephalus	Sparidae	Perciformes	Actinopterygii
USEC-SE SHEEPSHEAD	Archosargus probatocephalus	Sparidae	Perciformes	Actinopterygii
USEC-SE PORGY, JOLTHEAD	Calamus bajonado	Sparidae	Perciformes	Actinopterygii
USEC-SE PORGY, WHITEBONE	Calamus leucosteus	Sparidae	Perciformes	Actinopterygii
USEC-SE PORGY, KNOBBED	Calamus nodosus	Sparidae	Perciformes	Actinopterygii
USEC-SE PINFISH, SPOTTAIL	Diplodus holbrookii	Sparidae	Perciformes	Actinopterygii
USEC-SE PINFISH	Lagodon rhomboides	Sparidae	Perciformes	Actinopterygii
sAtl red porgy	Pagrus pagrus	Sparidae	Perciformes	Actinopterygii
USEC-SE PORGY, RED	Pagrus pagrus	Sparidae	Perciformes	Actinopterygii
USEC-SE PORGY, LONGSPINE	Stenotomus caprinus	Sparidae	Perciformes	Actinopterygii
USNE scup	Stenotomus chrysops	Sparidae	Perciformes	Actinopterygii
USWC-48 PRICKLEBACK, MONKEYFACE	Cebidichthys violaceus	Stichaeidae	Perciformes	Actinopterygii
USEC-NE HARVESTFISH	Peprilus alepidotus	Stromateidae	Perciformes	Actinopterygii
USEC-SE HARVESTFISH	Peprilus alepidotus	Stromateidae	Perciformes	Actinopterygii
USWC-48 POMPANO, PACIFIC	Peprilus simillimus	Stromateidae	Perciformes	Actinopterygii
USNE butterfish	Peprilus triacanthus	Stromateidae	Perciformes	Actinopterygii
USEC-SE CUTLASSFISH, ATLANTIC	Trichiurus lepturus	Trichiuridae	Perciformes	Actinopterygii
USEC-NE STARGAZER, NORTHERN	Astroscopus guttatus	Uranoscopidae	Perciformes	Actinopterygii
USEC-NE POUT, OCEAN	Macrozoarces americanus	Zoarcidae	Perciformes	Actinopterygii
USEC-NE HOGCHOKER	Trinectes maculatus	Achiridae	Pleuronectiformes	Actinopterygii
USWC-48 SOLE, ROCK	Paraplagusia bilineata	Cynoglossidae	Pleuronectiformes	Actinopterygii
Pacific sanddab - Pacific Coast	Citharichthys sordidus	Paralichthyidae	Pleuronectiformes	Actinopterygii
USWC-48 HALIBUT, CALIFORNIA	Paralichthys californicus	Paralichthyidae	Pleuronectiformes	Actinopterygii
USNE summer flounder	Paralichthys dentatus	Paralichthyidae	Pleuronectiformes	Actinopterygii
North Carolina southern flounder	Paralichthys lethostigma	Paralichthyidae	Pleuronectiformes	Actinopterygii
USEC-NE FLOUNDER, SOUTHERN	Paralichthys lethostigma	Paralichthyidae	Pleuronectiformes	Actinopterygii
USEC-SE FLOUNDER, SOUTHERN	Paralichthys lethostigma	Paralichthyidae	Pleuronectiformes	Actinopterygii
USEC-NE FLOUNDER, FOURSPOT	Paralichthys oblongus	Paralichthyidae	Pleuronectiformes	Actinopterygii
USWC-48 SOLE, FANTAIL	Xystreurys liolepis	Paralichthyidae	Pleuronectiformes	Actinopterygii

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
BSAI arrowtooth flounder	Atheresthes stomias	Pleuronectidae	Pleuronectiformes	Actinopterygii
GOA arrowtooth flounder	Atheresthes stomias	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC arrowtooth flounder	Atheresthes stomias	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC-AK SOLE, PETRALE	Eopsetta jordani	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC petrale sole	Eopsetta jordani	Pleuronectidae	Pleuronectiformes	Actinopterygii
GoMaine witch flounder	Glyptocephalus cynoglossus	Pleuronectidae	Pleuronectiformes	Actinopterygii
GOA rex sole	Glyptocephalus zachirus	Pleuronectidae	Pleuronectiformes	Actinopterygii
Rex sole - Pacific Coast	Glyptocephalus zachirus	Pleuronectidae	Pleuronectiformes	Actinopterygii
BSAI flathead sole	Hippoglossoides elassodon	Pleuronectidae	Pleuronectiformes	Actinopterygii
GOA flathead sole	Hippoglossoides elassodon	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC-48 SOLE, FLATHEAD	Hippoglossoides elassodon	Pleuronectidae	Pleuronectiformes	Actinopterygii
GeBank/GoMaine American plaice	Hippoglossoides platessoides	Pleuronectidae	Pleuronectiformes	Actinopterygii
GeBank/GoMaine Atlantic halibut	Hippoglossus hippoglossus	Pleuronectidae	Pleuronectiformes	Actinopterygii
Pacific halibut (coastwide)	Hippoglossus stenolepis	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC-48 SOLE, BUTTER	Isopsetta isolepis	Pleuronectidae	Pleuronectiformes	Actinopterygii
GOA southern rock sole	Lepidopsetta bilineata	Pleuronectidae	Pleuronectiformes	Actinopterygii
BSAI northern rock sole	Lepidopsetta polyxystra	Pleuronectidae	Pleuronectiformes	Actinopterygii
GOA northern rock sole	Lepidopsetta polyxystra	Pleuronectidae	Pleuronectiformes	Actinopterygii
BSAI yellowfin sole	Limanda aspera	Pleuronectidae	Pleuronectiformes	Actinopterygii
CCod/GoMaine yellowtail flounder	Limanda ferruginea	Pleuronectidae	Pleuronectiformes	Actinopterygii
GeBank yellowtail flounder	Limanda ferruginea	Pleuronectidae	Pleuronectiformes	Actinopterygii
sNEng/midAtl yellowtail flounder	Limanda ferruginea	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC-48 SOLE, DEEPSEA	Microstomus bathybius	Pleuronectidae	Pleuronectiformes	Actinopterygii
GOA dover sole	Microstomus pacificus	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC dover sole	Microstomus pacificus	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC-AK SOLE, ENGLISH	Parophrys vetulus	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC English sole	Parophrys vetulus	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC-AK FLOUNDER, STARRY	Platichthys stellatus	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC starry flounder (northern)	Platichthys stellatus	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC starry flounder (southern)	Platichthys stellatus	Pleuronectidae	Pleuronectiformes	Actinopterygii
BSAI Alaska plaice	Pleuronectes quadrituberculatus	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC-48 SOLE, C-O	Pleuronichthys coenosus	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC-48 SOLE, CURLFIN	Pleuronichthys decurrens	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC-48 TURBOT, HORNYHEAD	Pleuronichthys verticalis	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC-48 SOLE, SAND	Psettichthys melanostictus	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC-AK SOLE, SAND	Psettichthys melanostictus	Pleuronectidae	Pleuronectiformes	Actinopterygii
GeBank winter flounder	Pseudopleuronectes americanus	Pleuronectidae	Pleuronectiformes	Actinopterygii
GoMaine winter flounder	Pseudopleuronectes americanus	Pleuronectidae	Pleuronectiformes	Actinopterygii
sNEng/midAtl winter flounder	Pseudopleuronectes americanus	Pleuronectidae	Pleuronectiformes	Actinopterygii
BSAI Greenland halibut	Reinhardtius hippoglossoides	Pleuronectidae	Pleuronectiformes	Actinopterygii
USEC-NE HALIBUT, GREENLAND	Reinhardtius hippoglossoides	Pleuronectidae	Pleuronectiformes	Actinopterygii
USEC-NE FLOUNDER, WINDOWPANE	Scophthalmus aquosus	Scophthalmidae	Pleuronectiformes	Actinopterygii
Alaska sablefish	Anoplopoma fimbria	Anoplopomatidae	Scorpaeniformes	Actinopterygii
USWC sablefish	Anoplopoma fimbria	Anoplopomatidae	Scorpaeniformes	Actinopterygii

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
USWC cabezon (nCal)	Scorpaenichthys marmoratus	Cottidae	Scorpaeniformes	Actinopterygii
USWC cabezon (OR)	Scorpaenichthys marmoratus	Cottidae	Scorpaeniformes	Actinopterygii
USWC cabezon (sCal)	Scorpaenichthys marmoratus	Cottidae	Scorpaeniformes	Actinopterygii
USEC-NE LUMPFISH	Cyclopterus lumpus	Cyclopteridae	Scorpaeniformes	Actinopterygii
USEC-NE SEA RAVEN	Hemitripterus americanus	Hemitripteridae	Scorpaeniformes	Actinopterygii
USWC-48 GREENLING, KELP	Hexagrammos decagrammus	Hexagrammidae	Scorpaeniformes	Actinopterygii
USWC kelp greenling (OR)	Hexagrammos decagrammus	Hexagrammidae	Scorpaeniformes	Actinopterygii
USEC-SE LINGCOD	Ophiodon elongatus	Hexagrammidae	Scorpaeniformes	Actinopterygii
USWC-AK LINGCOD	Ophiodon elongatus	Hexagrammidae	Scorpaeniformes	Actinopterygii
USWC lingcod (northern)	Ophiodon elongatus	Hexagrammidae	Scorpaeniformes	Actinopterygii
USWC lingcod (southern)	Ophiodon elongatus	Hexagrammidae	Scorpaeniformes	Actinopterygii
BSAI atka mackerel	Pleurogrammus monopterygius	Hexagrammidae	Scorpaeniformes	Actinopterygii
USEC-SE SCORPIONFISH, SPINYCHEEK	Neomerinthe hemingwayi	Scorpaenidae	Scorpaeniformes	Actinopterygii
USEC-SE LIONFISH	Pterois volitans	Scorpaenidae	Scorpaeniformes	Actinopterygii
USWC California scorpionfish (southern)	Scorpaena guttata	Scorpaenidae	Scorpaeniformes	Actinopterygii
USEC-SE SCORPIONFISH, SPOTTED	Scorpaena plumieri	Scorpaenidae	Scorpaeniformes	Actinopterygii
USEC-NE ROSEFISH, BLACKBELLY	Helicolenus dactylopterus	Sebastidae	Scorpaeniformes	Actinopterygii
USEC-SE ROSEFISH, BLACKBELLY	Helicolenus dactylopterus	Sebastidae	Scorpaeniformes	Actinopterygii
BSAI rougheye rockfish	Sebastes aleutianus	Sebastidae	Scorpaeniformes	Actinopterygii
GOA rougheye rockfish	Sebastes aleutianus	Sebastidae	Scorpaeniformes	Actinopterygii
Rougheye Rockfish - Pacific Coast	Sebastes aleutianus	Sebastidae	Scorpaeniformes	Actinopterygii
BSAI Pacific ocean perch	Sebastes alutus	Sebastidae	Scorpaeniformes	Actinopterygii
GOA Pacific ocean perch	Sebastes alutus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC Pacific ocean perch	Sebastes alutus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, KELP	Sebastes atrovirens	Sebastidae	Scorpaeniformes	Actinopterygii
Brown rockfish - Pacific Coast	Sebastes auriculatus	Sebastidae	Scorpaeniformes	Actinopterygii
Aurora rockfish - Pacific Coast	Sebastes aurora	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, REDBANDED	Sebastes babcocki	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, REDBANDED	Sebastes babcocki	Sebastidae	Scorpaeniformes	Actinopterygii
BSAI shortraker rockfish	Sebastes borealis	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, SILVERGRAY	Sebastes brevispinis	Sebastidae	Scorpaeniformes	Actinopterygii
USWC gopher rockfish	Sebastes carnatus	Sebastidae	Scorpaeniformes	Actinopterygii
Copper rockfish - Pacific Coast	Sebastes caurinus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, COPPER	Sebastes caurinus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC greenspotted rockfish (northern)	Sebastes chlorostictus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC greenspotted rockfish (southern)	Sebastes chlorostictus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, BLACK-AND-YELLOW	Sebastes chrysomelas	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, STARRY	Sebastes constellatus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, STARRY	Sebastes constellatus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, DARKBLOTCHED	Sebastes crameri	Sebastidae	Scorpaeniformes	Actinopterygii
USWC darkblotched rockfish	Sebastes crameri	Sebastidae	Scorpaeniformes	Actinopterygii
USWC splitnose rockfish	Sebastes diploproa	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, GREENSTRIPED	Sebastes elongatus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC greenstriped rockfish	Sebastes elongatus	Sebastidae	Scorpaeniformes	Actinopterygii

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
USWC-48 ROCKFISH, SWORDSPINE	Sebastes ensifer	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, WIDOW	Sebastes entomelas	Sebastidae	Scorpaeniformes	Actinopterygii
USWC widow rockfish	Sebastes entomelas	Sebastidae	Scorpaeniformes	Actinopterygii
GeBank/GoMaine Acadian redfish	Sebastes fasciatus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, YELLOWTAIL	Sebastes flavidus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC yellowtail rockfish (northern)	Sebastes flavidus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, BRONZESPOTTED	Sebastes gilli	Sebastidae	Scorpaeniformes	Actinopterygii
USWC chilipepper (southern)	Sebastes goodei	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, SQUARESPOT	Sebastes hopkinsi	Sebastidae	Scorpaeniformes	Actinopterygii
USWC shortbelly rockfish	Sebastes jordani	Sebastidae	Scorpaeniformes	Actinopterygii
USWC cowcod	Sebastes levis	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, BLACK	Sebastes melanops	Sebastidae	Scorpaeniformes	Actinopterygii
USWC black rockfish (California)	Sebastes melanops	Sebastidae	Scorpaeniformes	Actinopterygii
USWC black rockfish (Oregon)	Sebastes melanops	Sebastidae	Scorpaeniformes	Actinopterygii
USWC blackgill rockfish	Sebastes melanostomus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, VERMILION	Sebastes miniatus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, VERMILION	Sebastes miniatus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, BLUE	Sebastes mystinus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, BLUE	Sebastes mystinus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC blue rockfish	Sebastes mystinus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, CHINA	Sebastes nebulosus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, CHINA	Sebastes nebulosus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, SPECKLED	Sebastes ovalis	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, BOCACCIO	Sebastes paucispinis	Sebastidae	Scorpaeniformes	Actinopterygii
USWC bocaccio (southern)	Sebastes paucispinis	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, CANARY	Sebastes pinniger	Sebastidae	Scorpaeniformes	Actinopterygii
USWC canary rockfish	Sebastes pinniger	Sebastidae	Scorpaeniformes	Actinopterygii
BSAI northern rockfish	Sebastes polyspinis	Sebastidae	Scorpaeniformes	Actinopterygii
GOA northern rockfish	Sebastes polyspinis	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, REDSTRIPE	Sebastes proriger	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, GRASS	Sebastes rastrelliger	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, YELLOWMOUTH	Sebastes reedi	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, ROSY	Sebastes rosaceus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, GREENBLOTCHED	Sebastes rosenblatti	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, YELLOWEYE	Sebastes ruberrimus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC yelloweye rockfish	Sebastes ruberrimus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, FLAG	Sebastes rubrivinctus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, BANK	Sebastes rufus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, OLIVE	Sebastes serranoides	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, TREEFISH	Sebastes serriceps	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-48 ROCKFISH, PINKROSE	Sebastes simulator	Sebastidae	Scorpaeniformes	Actinopterygii
GOA dusky rockfish	Sebastes variabilis	Sebastidae	Scorpaeniformes	Actinopterygii
USWC-AK ROCKFISH, SHARPCHIN	Sebastes zacentrus	Sebastidae	Scorpaeniformes	Actinopterygii
USWC shortspine thornyhead	Sebastolobus alascanus	Sebastidae	Scorpaeniformes	Actinopterygii

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
GoMex gray triggerfish	Balistes capriscus	Balistidae	Tetraodontiformes	Actinopterygii
USEC-NE TRIGGERFISH, GRAY	Balistes capriscus	Balistidae	Tetraodontiformes	Actinopterygii
USEC-SE TRIGGERFISH, GRAY	Balistes capriscus	Balistidae	Tetraodontiformes	Actinopterygii
USEC-SE TRIGGERFISH, QUEEN	Balistes vetula	Balistidae	Tetraodontiformes	Actinopterygii
USEC-SE TRIGGERFISH, OCEAN	Canthidermis sufflamen	Balistidae	Tetraodontiformes	Actinopterygii
USEC-NE PUFFER, NOTHERN	Sphoeroides maculatus	Tetraodontidae	Tetraodontiformes	Actinopterygii
USEC-SE PUFFER, NOTHERN	Sphoeroides maculatus	Tetraodontidae	Tetraodontiformes	Actinopterygii
USEC-NE DORY, AMERICAN JOHN	Zenopsis ocellata	Zeidae	Zeiformes	Actinopterygii
USEC-SE DORY, AMERICAN JOHN	Zenopsis ocellata	Zeidae	Zeiformes	Actinopterygii
USEC-NE CLAM, ARC, BLOOD	Anadara ovalis	Arcidae	Arcoida	Bivalvia
USEC-SE CLAM, ARC, BLOOD	Anadara ovalis	Arcidae	Arcoida	Bivalvia
SE Alaska geoduck	Panopea generosa	Hiatellidae	Myoida	Bivalvia
WA geoduck clam	Panopea generosa	Hiatellidae	Myoida	Bivalvia
USEC-NE CLAM, SOFTSHELL	Mya arenaria	Myidae	Myoida	Bivalvia
USWC-48 CLAM, SOFTSHELL	Mya arenaria	Myidae	Myoida	Bivalvia
USWC-48 MUSSEL, CALIFORNIA	Mytilus californianus	Mytilidae	Mytiloida	Bivalvia
USEC-NE MUSSEL, BLUE	Mytilus edulis	Mytilidae	Mytiloida	Bivalvia
USEC-SE MUSSEL, BLUE	Mytilus edulis	Mytilidae	Mytiloida	Bivalvia
USWC-48 MUSSEL, BLUE	Mytilus edulis	Mytilidae	Mytiloida	Bivalvia
USWC-AK MUSSEL, BLUE	Mytilus edulis	Mytilidae	Mytiloida	Bivalvia
USWC-48 OYSTER, PACIFIC	Crassostrea gigas	Ostreidae	Ostreoida	Bivalvia
USWC-AK OYSTER, PACIFIC	Crassostrea gigas	Ostreidae	Ostreoida	Bivalvia
USEC-NE OYSTER, EASTERN	Crassostrea virginica	Ostreidae	Ostreoida	Bivalvia
USEC-SE OYSTER, EASTERN	Crassostrea virginica	Ostreidae	Ostreoida	Bivalvia
USWC-48 OYSTER, EASTERN	Crassostrea virginica	Ostreidae	Ostreoida	Bivalvia
USEC-NE OYSTER, EUROPEAN FLAT	Ostrea edulis	Ostreidae	Ostreoida	Bivalvia
USWC-48 OYSTER, EUROPEAN FLAT	Ostrea edulis	Ostreidae	Ostreoida	Bivalvia
USWC-48 OYSTER, OLYMPIA	Ostrea lurida	Ostreidae	Ostreoida	Bivalvia
USWC-AK OYSTER, OLYMPIA	Ostrea lurida	Ostreidae	Ostreoida	Bivalvia
USEC-NE SCALLOP, CALICO	Argopecten gibbus	Pectinidae	Ostreoida	Bivalvia
USEC-SE SCALLOP, CALICO	Argopecten gibbus	Pectinidae	Ostreoida	Bivalvia
USEC-NE SCALLOP, BAY	Argopecten irradians	Pectinidae	Ostreoida	Bivalvia
USEC-SE SCALLOP, BAY	Argopecten irradians	Pectinidae	Ostreoida	Bivalvia
USEC-NE SCALLOP, ICELAND	Chlamys islandica	Pectinidae	Ostreoida	Bivalvia
USWC-AK SCALLOP, WEATHERVANE	Patinopecten caurinus	Pectinidae	Ostreoida	Bivalvia
GeBank/midAtl sea scallop	Placopecten magellanicus	Pectinidae	Ostreoida	Bivalvia
USWC-AK SCALLOP, SEA	Placopecten magellanicus	Pectinidae	Ostreoida	Bivalvia
USEC ocean quahog	Arctica islandica	Arcticidae	Veneroida	Bivalvia
USWC-48 COCKLE, NUTTALL	Clinocardium nuttallii	Cardiidae	Veneroida	Bivalvia
USWC-AK COCKLE, NUTTALL	Clinocardium nuttallii	Cardiidae	Veneroida	Bivalvia
USWC-48 CLAM, VARIABLE COQUINA	Donax variabilis	Donacidae	Veneroida	Bivalvia
USEC-NE CLAM, ARCTIC SURF (STIMPSON)	Mactromeris polynyma	Mactridae	Veneroida	Bivalvia
USEC-SE CLAM, ATLANTIC RANGIA	Rangia cuneata	Mactridae	Veneroida	Bivalvia
USEC Atlantic surfclam	Spisula solidissima	Mactridae	Veneroida	Bivalvia

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
USEC-NE CLAM, ATLANTIC JACKKNIFE	Ensis directus	Pharidae	Veneroida	Bivalvia
USWC-AK CLAM, ATLANTIC JACKKNIFE	Ensis directus	Pharidae	Veneroida	Bivalvia
USWC-48 CLAM, CALIFORNIA JACKKNIFE	Ensis myrae	Pharidae	Veneroida	Bivalvia
USWC-48 CLAM, PACIFIC RAZOR	Siliqua patula	Pharidae	Veneroida	Bivalvia
USWC-AK CLAM, PACIFIC RAZOR	Siliqua patula	Pharidae	Veneroida	Bivalvia
USEC-SE CLAM, SUNRAY VENUS	Macrocallista nimbosa	Veneridae	Veneroida	Bivalvia
USEC-NE CLAM, NORTHERN QUAHOG	Mercenaria mercenaria	Veneridae	Veneroida	Bivalvia
USEC-SE CLAM, NORTHERN QUAHOG	Mercenaria mercenaria	Veneridae	Veneroida	Bivalvia
USWC-48 CLAM, PACIFIC LITTLENECK	Protothaca staminea	Veneridae	Veneroida	Bivalvia
USWC-AK CLAM, PACIFIC LITTLENECK	Protothaca staminea	Veneridae	Veneroida	Bivalvia
USWC-48 CLAM, BUTTER	Saxidomus giganteus	Veneridae	Veneroida	Bivalvia
USWC-AK CLAM, BUTTER	Saxidomus giganteus	Veneridae	Veneroida	Bivalvia
USWC-48 SHRIMP, BRINE	Artemia salina	Artemiidae	Anostraca	Branchiopoda
USWC-48 LAMPREY, PACIFIC	Lampetra tridentata	Petromyzontidae	Petromyzontiformes	Cephalaspidomorphi
USEC-NE LAMPREY, SEA	Petromyzon marinus	Petromyzontidae	Petromyzontiformes	Cephalaspidomorphi
USEC-SE LAMPREY, SEA	Petromyzon marinus	Petromyzontidae	Petromyzontiformes	Cephalaspidomorphi
USWC-48 LAMPREY, SEA	Petromyzon marinus	Petromyzontidae	Petromyzontiformes	Cephalaspidomorphi
USWC market squid	Loligo opalescens	Loliginidae	Teuthida	Cephalopoda
USNE longfin inshore squid	Loligo pealeii	Loliginidae	Teuthida	Cephalopoda
USWC-AK SQUID, JUMBO	Dosidicus gigas	Ommastrephidae	Teuthida	Cephalopoda
USNE northern shortfin squid	Illex illecebrosus	Ommastrephidae	Teuthida	Cephalopoda
SE Alaska red sea urchin	Strongylocentrotus franciscanus	Strongylocentrotidae	Echinoida	Echinoidea
WA red sea urchin	Strongylocentrotus franciscanus	Strongylocentrotidae	Echinoida	Echinoidea
sAtl blacknose shark	Carcharhinus acronotus	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-SE SHARK, BLACKNOSE	Carcharhinus acronotus	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-NE SHARK, BIGNOSE	Carcharhinus altimus	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-SE SHARK, SPINNER	Carcharhinus brevipinna	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-NE SHARK, SILKY	Carcharhinus falciformis	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-SE SHARK, SILKY	Carcharhinus falciformis	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USSE finetooth shark	Carcharhinus isodon	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-NE SHARK, BULL	Carcharhinus leucas	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-SE SHARK, BULL	Carcharhinus leucas	Carcharhinidae	Carcharhiniformes	Elasmobranchii
GoMex blacktip shark	Carcharhinus limbatus	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-NE SHARK, BLACKTIP	Carcharhinus limbatus	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-SE SHARK, BLACKTIP	Carcharhinus limbatus	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC dusky shark	Carcharhinus obscurus	Carcharhinidae	Carcharhiniformes	Elasmobranchii
Sandbar shark Atlantic	Carcharhinus plumbeus	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-NE SHARK, NIGHT	Carcharhinus signatus	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-NE SHARK, TIGER	Galeocerdo cuvier	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-SE SHARK, TIGER	Galeocerdo cuvier	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-NE SHARK, LEMON	Negaprion brevirostris	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-SE SHARK, LEMON	Negaprion brevirostris	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USSE Atlantic sharpnose shark	Rhizoprionodon terraenovae	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-SE SHARK, GREAT HAMMERHEAD	Sphyrna mokarran	Sphyrnidae	Carcharhiniformes	Elasmobranchii

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
USSE bonnethead shark	Sphyrna tiburo	Sphyrnidae	Carcharhiniformes	Elasmobranchii
USWC-48 SHARK, SOUPFIN	Galeorhinus zyopterus	Triakidae	Carcharhiniformes	Elasmobranchii
USEC smooth dogfish shark	Mustelus canis	Triakidae	Carcharhiniformes	Elasmobranchii
USWC-48 SHARK, LEOPARD	Triakis semifasciata	Triakidae	Carcharhiniformes	Elasmobranchii
USEC-NE SHARK, BIGEYE THRESHER	Alopias superciliosus	Alopiidae	Lamniformes	Elasmobranchii
USEC-SE SHARK, BIGEYE THRESHER	Alopias superciliosus	Alopiidae	Lamniformes	Elasmobranchii
USWC-48 SHARK, BIGEYE THRESHER	Alopias superciliosus	Alopiidae	Lamniformes	Elasmobranchii
USEC-NE SHARK, WHITE	Carcharodon carcharias	Lamnidae	Lamniformes	Elasmobranchii
USWC-48 SHARK, WHITE	Carcharodon carcharias	Lamnidae	Lamniformes	Elasmobranchii
USEC-NE SHARK, LONGFIN MAKO	Isurus paucus	Lamnidae	Lamniformes	Elasmobranchii
USEC-SE SHARK, LONGFIN MAKO	Isurus paucus	Lamnidae	Lamniformes	Elasmobranchii
USEC-NE SHARK, SAND TIGER	Carcharias taurus	Odontaspididae	Lamniformes	Elasmobranchii
USEC-SE SHARK, SAND TIGER	Carcharias taurus	Odontaspididae	Lamniformes	Elasmobranchii
USEC-NE RAY,COWNOSE	Rhinoptera bonasus	Myliobatidae	Myliobatiformes	Elasmobranchii
USEC-NE SHARK, NURSE	Ginglymostoma cirratum	Ginglymostomatidae	Orectolobiformes	Elasmobranchii
USEC-SE SAWFISH, SMALLTOOTH	Pristis pectinata	Pristidae	Pristiformes	Elasmobranchii
USEC-NE SKATE, LITTLE	Leucoraja erinacea	Rajidae	Rajiformes	Elasmobranchii
USWC-48 SKATE, BIG	Raja binoculata	Rajidae	Rajiformes	Elasmobranchii
USWC-48 SKATE, CALIFORNIA	Raja inornata	Rajidae	Rajiformes	Elasmobranchii
USWC longnose skate	Raja rhina	Rajidae	Rajiformes	Elasmobranchii
USEC spiny dogfish	Squalus acanthias	Squalidae	Squaliformes	Elasmobranchii
USWC spiny dogfish	Squalus acanthias	Squalidae	Squaliformes	Elasmobranchii
USWC-48 SHARK, PACIFIC ANGEL	Squatina californica	Squatinidae	Squatiniformes	Elasmobranchii
USEC-NE SHARK, ATLANTIC ANGEL	Squatina dumeril	Squatinidae	Squatiniformes	Elasmobranchii
USEC-SE SHARK, ATLANTIC ANGEL	Squatina dumeril	Squatinidae	Squatiniformes	Elasmobranchii
USEC-NE WHELK, KNOBBED	Busycon carica	Melongenidae	Neogastropoda	Gastropoda
USEC-SE WHELK, KNOBBED	Busycon carica	Melongenidae	Neogastropoda	Gastropoda
USEC-NE WHELK, LIGHTNING	Busycon sinistrum	Melongenidae	Neogastropoda	Gastropoda
USEC-NE WHELK, CHANNELED	Busycotypus canaliculatus	Melongenidae	Neogastropoda	Gastropoda
USWC-48 RATFISH SPOTTED	Hydrolagus colliei	Chimaeridae	Chimaeriformes	Holocephali
USEC-NE CRAB, JONAH	Cancer borealis	Cancridae	Decapoda	Malacostraca
USEC-NE CRAB, ATLANTIC ROCK	Cancer irroratus	Cancridae	Decapoda	Malacostraca
USWC-48 CRAB, DUNGENESS	Cancer magister	Cancridae	Decapoda	Malacostraca
USWC-AK CRAB, DUNGENESS	Cancer magister	Cancridae	Decapoda	Malacostraca
USWC-48 CRAB, RED ROCK	Cancer productus	Cancridae	Decapoda	Malacostraca
USEC-SE CRAB, DEEPSEA GOLDEN	Chaceon fenneri	Geryonidae	Decapoda	Malacostraca
USNE deep sea red crab	Chaceon quinquedens	Geryonidae	Decapoda	Malacostraca
Bristol Bay red king crab	Paralithodes camtschaticus	Lithodidae	Decapoda	Malacostraca
Norton Sound red king crab	Paralithodes camtschaticus	Lithodidae	Decapoda	Malacostraca
St-Matthews blue king crab	Paralithodes platypus	Lithodidae	Decapoda	Malacostraca
USEC-NE CRAB, FLORIDA STONE CLAWS	Menippe mercenaria	Menippidae	Decapoda	Malacostraca
USEC-SE CRAB, FLORIDA STONE CLAWS	Menippe mercenaria	Menippidae	Decapoda	Malacostraca
GeBank American lobster	Homarus americanus	Nephropidae	Decapoda	Malacostraca
GoMaine American lobster	Homarus americanus	Nephropidae	Decapoda	Malacostraca

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
sNEng American lobster	Homarus americanus	Nephropidae	Decapoda	Malacostraca
USEC-NE LOBSTER, AMERICAN	Homarus americanus	Nephropidae	Decapoda	Malacostraca
USEC-SE LOBSTER, AMERICAN	Homarus americanus	Nephropidae	Decapoda	Malacostraca
EBS tanner crab	Chionoecetes bairdi	Oregoniidae	Decapoda	Malacostraca
USWC-48 CRAB, SOUTHERN TANNER	Chionoecetes bairdi	Oregoniidae	Decapoda	Malacostraca
EBS snow crab	Chionoecetes opilio	Oregoniidae	Decapoda	Malacostraca
USEC-SE LOBSTER, CARIBBEAN SPINY	Panulirus argus	Palinuridae	Decapoda	Malacostraca
CA spiny lobster	Panulirus interruptus	Palinuridae	Decapoda	Malacostraca
USWC-48 SHRIMP, OCEAN	Pandalus jordani	Pandalidae	Decapoda	Malacostraca
USWC-AK SHRIMP, OCEAN	Pandalus jordani	Pandalidae	Decapoda	Malacostraca
USWC-48 SHRIMP, SPOT	Pandalus platyceros	Pandalidae	Decapoda	Malacostraca
USEC-NE SHRIMP, BROWN	Farfantepenaeus aztecus	Penaeidae	Decapoda	Malacostraca
USEC-SE SHRIMP, BROWN	Farfantepenaeus aztecus	Penaeidae	Decapoda	Malacostraca
GoMex pink shrimp	Farfantepenaeus duorarum	Penaeidae	Decapoda	Malacostraca
USEC-SE SHRIMP, PINK	Farfantepenaeus duorarum	Penaeidae	Decapoda	Malacostraca
GoMex white shrimp	Litopenaeus setiferus	Penaeidae	Decapoda	Malacostraca
USEC-SE SHRIMP, WHITE	Litopenaeus setiferus	Penaeidae	Decapoda	Malacostraca
GoMex brown shrimp	Penaeus aztecus	Penaeidae	Decapoda	Malacostraca
USEC-SE SHRIMP, SEABOB	Xiphopenaeus kroyeri	Penaeidae	Decapoda	Malacostraca
Chesapeake Bay blue crab	Callinectes sapidus	Portunidae	Decapoda	Malacostraca
Eastern Gulf of Mexico blue crab	Callinectes sapidus	Portunidae	Decapoda	Malacostraca
Florida South Atlantic blue crab	Callinectes sapidus	Portunidae	Decapoda	Malacostraca
North Carolina blue crab	Callinectes sapidus	Portunidae	Decapoda	Malacostraca
USEC-NE CRAB, BLUE	Callinectes sapidus	Portunidae	Decapoda	Malacostraca
USEC-SE CRAB, BLUE	Callinectes sapidus	Portunidae	Decapoda	Malacostraca
USWC-AK CRAB, BLUE	Callinectes sapidus	Portunidae	Decapoda	Malacostraca
Western Gulf of Mexico blue crab	Callinectes sapidus	Portunidae	Decapoda	Malacostraca
USEC-NE CRAB, GREEN	Carcinus maenas	Portunidae	Decapoda	Malacostraca
USWC-48 CRAB, RED PA	Podophthalmus vigil	Portunidae	Decapoda	Malacostraca
USWC-48 SHRIMP, PACIFIC ROCK	Sicyonia ingentis	Sicyoniidae	Decapoda	Malacostraca
USEC-NE SHRIMP, ROYAL RED	Pleoticus robustus	Solenoceridae	Decapoda	Malacostraca
USEC-SE SHRIMP, ROYAL RED	Pleoticus robustus	Solenoceridae	Decapoda	Malacostraca
USWC-48 SHRIMP, BLUE MUD	Upogebia pugettensis	Upogebiidae	Decapoda	Malacostraca
Delaware Bay horseshoe crab	Limulus polyphemus	Limulidae	Xiphosura	Merostomata

Table B.3: Stocks for which assessments or other abundance information was available, but which were excluded from our analysis. This was generally due to missing landings information at the stock level. The assessment year is the year of first stock assessment.

Stock	Assessment year	SIS class
GoMaine northern shrimp	1997	
USSE scalloped hammerhead shark	2009	3
GoMex king mackerel	1983	4
sAtl king mackerel	1983	4
USWC black rockfish (northern)	1994	4
USWC longspine thornyhead	1990	4
GOA shortspine thornyhead	1995	3
SE Alaska sea cucumber	1990	
SE Alaska spot shrimp	1996	
Sharpchin rockfish - Pacific Coast	2013	3
Stripetail rockfish - Pacific Coast	2013	3
BSAI Kamchatka flounder	2012	4

C Validation of assessment classifications

In this appendix, we compare our assessment classifications with those of NOAA's Species Information System (SIS) database.

Our classification system consisted of whether or not a stock has had a assessment conducted, and subsequently, the year in which the first assessment occurred. Our definition of a stock assessment required the use of a population dynamics model fit to fishery landings data, coupled with some benchmark with which to compare model-estimated time series of abundance or fishing pressure (described further in the main text). These biological reference point benchmarks may have been estimated within the same assessment model or specified externally, and allow for comparing estimates of current abundance or fishing pressure relative to target levels. To determine the year of first stock assessment, we reviewed historical assessments on the websites of US Fishery Management Councils and NMFS Science Centers, and also sought the input of fishery scientists and managers within each region (Appendix A).

The SIS database uses a 6-level categorization of assessments [CITATION, https://www.st.nmfs.noaa.gov/sisPortal/sisPort as follows:

0. Although some data may have been collected on this species, these data have not been examined beyond simple time series plots or tabulations of catch.

1. Either:

   a time series of a (potentially imprecise) abundance index calculated as raw or standardized CPUE in commercial, recreational, or survey vessel data, or

   b onetime estimation of absolute abundance made on the basis of tagging results, a depletion study, or some form of calibrated survey.

2. Simple equilibrium models applied to life history information; for example, yield per recruit or spawner per recruit functions based on mortality, growth, and maturity schedules; catch curve analysis; survival analysis; or length-based cohort analysis.

3. Equilibrium and non-equilibrium production models aggregated both spatially and over age and size; for example, the Schaefer model and the Pella-Tomlinson model.

4. Size, stage, or age structured models such as cohort analysis and untuned and tuned VPA analyses, age-structured production models, CAGEAN, stock synthesis, size or age-structured Bayesian models, modified DeLury methods, and size or age-based mark-recapture models.

5. Assessment models incorporating ecosystem considerations and spatial and seasonal analyses in addition to Levels 3 or 4. Ecosystem considerations include one or more of the following:

   a one or more time-varying parameters, either estimated as constrained series, or driven by environmental variables,

   b multiple target species as state variables in the model, or

   c living components of the ecosystem other than the target species included as state variables in the model."

We expect our classification of "assessed" to align with levels 3–6 in the SIS database, and our classification of "unassessed" to align with levels 0–2. This is generally what we find, and the few discrepancies are described below. These comparisons can be followed in our final dataset provided (Tables B.1, B.2, B.3), which list for each stock in our dataset the corresponding stock from the SIS database. In summary, the comparison shows:

I) Of the 187 stocks in our final dataset with a year of first stock assessment assignment, 152 have a corresponding stock in the SIS database. Of these 152 overlapping stocks, 145 (95%) had an assessment level of 3 or greater assigned in the SIS database. The 7 stocks that we classified as assessed but that have an assessment level of 1 or 2 in the SIS database are as follows:

1. Silver hake - Gulf of Maine / Northern Georges Bank

2. Silver hake - Southern Georges Bank / Mid-Atlantic
3. Winter flounder - Gulf of Maine
4. Opalescent inshore squid - Pacific Coast
5. Longfin inshore squid - Georges Bank / Cape Hatteras
6. Northern shortfin squid - Northwestern Atlantic Coast
7. Red deepsea crab - Northwestern Atlantic

The reasons for these discrepancies can be attributed to a population model previously used in the stock assessment process to inform fisheries management, but currently assessments rely on simpler models (with lower assessment level categories in the SIS database). Specifically:

- 1–3: The silver hake and winter flounder stocks previously had age-structured Virtual Population Analysis assessment models used. More recently, the assessment models were not approved, so management currently relies on index-based models.
- 4–6: The squid stocks previously had population models used in assessments, but currently use index-based or simpler equilibrium models.
- 7: An older red deepsea crab stock assessment used a population model to estimate MSY, but more recent assessments rely on index-based methods for management.

II) Of the 28 stocks in our final dataset that were considered unassessed (with qualitative categories of "only relative indices", "minimal information", or "no published document"), 18 have a corresponding stock in the SIS database. Of these 18 overlapping stocks, 16 (89%) had an assessment level of 2 or less assigned in the SIS database. The 2 stocks that we classified as unassessed but that have an assessment level of 3 in the SIS database are as follows:

1. Shortraker rockfish - Gulf of Alaska
2. Yelloweye rockfish - Gulf of Alaska

Stock assessments for these two rockfish stocks are based on area-swept biomass estimates from surveys. To be consistent with other stocks in our analysis, for which assessments relying on relative index methods are considered unassessed, we consider these stocks as unassessed as well.

D Model fit

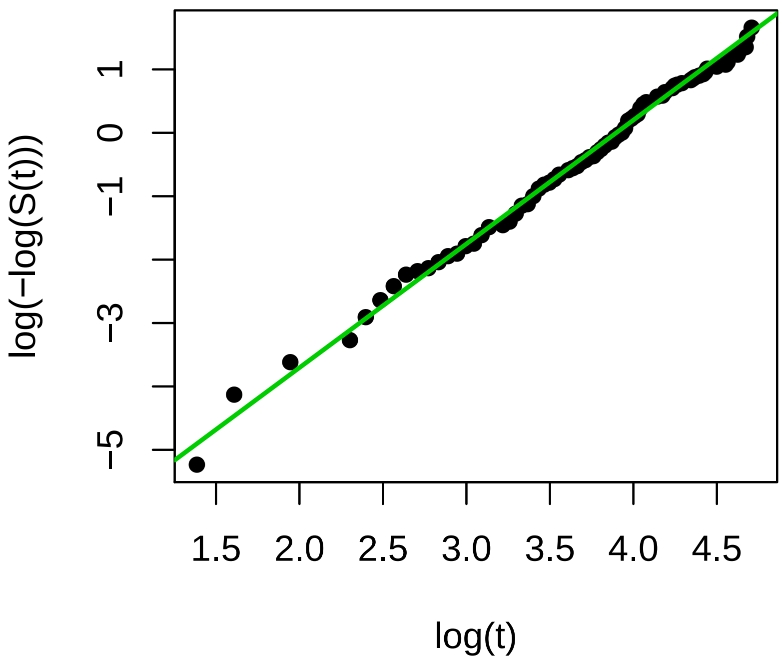

Figure D.1: Appropriateness of the Weibull event-time model for the time-to-assessment dataset. If the Weibull applies, the time from first landings (or from first quantitative stock assessments in 1960 if a stock was landed before 1960) to the year of first assessment should fall on a line with slope τ (the Weibull shape parameter) between $log(-log(\hat{S}(t)))$, where $\hat{S}(t)$ is the non-parametric Kaplan-Meyer estimate of survival at time t, and the log of t. Here, τ evaluates to 1.95 (slope of the green line), suggesting an increasing assessment rate with increasing time t.

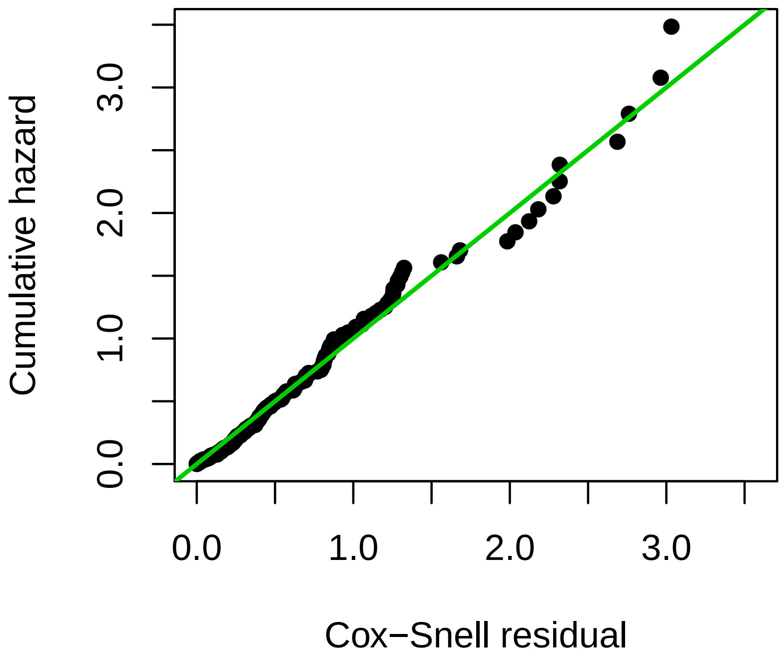

Figure D.2: Model fit of the Weibull survival model, based on Cox-Snell residuals calculated at the posterior mean of the linear predictor. For a perfect fit all data points would lie on the y=x (green) line.

E Model estimates and predictions

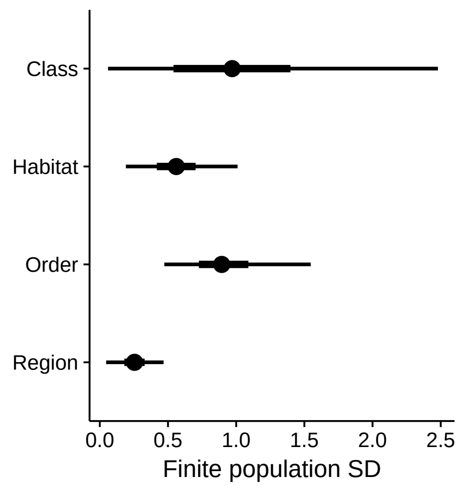

Figure E.3: Comparison of finite population standard deviation (i.e., variance attributed to each variable) for random effects in the Weibull survival model. Circles show posterior medians, thick bars show inter-quartile ranges of the posteriors, and thin lines show 95% confidence intervals.

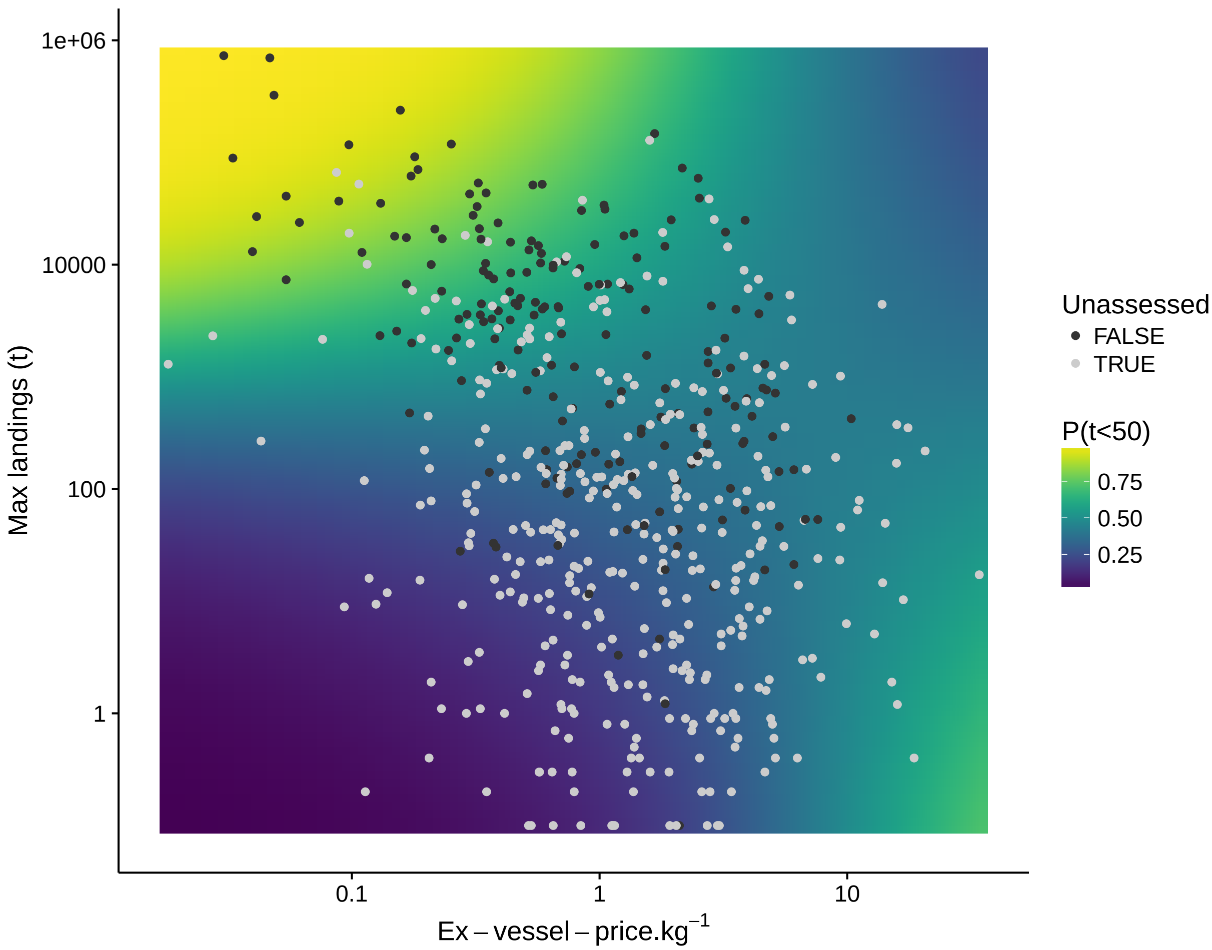

Figure E.4: Marginal probability of a stock being assessed after 50 years as a function of mean Ex-vessel price (US$·kg^{-1}) and and maximum landings prior to assessment. Marginal probabilities were evaluated at the mean of remaining continuous covariates. The dataset used for analysis is over-layed with assessed stocks as dark grey points and unassessed stocks in light grey.

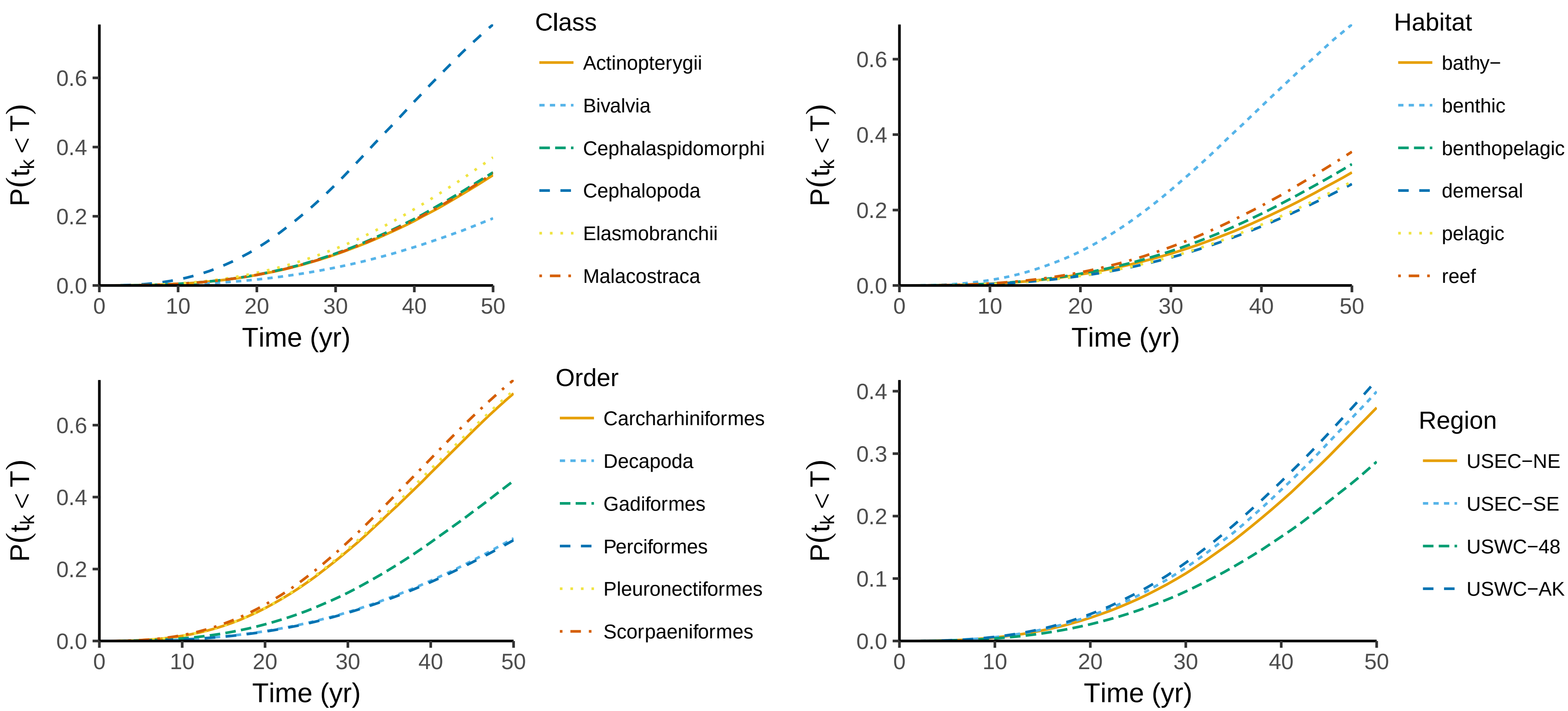

Figure E.5: Marginal probability of a stock in category k being assessed as a function of time ($P(T_k \leq t) = F_k(t) = \exp(-\lambda_k t^\tau)$), for stocks of various taxonomic orders, class, regions and habitats. For taxonomic variables, only the eight levels with the most stocks represented in our dataset are shown. Marginal probabilities were evaluated at the mean of (centered) continuous covariates.

Table E.4: Posterior means of model parameters under interpretations of ratio of rates (θ) or time-to-assessment (ν), and probability $P(\theta > 1)$ that increasing parameter values or stocks in a given category have an increased likelihood of assessment compared to the baseline. Under the ratio of rates interpretation, the rate effect θ represents rates at which stocks with different characteristics are assessed relative to a baseline of 1. Under the time-to-assessment interpretation, the time effect is a multiplicative acceleration factor, i.e., $\nu = 0.5$ suggests a stock with these characteristics is assessed twice as fast as the average stock.

Effect	Category	Rate effect (θ)	Time effect (ν)	$P(\theta > 1)$
Region	USEC-NE	1.05	0.98	0.60
Region	USEC-SE	1.09	0.97	0.65
Region	USWC-48	0.72	1.12	0.09
Region	USWC-AK	1.10	0.97	0.67
Habitat	Bathy-	0.85	1.06	0.32
Habitat	Benthic	2.38	0.74	0.98
Habitat	Benthopelagic	1.08	0.97	0.59
Habitat	Demersal	0.75	1.11	0.16
Habitat	Pelagic	0.60	1.20	0.09
Habitat	Reef	0.98	1.01	0.47
Class	Actinopterygii	0.81	1.08	0.34
Class	Bivalvia	0.57	1.22	0.20
Class	Branchiopoda	0.92	1.03	0.45
Class	Cephalaspidomorphi	0.97	1.01	0.48
Class	Cephalopoda	3.67	0.63	0.91
Class	Echinoidea	4.48	0.59	0.90
Class	Elasmobranchii	0.71	1.13	0.28
Class	Gastropoda	0.96	1.01	0.48
Class	Holocephali	0.29	1.55	0.13
Class	Malacostraca	0.81	1.08	0.36
Class	Merostomata	1.00	1.00	0.50
Order	Acipenseriformes	0.99	1.00	0.49
Order	Anguilliformes	0.81	1.08	0.33
Order	Anostraca	0.98	1.01	0.49
Order	Arcoida	0.99	1.01	0.49
Order	Beloniformes	0.89	1.04	0.40
Order	Carcharhiniformes	1.55	0.86	0.86
Order	Chimaeriformes	0.79	1.09	0.33
Order	Clupeiformes	1.17	0.94	0.66
Order	Cypriniformes	1.00	1.00	0.50
Order	Cyprinodontiformes	0.97	1.01	0.47
Order	Decapoda	0.91	1.04	0.41
Order	Echinoida	1.38	0.89	0.73
Order	Elopiformes	0.83	1.07	0.35
Order	Gadiformes	0.93	1.03	0.40
Order	Lamniformes	0.88	1.05	0.39
Order	Lampriformes	1.00	1.00	0.50
Order	Lophiiformes	0.99	1.00	0.49
Order	Mugiliformes	0.88	1.05	0.39
Order	Myliobatiformes	0.99	1.01	0.48
Order	Myoida	1.40	0.89	0.75
Order	Mytiloida	0.89	1.04	0.41
Order	Neogastropoda	1.02	0.99	0.51
Order	Ophidiiformes	0.99	1.00	0.49

Continued on next page

Table E.4 – continued from previous page

Effect	Category	Rate effect (θ)	Time effect (ν)	$P(\theta > 1)$
Order	Orectolobiformes	0.99	1.00	0.49
Order	Osmeriformes	0.92	1.03	0.44
Order	Ostreoida	0.71	1.13	0.22
Order	Perciformes	0.72	1.12	0.13
Order	Petromyzontiformes	1.00	1.00	0.50
Order	Pleuronectiformes	1.67	0.83	0.96
Order	Pristiformes	1.00	1.00	0.50
Order	Rajiformes	0.95	1.02	0.45
Order	Scorpaeniformes	1.81	0.81	0.97
Order	Squaliformes	0.70	1.14	0.20
Order	Squatiniformes	0.97	1.01	0.48
Order	Tetraodontiformes	1.04	0.99	0.54
Order	Teuthida	1.36	0.90	0.71
Order	Veneroida	0.98	1.01	0.48
Order	Xiphosura	1.01	1.00	0.50
Order	Zeiformes	1.00	1.00	0.50
Num.	Maximum length	1.67	0.83	0.95
Num.	Mean ex-vessel price	3.43	0.65	0.99
Num.	Maximum landings	2.69	0.70	1.00
Num.	Interaction	0.20	1.78	0.00
Num.	FMP	4.90	0.57	1.00