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. Thorsen, NOAA Northwest Fisheries Science Center, Seattle
Michael C. Melnychuk, School of Aquatic and Fisheries Science,
University of Washington, Seattle

January 17, 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

Fisheries management requires estimating 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 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 600 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. However, we also find that after controlling for landings and price, there has been a consistent bias

towards assessing larger 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 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 fisheries management in the United States) 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 harvest rate with a target 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, depletion-corrected average catch ([18]) is used to estimate an annual fishing limit for many stocks, but is not used to estimate population abundance. DCAC and similar methods 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., [15]). 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 [17]). 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. The dearth of assessed species presumably 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 population stability (a characteristic of population size), rather than simply managing annual fishery removals, is possible only by estimating population abundance 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. Unassessed stocks may receive less attention from the public or fisheries managers when management changes are warranted.

2. Output from stock assessments has often been used in meta-analyses to understand ecological characteristics of marine fishes in general ([23, 30, 16]). 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., 13]), 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 seek to 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 with paired biological reference points. To do so, we combine two databases representing fished coastal marine species in the continental United States 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 with peer-reviewed stock assessments. For each stock landed in the continental United States and Alaska, whether caught in US federal or state jurisdictions, we record the year that it 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)?; (3) are there certain taxa (e.g., invertebrates or sharks) 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 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 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 fisheries management plans (FMPs). We note that NMFS only has jurisdiction over those stocks listed in federal FMPs, and that results would differ if we had chosen to restrict analysis to only those stocks in federal jurisdiction. We chose to analyze all landed stocks because we believe that consumers, scientists, and conservationists take interest in management performance across jurisdictions, rather than resticting their attention to the subset of federally managed stocks.

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 molluscs, crustaceans and echinoderms, but exclude corals, sponges, and other benthic invertebrates as these 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 NOAA landings database to define the set of landed stocks. This database provides annual landings for both assessed and unassessed stocks by species and state from 1950-2013. We aggregated state landings into four regions, defined as: Alaska (i.e., the Eastern Bering Sea, Gulf of Alaska, and Aleutian Islands); US West Coast (i.e., the federal 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 several manual exceptions, e.g., North Carolina landings of weakfish were aggregated with the Northeast weakfish ”stock”.

2.3 Labelling landed stocks as assessed or unassessed

Given the set of landed stocks in each of our US regions, we then determined which stocks had an existing stock assessment, and what was the year of first assessment for those assessed stocks. 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 recent years, assuming that stocks which qualified as assessed in a previous year continue to qualify as presently assessed. 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. Finally, any stock (e.g., a species landed in one of the four regions) for which a stock assessment was available in that same region was treated as ”assessed”, and any stock for which a stock assessment was not available was labelled as ”unassessed”.

2.4 Explanatory variables

Several variables were considered as explanatory factors affecting the year in which a stock was first assessed. 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. For unassessed stocks, the maximum annual landings throughout the time series and the ex-vessel price in the final year of the time series were used as values for these predictor variables. 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. We defined time-to-event (T) as the time between first recorded landings and a full stock assessment. The first stock assessment (as defined by our criteria above) occured 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. Thus $T = \min(Y_a - Y_l, Y_a - 1960)$, where Y_a and Y_l are the year of first assessment and first landings, respectively.

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 parmeters 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.

$$\begin{aligned} f(t) &= A(t) \times r(t) \qquad (2) \\ &= \exp(-\lambda t^{\tau}) \times \lambda \tau t^{\tau - 1}, \qquad (3) \end{aligned}$$

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 function of covariates and categorical random effects:

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

where β is a row-vector of regression coefficients, and X_i is a vector of continuous covariates. 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 to a standard deviation of 1 for the analysis. Categorical variables α, γ, κ, ω, and ζ_f were region, habitat, class, order, and family, respectively, 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.

All random effects were given half-Cauchy priors 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 populations in the United States (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 populations in Alaska, West Coast, and Southeast regions approximately doubled, while the number of landed populations 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, less than 30 populations in each of the four regions were assessed. As a proportion of all landed populations, 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 36% in Alaska. In terms of regional landings, the assessment of large stocks 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).

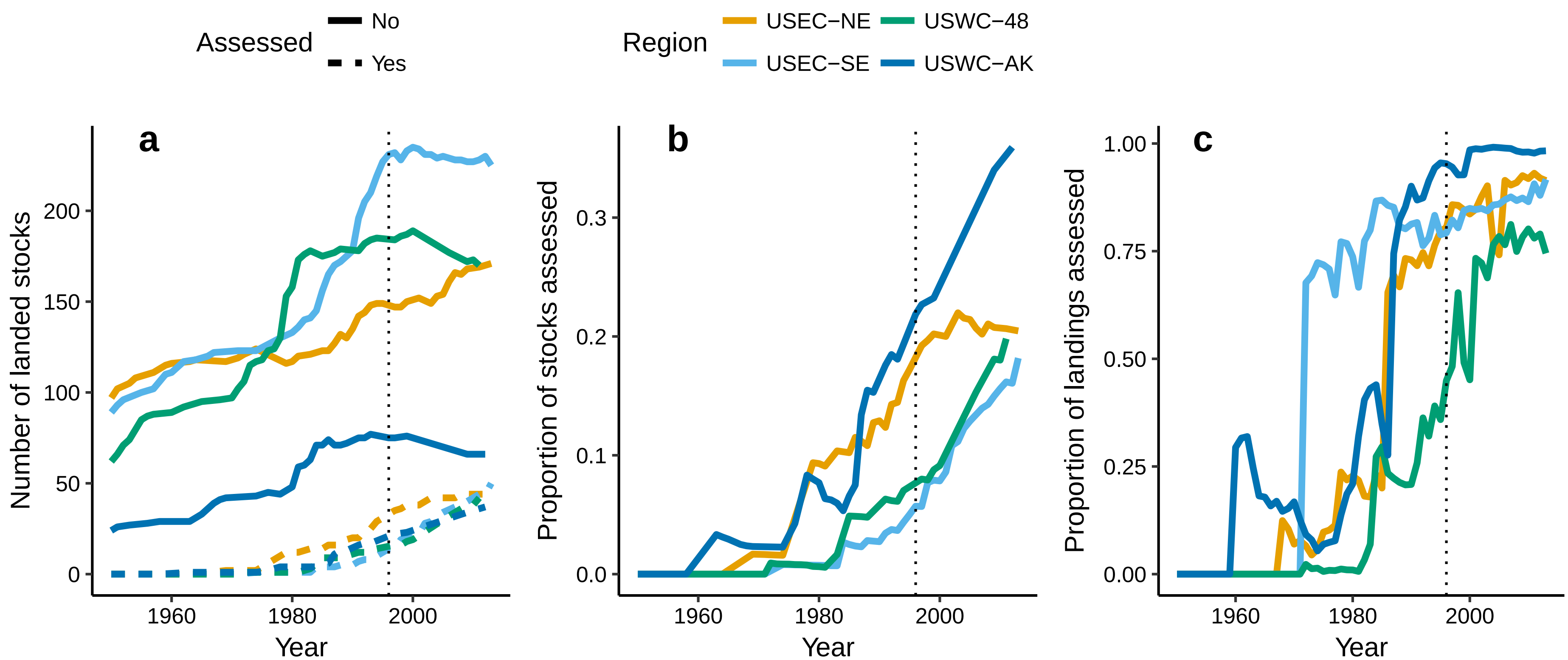

Figure 1: Timeline of a) the number of stocks landed by region and assessment status, b) proportion of landed stocks that are assessed, and c) the proportion of landed tonnage derived from assessed stocks. The dotted vertical line marks the enactment of the Sustainable Fisheries Act of 1996.

The majority of landed populations 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.

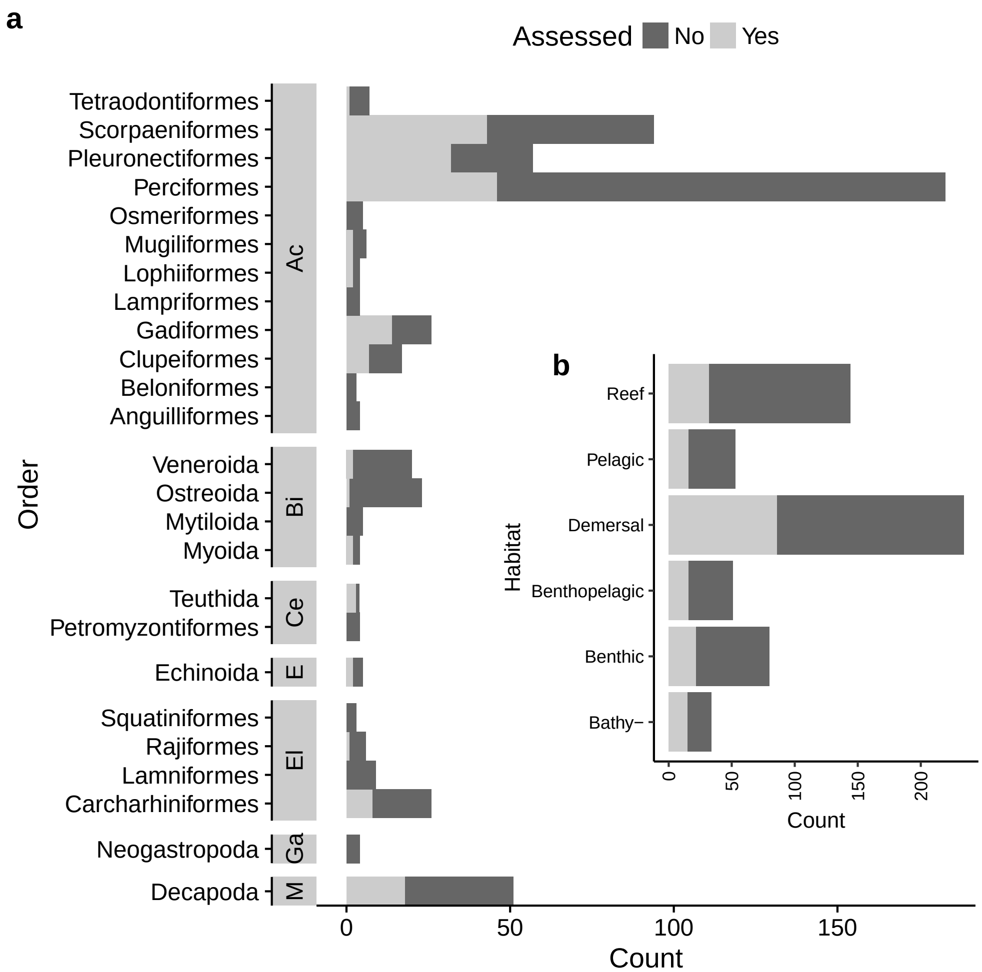

Figure 2: Assessment status at time of last known status (censoring time) a) by taxonomic order and sorted by class and b) by habitat type. In a), classes are abbreviated as Ac: Actinopterygii, Bi: Bivalvia, M: Malacostraca, E: Echinoidea, El: Elasmobranchii, Ce: Cephalaspidomorphi, Ga: Gastropoda, and 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 vice-versa, 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 species have been preferentially assessed.

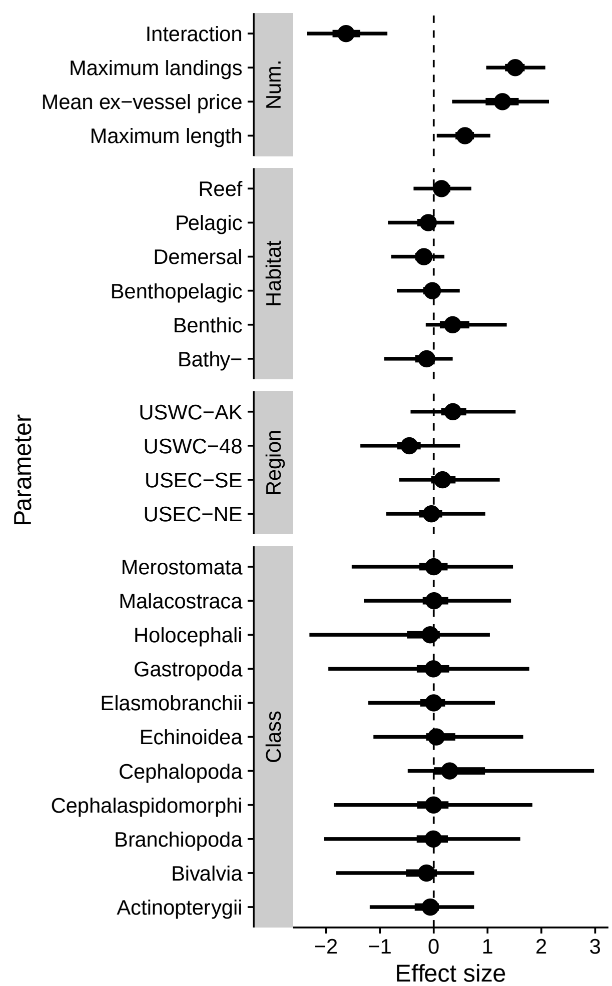

Figure 3: Summaries of estimated posterior distributions for numeric (Num.) covariates in the model, regional random effects, habitat random effects, and taxonomic class random effects. Circles show posterior medians, thick bars show inter-quartile ranges of the posteriors, and thin lines show 95% confidence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

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.4, 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: 2.72) 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 un-assessed stocks, and were calcualted 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 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 United States 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 limits. Thus, NMFS and other agencies both measure and manage annual harvest for the majority of US fishes. However, different methods are used for setting ACLs. Stock-reduction analyses

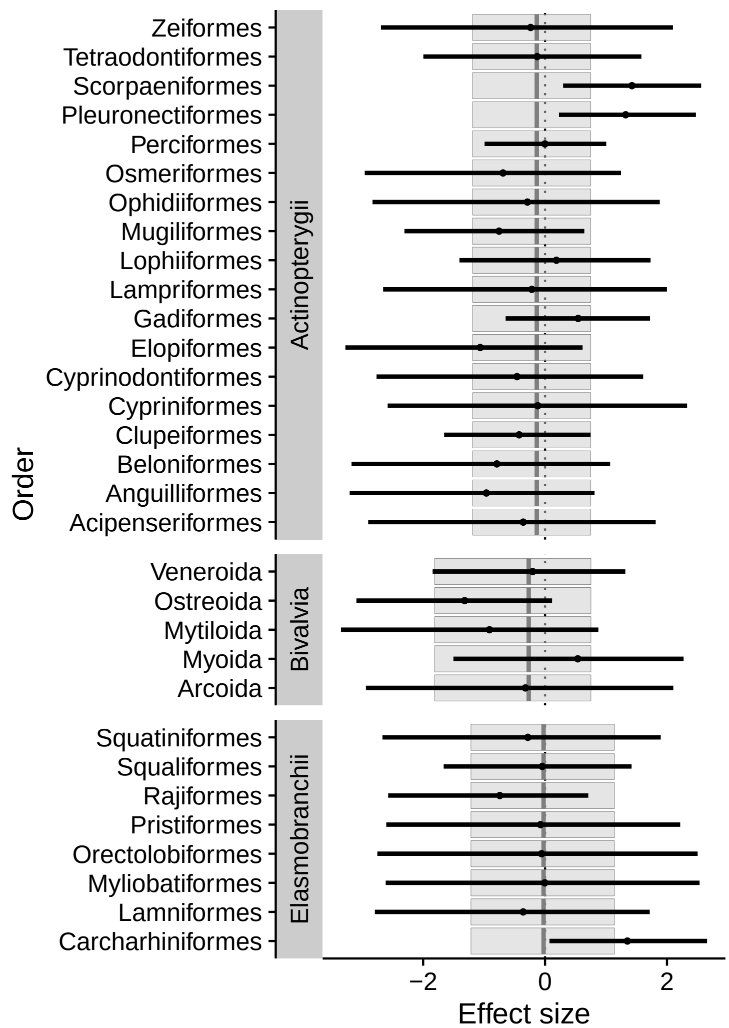

Figure 4: Summaries of estimated posterior distributions for random effects of orders within classes. For classes containing multiple nested orders in the dataset, grey lines show posterior means and coloured boxes show 95% confidence intervals of class effects. Order effects are shown as relative to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

(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 formal stock-assessment model, 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 targets ([32]). Nevertheless, we have excluded SRAs and COMs from our definition of ”formal stock assessments”, since NMFS and other agencies are measuring population abundance only for those species that have a stock

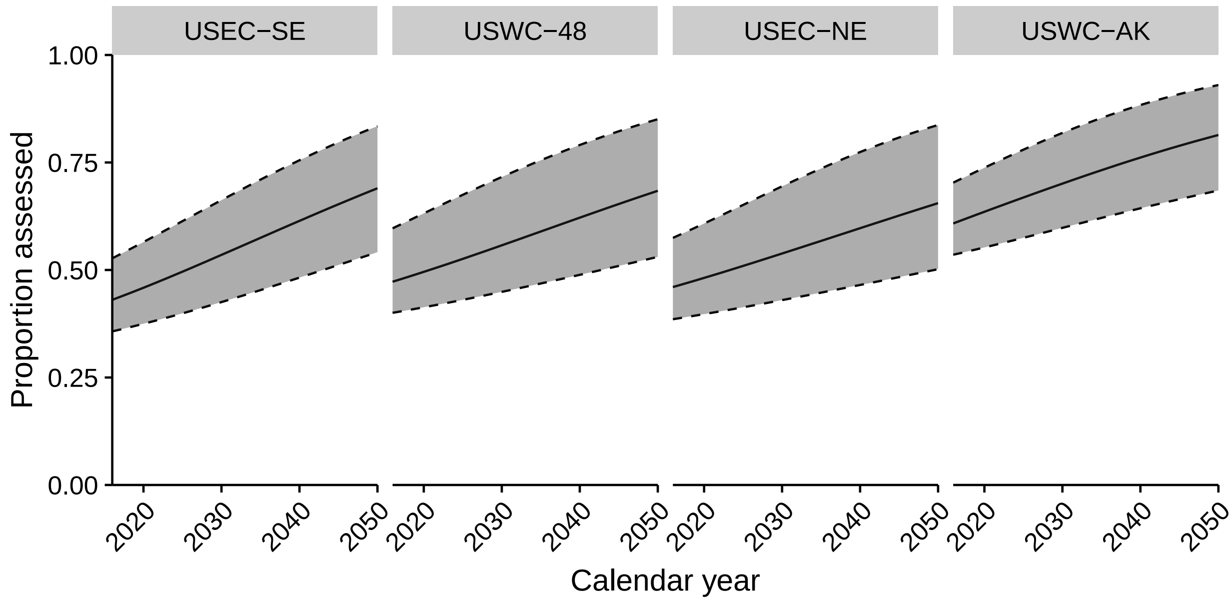

Figure 5: Projected proportion of stocks assessed by region and calendar year, based on assessment probabilities of stocks within each region over the projected year range.

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, formal 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 ([14, 19]).

2. The ability of formal 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, 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 formal stock assessments.

There are many differences in quality and complexity among formal 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 uassessed aligned with the SIS categories 0–2, while assessed 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 consisered. NMFS has already embarked upon the task of defining and compiling records of different assessment types and qualities (R. Methot, personal communication), 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]). However, we were unable to identify a variable proportional to recreational value that was consistently measured across all regions, so we cannot comment on the potential predictive power of economic value for recreational fishing.

Certain taxonomic classes, or orders within classes, stood out as being more likely to have undergone a formal 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 United States 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. Among bony fishes, flatfishes (Pleuronectiformes) and scorpaenfishes such as rockfishes and greenlings (Scorpaeniformes) 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 formal stock assessments, in the US most landed cephalopods are assessed (all are squid species). This may result from defined units of assesment having coastwide 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 un-assessed 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 United States 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. However, this pattern is likely not characteristic of most countries, in part because of political mandates in the United States to estimate harvest limits and accountability measures for all fished stocks ([21]). Most countries currently have a lower proportion of assessed stocks, and may still be within a period of rapid increase in the proportion of assessed stocks. It is not necessarily the case that formal 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 formal stock assessments. Further improvements in management performance given current resources could also perhaps 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 Rick Methot for helpful comments on the manuscript, and 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] 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.

[14] 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.

[15] 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).

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

[17] A. 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.

[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 formal 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 formal stock assessment is high compared to the proportion of stocks from the NOAA landings database that are formally 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 NOAA landings database: To ensure that we had not overlooked any U.S. marine stocks with a formal 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 "stock assessment" and "Latin name of species" 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 14 stock assessments meeting our criteria for a formal 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 14 stocks were added to our dataset along with their year of first assessment.

In total, after steps 1–3 we generated a list of 230 U.S. stocks, including 199 stocks with formal stock assessments that qualified under our defined criteria, and 31 which we classified as unassessed. (Later, when merging this dataset with the NOAA landings dataset, additional stocks were added to the unassessed category.) Of these 199 assessed and 31 unassessed stocks in our full dataset, 187 assessed and 28 unassessed stocks were used in our final dataset for analysis (Tables **??**,**??**; this number of unassessed stocks does not include the unassessed stocks added after merging with the NOAA landings database). The remaning 12 assessed and 3 unassessed stocks (Table **??**) were excluded from our final dataset for analysis because they either they did not have any recorded landings in the NOAA landings database, or the year of first assessment preceded the year in which landings data first began in the NOAA landings database.

B Dataset

Table B.1: Dataset used for time-to-event analysis. The assessment year is the year of first stock 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. SIS cat. is the SIS assessment database category.

Stock	Assessment year	Region	Habitat	Price (US\$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
USWC-48 STURGEON, GREEN		USWC-48	demersal	1.18	109.30	270.00	
USWC-48 STURGEON, WHITE		USWC-48	demersal	3.80	349.40	610.00	
USEC-NE EEL, AMERICAN		USEC-NE	demersal	21.44	1183.80	152.00	
USEC-SE EEL, AMERICAN		USEC-SE	demersal	6.92	586.10	152.00	
USEC-NE EEL, CONGER		USEC-NE	demersal	0.60	107.60	230.00	
USEC-SE EEL, CONGER		USEC-SE	demersal	1.17	6.10	230.00	
USEC-NE NEEDLEFISH, ATLANTIC		USEC-NE	reef	0.31	2.90	111.00	
USEC-NE HOUNDFISH		USEC-NE	reef	0.33	1.10	150.00	
USEC-SE BALLYHOO		USEC-SE	reef	1.44	625.40	55.00	
GoMex Gulf menhaden	1972	USEC-SE	pelagic	0.04	729919.60	35.00	
USEC Atlantic menhaden	1986	USEC-NE	pelagic	0.06	697362.10	50.00	
GeBank/GoMaine Atlantic herring TRAC	1968	USEC-NE	benthopelagic	0.05	89147.40	45.00	5
Alaska Kodiak herring	1978	USWC-AK	pelagic	0.72	7335.99	34.00	
Alaska Sitka herring	1976	USWC-AK	pelagic	0.15	26842.71	34.00	
Alaska Togiak herring	1978	USWC-AK	pelagic	0.13	40831.20	34.00	
USWC-48 HERRING, PACIFIC		USWC-48	pelagic	0.62	11784.40	34.00	
USEC-NE SHAD, GIZZARD		USEC-NE	pelagic	0.15	1389.70	57.00	
USEC-SE SHAD, GIZZARD		USEC-SE	pelagic	0.17	938.70	57.00	
USEC-NE HERRING, ATLANTIC THREAD		USEC-NE	reef	0.03	2321.10	38.00	
USEC-SE HERRING, ATLANTIC THREAD		USEC-SE	reef	0.38	10083.00	38.00	
USEC-SE SARDINE, SPANISH		USEC-SE	reef	0.46	2921.80	30.00	
USWC Pacific sardine	1996	USWC-48	pelagic	0.19	324105.00	39.50	4
USEC-SE HERRING, ROUND		USEC-SE	pelagic	1.92	0.90	33.00	
USWC-48 HERRING, ROUND		USWC-48	pelagic	0.18	78.30	33.00	
USEC-NE ANCHOVY, BAY		USEC-NE	pelagic	2.04	0.10	10.00	
USWC-48 ANCHOVY, NORTHERN		USWC-48	pelagic	0.39	52309.00	24.80	
USWC-48 SACRAMENTO BLACKFISH		USWC-48	benthopelagic	0.75	137.40	55.00	
USWC-48 SPLITTAIL		USWC-48	benthopelagic	0.62	2.40	44.00	
USEC-NE MUMMICHOG		USEC-NE	benthopelagic	187.19	2.10	15.00	
USEC-SE LADYFISH		USEC-SE	reef	0.41	2721.50	100.00	
USEC-NE TARPON		USEC-NE	reef	0.52	0.10	250.00	
BSAI Pacific cod	1987	USWC-AK	demersal	0.42	53463.25	119.00	4
GOA Pacific cod	1988	USWC-AK	demersal	1.08	32985.26	119.00	4

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
USWC Pacific cod	no published document	USWC-48	demersal	0.58	15995.40	119.00	
GeBank Atlantic cod TRAC	1977	USEC-NE	benthopelagic	0.30	3271.00	200.00	4
GoMaine Atlantic cod	1989	USEC-NE	benthopelagic	0.42	51321.40	200.00	4
GeBank haddock TRAC	1968	USEC-NE	demersal	0.18	70483.60	112.00	4
GoMaine haddock	1982	USEC-NE	demersal	0.48	4305.80	112.00	4
USWC-48 TOMCOD, PACIFIC		USWC-48	demersal	0.49	267.60	30.50	
USWC-AK TOMCOD, PACIFIC		USWC-AK	demersal	0.35	0.20	30.50	
USEC-NE TOMCOD, ATLANTIC		USEC-NE	demersal	0.74	1.10	38.10	
GeBank/GoMaine Atlantic pollock	1978	USEC-NE	demersal	0.16	17947.30	130.00	4
AI walleye pollock	2003	USWC-AK	benthopelagic	132.42	2003.21	91.00	4
EBS walleye pollock	1987	USWC-AK	benthopelagic	0.18	238409.34	91.00	4
GOA walleye pollock	1990	USWC-AK	benthopelagic	2.67	91572.83	91.00	4
USWC-48 POLLOCK, WALLEYE		USWC-48	benthopelagic	0.28	3911.50	91.00	
USEC-NE CUSK		USEC-NE	demersal	0.69	2363.00	120.00	
USEC-SE CUSK		USEC-SE	demersal	2.34	2.70	120.00	
USNE offshore hake	minimal information	USEC-NE	bathy-	1.34	118.60	40.60	1
nGeBank/GoMaine silver hake	1978	USEC-NE	demersal	0.16	23778.77	76.00	1
sGeBank/midAtl silver hake	1978	USEC-NE	demersal	0.14	36850.37	76.00	1
USWC/BC Pacific hake	1982	USWC-48	pelagic	0.06	13071.90	91.00	4
nGeBank/GoMaine red hake	only relative indices	USEC-NE	demersal	0.62	1705.70	66.00	1
sGeBank/midAtl red hake	only relative indices	USEC-NE	demersal	0.43	3040.40	66.00	1
USEC-NE HAKE, SOUTHERN		USEC-NE	demersal	0.64	0.30	35.00	
GeBank/GoMaine white hake	1995	USEC-NE	demersal	0.36	8443.70	133.00	4
USEC-SE HAKE, WHITE		USEC-SE	demersal	0.71	3.30	133.00	
USEC-NE OPAH		USEC-NE	bathy-	3.63	0.90	200.00	
USEC-SE OPAH		USEC-SE	bathy-	3.14	1.00	200.00	
USWC-48 OPAH		USWC-48	bathy-	1.91	0.30	200.00	
USEC-NE DEALFISH		USEC-NE	bathy-	1.10	41.40	300.00	
nGeBank/GoMaine monkfish	2002	USEC-NE	demersal	0.83	19093.80	120.00	4
sGeBank/midAtl monkfish	2002	USEC-NE	demersal	0.70	11515.90	120.00	4
USEC-SE GOOSEFISH		USEC-SE	demersal	0.34	6.20	120.00	
USEC-NE GOOSEFISH, BLACKFIN		USEC-NE	bathy-	3.40	0.20	60.00	
East Florida striped mullet	2005	USEC-SE	benthopelagic	0.56	3214.10	100.00	
USEC-NE MULLET, STRIPED (LIZA)		USEC-NE	benthopelagic	0.62	90.70	100.00	
USEC-SE MULLET, STRIPED (LIZA)		USEC-SE	benthopelagic	0.76	8473.70	100.00	
USWC-48 MULLET, STRIPED (LIZA)		USWC-48	benthopelagic	0.74	108.60	100.00	
West Florida striped mullet	2005	USEC-SE	benthopelagic	0.66	15873.90	100.00	
USEC-SE MULLET, WHITE		USEC-SE	reef	0.64	2685.20	90.00	

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
USEC-SE BROTULA, BEARDED		USEC-SE	reef	1.77	36.90	94.00	
USEC-SE AUSTRALIAN ROCKLING		USEC-SE	bathy-	1.87	3.40	200.00	
USWC-48 SMELT, WHITEBAIT		USWC-48	demersal	0.21	152.30	22.90	
USWC-AK CAPELIN		USWC-AK	pelagic	1.10	18.10	20.00	
USEC-NE SMELT, RAINBOW		USEC-NE	pelagic	0.90	162.80	35.60	
USWC-48 SMELT, EULACHON		USWC-48	pelagic	1.33	1771.70	34.00	
USWC-AK SMELT, EULACHON		USWC-AK	pelagic	0.49	156.10	34.00	
USEC-NE LAUNCE, AMERICAN SAND		USEC-NE	demersal	2.08	217.80	23.50	
USWC-48 LAUNCE, AMERICAN SAND		USWC-48	demersal	1.29	0.40	23.50	
USNE Atlantic wolffish	2008	USEC-NE	demersal	0.48	1205.00	150.00	4
USWC-48 WOLF-EEL		USWC-48	demersal	1.69	7.90	240.00	
USEC-SE POMPANO, AFRICAN		USEC-SE	reef	3.50	6.00	150.00	
USEC-NE RUNNER, BLUE		USEC-NE	reef	1.25	0.30	70.00	
USEC-SE RUNNER, BLUE		USEC-SE	reef	0.57	1156.40	70.00	
USEC-NE JACK, CREVALLE		USEC-NE	reef	1.11	7.20	124.00	
USEC-SE JACK, CREVALLE		USEC-SE	reef	0.52	2052.10	124.00	
USEC-SE JACK, HORSE-EYE		USEC-SE	reef	1.31	1.90	101.00	
USEC-SE JACK, BLACK		USEC-SE	benthopelagic	1.36	0.60	100.00	
USEC-SE JACK, BAR		USEC-SE	reef	1.96	41.80	59.00	
USEC-SE RUNNER, RAINBOW		USEC-SE	reef	1.50	1.80	180.00	
USEC-NE PILOTFISH		USEC-NE	reef	0.08	1.20	70.00	
USEC-SE SCAD, BIGEYE		USEC-SE	reef	11.35	180.60	70.00	
USEC-SE MOONFISH, ATLANTIC		USEC-SE	benthopelagic	1.47	29.20	60.00	
USEC-SE LOOKDOWN		USEC-SE	demersal	1.29	18.90	48.30	
GoMex greater amberjack	1995	USEC-SE	reef	1.99	784.90	190.00	4
sAtl greater amberjack	1999	USEC-SE	reef	1.83	438.00	190.00	4
USWC-48 YELLOWTAIL JACK		USWC-48	benthopelagic	1.44	4285.10	250.00	
USEC-SE JACK, ALMACO		USEC-SE	reef	1.92	125.20	160.00	
USEC-SE RUDDERFISH, BANDED		USEC-SE	benthopelagic	1.38	49.70	75.00	
East Florida pompano	2002	USEC-SE	benthopelagic	4.30	266.30	64.00	
USEC-NE POMPANO, FLORIDA		USEC-NE	benthopelagic	2.19	2.00	64.00	
USEC-SE POMPANO, FLORIDA		USEC-SE	benthopelagic	2.91	69.60	64.00	
USWC-48 POMPANO, FLORIDA		USWC-48	benthopelagic	0.81	122.20	64.00	
West Florida pompano	2002	USEC-SE	benthopelagic	3.90	546.40	64.00	
USEC-SE PERMIT		USEC-SE	reef	1.48	97.00	122.00	
USEC-NE SCAD, ROUGH		USEC-NE	reef	0.66	0.70	40.00	
USWC-48 JACK MACKEREL		USWC-48	pelagic	0.14	66461.80	81.00	
USEC-NE BASS, ROCK		USEC-NE	demersal	0.48	11.30	43.00	

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
USEC-SE BLACK DRIFTFISH		USEC-SE	pelagic	2.94	14.10	60.00	
USEC-NE BARRELFISH		USEC-NE	pelagic	3.01	0.20	91.00	
USEC-SE BARRELFISH		USEC-SE	pelagic	3.69	15.30	91.00	
USEC-NE DOLPHINFISH		USEC-NE	pelagic	3.45	96.30	210.00	
USEC-SE DOLPHINFISH		USEC-SE	pelagic	1.75	1062.30	210.00	
USWC-48 DOLPHINFISH		USWC-48	pelagic	2.35	43.00	210.00	
USEC-NE ESCOLAR		USEC-NE	benthopelagic	2.81	4.00	200.00	
USEC-SE ESCOLAR		USEC-SE	benthopelagic	2.44	101.30	200.00	
USEC-SE OILFISH		USEC-SE	benthopelagic	2.21	84.60	300.00	
USWC-48 MUDSUCKER, LONGJAW		USWC-48	demersal	4.18	5.50	21.00	
USEC-SE MARGATE		USEC-SE	reef	1.67	23.60	79.00	
USEC-SE GRUNT, TOMTATE		USEC-SE	reef	0.73	0.20	25.00	
USEC-SE GRUNT, WHITE		USEC-SE	reef	2.16	18.80	53.00	
USEC-NE PIGFISH		USEC-NE	demersal	0.43	15.40	46.00	
USEC-SE PIGFISH		USEC-SE	demersal	1.40	187.40	46.00	
USWC-48 OPALEYE		USWC-48	benthopelagic	0.51	10.70	66.00	
USWC-48 HALFMOON		USWC-48	demersal	0.61	22.50	48.00	
East Florida hogfish	2013	USEC-SE	reef	2.98	13.40	91.00	4
Northern sAtl hogfish	2013	USEC-SE	reef	4.13	19.00	91.00	4
USEC-NE HOGFISH		USEC-NE	reef	0.40	0.40	91.00	
West Florida hogfish	2013	USEC-SE	reef	2.45	53.00	91.00	4
USWC California sheephead	2004	USWC-48	reef	2.27	143.10	91.00	
USEC tautog	1996	USEC-NE	reef	0.44	524.80	91.00	
USEC-NE CUNNER		USEC-NE	reef	1.58	12.50	38.00	
USEC-SE TRIPLETAIL		USEC-SE	benthopelagic	1.30	21.80	110.00	
USEC-SE SNAPPER, BLACK		USEC-SE	reef	3.31	20.80	65.00	
USEC-SE SNAPPER, QUEEN		USEC-SE	bathy-	4.48	30.90	100.00	
USSE mutton snapper	2008	USEC-SE	reef	2.63	251.40	94.00	4
USEC-SE SNAPPER, SCHOOLMASTER		USEC-SE	reef	2.99	0.10	67.20	
USEC-SE SNAPPER, BLACKFIN		USEC-SE	reef	4.06	6.90	75.00	
GoMex red snapper	1988	USEC-SE	reef	1.56	6072.30	100.00	4
sAtl red snapper	1998	USEC-SE	reef	3.00	473.00	100.00	4
USEC-NE SNAPPER, RED		USEC-NE	reef	2.13	0.20	100.00	
USEC-SE SNAPPER, CUBERA		USEC-SE	reef	3.09	5.10	160.00	
USEC-SE SNAPPER, GRAY		USEC-SE	reef	2.27	460.40	89.00	
USEC-NE SNAPPER, DOG		USEC-NE	reef	2.72	0.10	128.00	
USEC-SE SNAPPER, DOG		USEC-SE	reef	2.52	2.00	128.00	
USEC-SE SNAPPER, MAHOGANY		USEC-SE	reef	4.70	0.50	48.00	

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
USEC-SE SNAPPER CARIBBEAN RED		USEC-SE	demersal	3.15	0.40	100.00	
USEC-SE SNAPPER, LANE		USEC-SE	reef	2.73	69.20	60.00	
USEC-SE SNAPPER, SILK		USEC-SE	reef	4.70	147.00	83.00	
USSE yellowtail snapper	2003	USEC-SE	reef	2.35	1079.00	86.30	4
USEC-SE WENCHMAN		USEC-SE	demersal	2.27	19.40	56.00	
GoMex vermilion snapper	1998	USEC-SE	demersal	1.93	1199.60	60.00	4
sAtl vermilion snapper	1998	USEC-SE	demersal	2.41	639.60	60.00	4
USEC-SE TILEFISH, GOLDFACE		USEC-SE	demersal	3.04	41.00	60.00	
USEC-SE TILEFISH, BLACKLINE		USEC-SE	demersal	1.91	1.40	60.00	
sAtl blueline tilefish	2013	USEC-SE	demersal	2.67	217.30	90.00	4
USEC-SE TILEFISH, BLUELINE		USEC-SE	demersal	2.02	98.20	90.00	
USWC-48 WHITEFISH, OCEAN		USWC-48	reef	0.39	9.30	102.00	
USWC-AK WHITEFISH, OCEAN		USWC-AK	reef	0.54	43.30	102.00	
GoMex golden tilefish	2011	USEC-SE	demersal	1.83	487.40	125.00	4
sAtl golden tilefish	2004	USEC-SE	demersal	2.08	1682.70	125.00	4
USNE golden tilefish	1993	USEC-NE	demersal	1.00	3967.60	125.00	4
USEC-NE TILEFISH, SAND		USEC-NE	reef	4.65	0.30	70.00	
USEC-SE TILEFISH, SAND		USEC-SE	reef	1.66	2.50	70.00	
USEC striped bass	1997	USEC-NE	demersal	1.70	6686.30	200.00	
USWC-48 BASS, STRIPED		USWC-48	demersal	0.29	31.20	200.00	
USEC-NE WRECKFISH		USEC-NE	demersal	5.44	0.60	210.00	
USEC-SE WRECKFISH		USEC-SE	demersal	4.00	1729.10	210.00	
USWC-48 SEA BASS, GIANT		USWC-48	demersal	2.32	202.40	250.00	
USWC-48 BLACKSMITH		USWC-48	reef	0.11	16.00	25.00	
USEC bluefish	1994	USEC-NE	pelagic	0.38	7466.10	130.00	4
USEC-SE BLUEFISH		USEC-SE	pelagic	0.48	703.60	130.00	
USEC-SE BIGEYE		USEC-SE	reef	1.83	4.10	50.00	
GoMex cobia	2001	USEC-SE	reef	1.20	166.60	200.00	4
sAtl cobia	2013	USEC-SE	reef	1.67	30.60	200.00	4
USEC-NE COBIA		USEC-NE	reef	3.07	0.40	200.00	
USWC California white seabass	2016	USWC-48	demersal	2.85	1552.80	166.00	
USEC-SE SEATROUT, SAND		USEC-SE	demersal	0.85	1176.10	63.50	
Mississippi spotted sea trout	2016	USEC-SE	demersal	2.29	571.40	100.00	
USEC-NE SEATROUT, SPOTTED		USEC-NE	demersal	1.65	89.20	100.00	
USEC-SE SEATROUT, SPOTTED		USEC-SE	demersal	2.00	3802.80	100.00	
USEC weakfish	1991	USEC-NE	demersal	0.60	16312.40	98.00	
USWC-48 CROAKER, PACIFIC WHITE		USWC-48	benthopelagic	0.92	1484.80	41.00	
USEC-NE SPOT		USEC-NE	demersal	0.71	3069.20	36.00	

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
USEC-SE SPOT		USEC-SE	demersal	0.56	4923.80	36.00	
USEC-NE KINGFISH, NORTHERN		USEC-NE	demersal	1.58	0.30	46.00	
USEC Atlantic croaker	2003	USEC-NE	demersal	0.57	13532.10	55.00	
USEC-SE CROAKER, ATLANTIC		USEC-SE	demersal	1.97	18265.70	55.00	
USEC-NE DRUM, BLACK		USEC-NE	demersal	0.66	219.80	170.00	
USEC-SE DRUM, BLACK		USEC-SE	demersal	0.71	4877.20	170.00	
USEC-NE DRUM, RED		USEC-NE	demersal	1.21	2.30	155.00	
USEC-SE DRUM, RED		USEC-SE	demersal	1.68	6408.00	155.00	
USNE midAtl red drum	2009	USEC-NE	demersal	0.96	175.20	155.00	
USSE sAtl red drum	2009	USEC-SE	demersal	1.28	125.00	155.00	
USWC-48 QUEENFISH		USWC-48	demersal	0.80	47.30	30.00	
USEC-NE WAHOO		USEC-NE	pelagic	4.19	8.90	250.00	
USEC-SE WAHOO		USEC-SE	pelagic	3.06	163.20	250.00	
USWC-48 WAHOO		USWC-48	pelagic	0.77	14.60	250.00	
USEC-NE MACKEREL, FRIGATE		USEC-NE	pelagic	0.55	74.80	65.00	
USEC-NE MACKEREL, CHUB		USEC-NE	pelagic	0.39	1984.20	64.00	
USEC-SE MACKEREL, CHUB		USEC-SE	pelagic	1.03	121.60	64.00	
USWC Pacific mackerel	2004	USWC-48	pelagic	0.16	35256.50	64.00	4
GoMex Spanish mackerel	1996	USEC-SE	pelagic	0.44	3880.20	91.00	4
sAtl Spanish mackerel	1996	USEC-SE	pelagic	0.67	5015.30	91.00	4
USWC-48 PACIFIC SIERRA		USWC-48	pelagic	0.19	1.90	99.00	
USNE Atlantic mackerel TRAC	1977	USEC-NE	pelagic	0.29	10021.30	60.00	4
USEC-SE SEA BASS, BANK		USEC-SE	demersal	1.99	1.30	30.00	
USEC-SE SEA BASS, ROCK		USEC-SE	reef	1.42	26.30	30.00	
sAtl black sea bass	1995	USEC-SE	reef	1.18	740.23	66.00	4
USEC-SE SEA BASS, BLACK		USEC-SE	reef	1.07	292.30	66.00	
USNE black sea bass	1994	USEC-NE	reef	1.44	9899.40	66.00	4
USEC-SE GRAYSBY		USEC-SE	reef	5.62	8.20	42.60	
USEC-NE SAND PERCH		USEC-NE	reef	0.41	11.90	30.00	
USEC-SE SAND PERCH		USEC-SE	reef	0.93	127.20	30.00	
USWC-48 SAND PERCH		USWC-48	reef	0.62	137.40	30.00	
USEC-SE HIND, ROCK		USEC-SE	demersal	4.51	13.90	61.00	
USWC-48 SPOTTED CABRILLA		USWC-48	reef	0.33	260.50	114.00	
USEC-SE HIND, SPECKLED		USEC-SE	demersal	4.01	47.40	110.00	
GoMex yellowedge grouper	2011	USEC-SE	demersal	5.02	716.40	115.00	4
USEC-SE CONEY		USEC-SE	reef	1.68	12.10	41.00	
USEC-SE HIND, RED		USEC-SE	reef	4.18	34.60	76.00	
USEC-SE GROUPER, MARBLED		USEC-SE	reef	3.78	19.70	91.00	

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
USEC-SE GROUPER, GOLIATH		USEC-SE	reef	0.64	128.90	250.00	
GoMex red grouper	1991	USEC-SE	reef	3.43	4001.50	125.00	5
sAtl red grouper	2010	USEC-SE	reef	4.31	293.00	125.00	4
USEC-SE GROUPER, MISTY		USEC-SE	bathy-	4.73	2.00	160.00	
USEC-SE GROUPER, WARSAW		USEC-SE	demersal	2.09	162.60	230.00	
sAtl snowy grouper	2004	USEC-SE	demersal	3.79	254.60	122.00	4
USEC-NE GROUPER, SNOWY		USEC-NE	demersal	4.89	0.80	122.00	
USEC-SE GROUPER, SNOWY		USEC-SE	demersal	4.66	128.50	122.00	
USEC-SE GROUPER, NASSAU		USEC-SE	reef	3.70	7.00	122.00	
USEC-SE BASS, LONGTAIL		USEC-SE	demersal	2.65	0.80	50.00	
USSE black grouper	2010	USEC-SE	reef	4.83	763.30	150.00	4
USEC-SE GROUPER, YELLOWMOUTH		USEC-SE	reef	5.48	0.40	84.00	
GoMex gag grouper	1994	USEC-SE	reef	4.13	793.80	145.00	5
sAtl gag grouper	1994	USEC-SE	reef	3.74	445.10	145.00	4
USEC-SE SCAMP		USEC-SE	reef	5.11	356.40	107.00	
USEC-SE GROUPER, YELLOWFIN		USEC-SE	reef	5.39	195.90	100.00	
USEC-SE CREOLE-FISH		USEC-SE	reef	2.73	2.40	30.00	
USEC-NE SHEEPSHEAD		USEC-NE	reef	0.77	12.30	91.00	
USEC-SE SHEEPSHEAD		USEC-SE	reef	0.66	2280.20	91.00	
USEC-SE PORGY, JOLTHEAD		USEC-SE	reef	2.12	9.70	76.00	
USEC-SE PORGY, WHITEBONE		USEC-SE	demersal	1.79	5.00	46.00	
USEC-SE PORGY, KNOBBED		USEC-SE	reef	1.66	39.70	54.40	
USEC-SE PINFISH, SPOTTAIL		USEC-SE	demersal	1.04	18.40	46.00	
USEC-SE PINFISH		USEC-SE	demersal	3.70	464.10	40.00	
sAtl red porgy	1992	USEC-SE	benthopelagic	2.40	349.90	91.00	4
USEC-NE PORGY, RED		USEC-NE	benthopelagic	1.60	8.70	91.00	
USEC-SE PORGY, RED		USEC-SE	benthopelagic	2.24	176.40	91.00	
USEC-SE PORGY, LONGSPINE		USEC-SE	demersal	2.58	0.20	30.00	
USNE scup	1995	USEC-NE	demersal	1.07	166.50	46.00	4
USWC-48 PRICKLEBACK, MONKEYFACE		USWC-48	demersal	6.02	0.40	76.00	
USEC-NE HARVESTFISH		USEC-NE	benthopelagic	1.29	244.10	30.00	
USEC-SE HARVESTFISH		USEC-SE	benthopelagic	0.99	332.60	30.00	
USWC-48 POMPANO, PACIFIC		USWC-48	benthopelagic	0.85	83.30	28.00	
USNE butterfish	1983	USEC-NE	benthopelagic	0.36	8956.30	30.00	5
USEC-SE CUTLASSFISH, ATLANTIC		USEC-SE	benthopelagic	1.98	375.10	234.00	
USEC-NE STARGAZER, NOTHERN		USEC-NE	demersal	0.79	0.30	59.00	
USEC-NE POUT, OCEAN		USEC-NE	demersal	0.93	0.90	110.00	
USNE ocean pout	only relative indices	USEC-NE	demersal	0.36	2194.60	110.00	1

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
USEC-NE HOGCHOKER		USEC-NE	demersal	0.12	8.90	20.00	
USWC-48 SOLE, ROCK		USWC-48	demersal	0.85	244.00	30.00	
Pacific sanddab - Pacific Coast	2013	USWC-48	demersal	0.56	1269.40	41.00	4
USWC-48 HALIBUT, CALIFORNIA		USWC-48	demersal	3.75	606.70	152.00	
USEC-SE FLOUNDER, SUMMER		USEC-SE	demersal	4.35	12.80	94.00	
USNE summer flounder	1990	USEC-NE	demersal	1.11	18077.60	94.00	4
North Carolina southern flounder	2009	USEC-SE	demersal	3.10	2213.00	83.00	
USEC-NE FLOUNDER, SOUTHERN		USEC-NE	demersal	4.67	0.70	83.00	
USEC-SE FLOUNDER, SOUTHERN		USEC-SE	demersal	2.32	85.20	83.00	
USEC-NE FLOUNDER, FOURSPOT		USEC-NE	demersal	0.92	13.20	41.00	
USWC-48 SOLE, FANTAIL		USWC-48	demersal	1.59	1.70	63.50	
BSAI arrowtooth flounder	1988	USWC-AK	demersal	0.97	476.38	84.00	5
GOA arrowtooth flounder	1996	USWC-AK	demersal	0.61	2329.61	84.00	4
USWC arrowtooth flounder	2007	USWC-48	demersal	0.19	5804.50	84.00	4
USWC-AK SOLE, PETRALE		USWC-AK	demersal	1.06	116.00	53.00	
USWC petrale sole	1984	USWC-48	demersal	0.53	4209.00	53.00	4
GoMaine witch flounder	1994	USEC-NE	demersal	0.82	6652.80	60.00	4
GOA rex sole	2004	USWC-AK	demersal	0.34	5740.80	60.00	4
Rex sole - Pacific Coast	2013	USWC-48	demersal	0.56	4620.10	60.00	3
BSAI flathead sole	1998	USWC-AK	demersal	0.30	17020.64	52.00	5
GOA flathead sole	2003	USWC-AK	demersal	1.46	2556.46	52.00	4
USWC-48 SOLE, FLATHEAD		USWC-48	demersal	0.71	35.50	52.00	
GeBank/GoMaine American plaice	1992	USEC-NE	demersal	0.73	15128.40	82.60	4
GeBank/GoMaine Atlantic halibut	2008	USEC-NE	demersal	3.58	242.70	470.00	3
USEC-NE HALIBUT, ATLANTIC		USEC-NE	demersal	3.44	4.70	470.00	
Pacific halibut (coastwide)	1960	USWC-AK	demersal	0.33	27498.50	258.00	4
USWC-48 HALIBUT, PACIFIC		USWC-48	demersal	2.08	109.80	258.00	
USWC-48 SOLE, BUTTER		USWC-48	demersal	0.72	43.60	55.00	
GOA southern rock sole	2012	USWC-AK	demersal	20.84	1266.51	58.00	4
BSAI northern rock sole	1992	USWC-AK	demersal	0.30	42707.79	69.00	4
GOA northern rock sole	2012	USWC-AK	demersal	9.70	2721.35	69.00	4
BSAI yellowfin sole	1987	USWC-AK	demersal	0.44	32.90	49.00	5
CCod/GoMaine yellowtail flounder	1999	USEC-NE	demersal	1.81	10733.67	64.00	4
GeBank yellowtail flounder TRAC	1989	USEC-NE	demersal	1.85	12602.07	64.00	4
sNEng/midAtl yellowtail flounder	1989	USEC-NE	demersal	0.99	14791.37	64.00	4
USEC-SE FLOUNDER, YELLOWTAIL		USEC-SE	demersal	0.93	17.20	64.00	
USWC-48 SOLE, DEEPSEA		USWC-48	bathy-	1.13	0.10	47.00	
GOA dover sole	2003	USWC-AK	demersal	0.26	2221.50	76.00	4

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
USWC dover sole	1984	USWC-48	demersal	0.24	20944.30	76.00	4
USWC-AK SOLE, ENGLISH		USWC-AK	demersal	0.30	40.20	49.00	
USWC English sole	1985	USWC-48	demersal	0.32	8082.40	49.00	3
USWC-AK FLOUNDER, STARRY		USWC-AK	demersal	0.36	877.10	91.00	
USWC starry flounder (northern)	2005	USWC-48	demersal	0.62	1096.50	91.00	4
USWC starry flounder (southern)	2005	USWC-48	demersal	1.11	212.60	91.00	4
BSAI Alaska plaice	1996	USWC-AK	demersal	0.21	21139.50	87.00	4
USWC-48 SOLE, C-O		USWC-48	demersal	0.29	1.00	36.00	
USWC-48 SOLE, CURLFIN		USWC-48	demersal	0.75	7.50	37.00	
USWC-48 TURBOT, HORNYHEAD		USWC-48	demersal	3.82	4.90	37.00	
USWC-48 SOLE, SAND		USWC-48	demersal	1.09	920.10	63.00	
USWC-AK SOLE, SAND		USWC-AK	demersal	0.65	4.50	63.00	
GeBank winter flounder	1999	USEC-NE	demersal	2.20	6715.54	64.00	4
GoMaine winter flounder	2003	USEC-NE	demersal	3.88	2380.19	64.00	1
sNEng/midAtl winter flounder	1996	USEC-NE	demersal	1.22	9244.87	64.00	4
BSAI Greenland halibut	1987	USWC-AK	benthopelagic	0.49	8544.10	80.00	4
USEC-NE HALIBUT, GREENLAND		USEC-NE	benthopelagic	2.21	10.60	80.00	
GeBank/GoMaine windowpane flounder	only relative indices	USEC-NE	demersal	1.34	1829.40	45.70	1
sNEng/midAtl windowpane flounder	only relative indices	USEC-NE	demersal	0.90	2377.10	45.70	1
Alaska sablefish	1987	USWC-AK	bathy-	0.57	33959.60	120.00	4
USWC sablefish	1984	USWC-48	bathy-	0.30	23554.80	120.00	4
USWC cabezon (nCal)	2003	USWC-48	demersal	2.44	148.57	99.00	4
USWC cabezon (OR)	2009	USWC-48	demersal	3.07	46.30	99.00	
USWC cabezon (sCal)	2003	USWC-48	demersal	17.05	21.23	99.00	4
USEC-NE LUMPFISH		USEC-NE	benthopelagic	0.46	3.50	61.00	
USEC-NE SEA RAVEN		USEC-NE	demersal	1.52	5.70	64.00	
USWC-48 GREENLING, KELP		USWC-48	demersal	7.56	23.30	61.00	
USWC kelp greenling (OR)	2005	USWC-48	demersal	5.71	53.50	61.00	4
USEC-SE LINGCOD		USEC-SE	demersal	0.31	124.40	152.00	
USWC-AK LINGCOD		USWC-AK	demersal	0.72	1096.00	152.00	
USWC lingcod (northern)	1994	USWC-48	demersal	0.35	3570.40	152.00	4
USWC lingcod (southern)	1999	USWC-48	demersal	0.51	1734.40	152.00	4
BSAI atka mackerel	1986	USWC-AK	demersal	0.43	30.38	56.50	4
GOA atka mackerel	only relative indices	USWC-AK	demersal	9.00	2586.21	56.50	1
USEC-SE SCORPIONFISH, SPINYCHEEK		USEC-SE	demersal	2.41	0.70	40.00	
USEC-SE LIONFISH		USEC-SE	reef	9.00	6.30	38.00	
USWC California scorpionfish (southern)	2005	USWC-48	demersal	3.48	1872.80	43.00	4
USEC-SE SCORPIONFISH, SPOTTED		USEC-SE	reef	3.46	1.00	45.00	

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
USEC-NE ROSEFISH, BLACKBELLY		USEC-NE	bathy-	1.51	0.80	47.00	
USEC-SE ROSEFISH, BLACKBELLY		USEC-SE	bathy-	2.39	66.90	47.00	
BSAI rougheye rockfish	2003	USWC-AK	bathy-	24.20	667.40	97.00	4
GOA rougheye rockfish	2005	USWC-AK	bathy-	9.01	1823.35	97.00	4
Rougheye Rockfish - Pacific Coast	2013	USWC-48	bathy-	0.63	50892.60	97.00	4
BSAI Pacific ocean perch	1985	USWC-AK	bathy-	0.49	925.02	53.00	4
GOA Pacific ocean perch	1990	USWC-AK	bathy-	0.85	2182.70	53.00	4
USWC Pacific ocean perch	1972	USWC-48	bathy-	0.11	12860.10	53.00	4
USWC-48 ROCKFISH, KELP		USWC-48	demersal	7.79	3.00	42.00	
Brown rockfish - Pacific Coast	2013	USWC-48	demersal	5.74	644.30	56.00	3
Aurora rockfish - Pacific Coast	2013	USWC-48	bathy-	2.87	4.60	41.00	4
USWC-48 ROCKFISH, REDBANDED		USWC-48	demersal	2.32	4.60	64.00	
USWC-AK ROCKFISH, REDBANDED		USWC-AK	demersal	0.63	43.50	64.00	
BSAI shortraker rockfish	2003	USWC-AK	bathy-	18.17	888.99	108.00	3
GOA shortraker rockfish	only relative indices	USWC-AK	bathy-	14.15	1251.95	108.00	3
USWC-AK ROCKFISH, SILVERGRAY		USWC-AK	demersal	0.65	23.30	71.00	
USWC gopher rockfish	2005	USWC-48	demersal	6.20	53.70	39.00	4
Copper rockfish - Pacific Coast	2013	USWC-48	demersal	4.75	64.80	58.00	3
USWC-AK ROCKFISH, COPPER		USWC-AK	demersal	0.59	2.70	58.00	
USWC greenspotted rockfish (northern)	2011	USWC-48	demersal	42.99	1.22	50.00	3
USWC greenspotted rockfish (southern)	2011	USWC-48	demersal	2.74	19.08	50.00	3
USWC-48 ROCKFISH, BLACK-AND-YELLOW		USWC-48	demersal	12.41	14.60	39.00	
USWC-48 ROCKFISH, STARRY		USWC-48	reef	4.82	15.30	46.00	
USWC-AK ROCKFISH, STARRY		USWC-AK	reef	0.20	446.50	46.00	
USWC-AK ROCKFISH, DARKBLOTCHED		USWC-AK	demersal	0.62	15.70	58.00	
USWC darkblotched rockfish	2000	USWC-48	demersal	0.72	11.60	58.00	4
USWC splitnose rockfish	2009	USWC-48	bathy-	0.83	111.20	46.00	4
USWC-AK ROCKFISH, GREENSTRIPED		USWC-AK	demersal	0.68	0.30	39.00	
USWC greenstriped rockfish	2009	USWC-48	demersal	1.34	3.30	39.00	4
USWC-48 ROCKFISH, SWORDSPINE		USWC-48	demersal	1.92	0.10	30.00	
USWC-AK ROCKFISH, WIDOW		USWC-AK	pelagic	0.56	9.80	60.00	
USWC widow rockfish	1983	USWC-48	pelagic	0.35	10276.00	60.00	4
GeBank/GoMaine Acadian redfish	1975	USEC-NE	demersal	0.10	117169.80	30.00	4
USEC-SE REDFISH, ACADIAN		USEC-SE	demersal	0.84	2.80	30.00	
USWC-AK ROCKFISH, YELLOWTAIL		USWC-AK	reef	0.66	24.80	66.00	
USWC yellowtail rockfish (northern)	1984	USWC-48	reef	0.65	219.50	66.00	3
USWC-48 ROCKFISH, BRONZESPOTTED		USWC-48	demersal	3.04	0.10	71.00	
USWC chilipepper (southern)	1985	USWC-48	demersal	0.69	31.40	56.00	4

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
USWC-48 ROCKFISH, SQUARESPOT		USWC-48	reef	4.19	0.60	29.00	
USWC-48 ROCKFISH, SHORTBELLY		USWC-48	demersal	0.57	15.50	32.00	
USWC shortbelly rockfish	2007	USWC-48	demersal	0.34	27.90	32.00	4
USWC cowcod	1999	USWC-48	bathy-	2.07	62.60	100.00	3
USWC-AK ROCKFISH, BLACK		USWC-AK	reef	0.69	517.50	63.00	
USWC black rockfish (Oregon)	2016	USWC-48	reef	2.66	197.40	63.00	4
USWC black rockfish (southern)	2003	USWC-48	reef	1.28	128.90	63.00	4
USWC blackgill rockfish	2005	USWC-48	bathy-	1.45	312.40	61.00	4
USWC-48 ROCKFISH, VERMILION		USWC-48	reef	3.14	26.40	91.00	
USWC-AK ROCKFISH, VERMILION		USWC-AK	reef	0.70	1.10	91.00	
USWC-48 ROCKFISH, BLUE		USWC-48	reef	2.24	6.20	61.00	
USWC-AK ROCKFISH, BLUE		USWC-AK	reef	0.65	0.10	61.00	
USWC blue rockfish	2007	USWC-48	reef	1.50	43.40	61.00	4
USWC-48 ROCKFISH, CHINA		USWC-48	reef	7.23	30.80	45.00	
USWC-AK ROCKFISH, CHINA		USWC-AK	reef	1.15	2.20	45.00	
USWC-48 ROCKFISH, SPECKLED		USWC-48	demersal	3.70	2.30	56.00	
USWC-AK ROCKFISH, BOCACCIO		USWC-AK	reef	0.59	50.10	91.00	
USWC bocaccio (southern)	1990	USWC-48	reef	0.56	4537.80	91.00	4
USWC-AK ROCKFISH, CANARY		USWC-AK	demersal	0.84	19.60	76.00	
USWC canary rockfish	1990	USWC-48	reef	1.08	47.20	76.00	4
BSAI northern rockfish	2003	USWC-AK	demersal	1.40	11512.13	41.00	4
GOA northern rockfish	2000	USWC-AK	demersal	1.13	13759.59	41.00	4
USWC-AK ROCKFISH, REDSTRIPE		USWC-AK	bathy-	0.63	22.50	61.00	
USWC-48 ROCKFISH, GRASS		USWC-48	demersal	13.05	49.50	56.00	
USWC-AK ROCKFISH, YELLOWMOUTH		USWC-AK	bathy-	0.80	0.60	58.00	
USWC-48 ROCKFISH, ROSY		USWC-48	demersal	3.17	3.90	36.00	
USWC-48 ROCKFISH, GREENBLOTCHED		USWC-48	demersal	3.91	0.90	48.00	
GOA yelloweye rockfish	only relative indices	USWC-AK	reef	1.36	992.70	104.00	3
USWC yelloweye rockfish	2001	USWC-48	reef	2.04	343.50	104.00	4
USWC-48 ROCKFISH, FLAG		USWC-48	demersal	4.83	0.90	51.00	
USWC-48 ROCKFISH, BANK		USWC-48	demersal	1.24	204.90	54.00	
USWC-48 ROCKFISH, OLIVE		USWC-48	reef	3.34	1.70	61.00	
USWC-48 ROCKFISH, TREEFISH		USWC-48	demersal	13.39	1.90	41.00	
USWC-48 ROCKFISH, PINKROSE		USWC-48	demersal	0.82	0.30	30.00	
GOA dusky rockfish	2003	USWC-AK	demersal	1.50	10750.70	43.08	4
USWC-AK ROCKFISH, SHARPCHIN		USWC-AK	bathy-	0.53	0.10	39.00	
USWC shortspine thornyhead	1990	USWC-48	bathy-	0.83	202.40	80.00	4
GoMex gray triggerfish	2001	USEC-SE	reef	1.81	43.80	60.00	4

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
USEC-NE TRIGGERFISH, GRAY		USEC-NE	reef	0.84	0.10	60.00	
USEC-SE TRIGGERFISH, GRAY		USEC-SE	reef	4.46	16.50	60.00	
USEC-SE TRIGGERFISH, QUEEN		USEC-SE	reef	3.25	1.70	60.00	
USEC-SE TRIGGERFISH, OCEAN		USEC-SE	reef	2.80	0.90	65.00	
USEC-NE PUFFER, NOTHERN		USEC-NE	demersal	1.40	5893.00	36.00	
USEC-SE PUFFER, NOTHERN		USEC-SE	demersal	0.61	222.10	36.00	
USEC-NE DORY, AMERICAN JOHN		USEC-NE	benthopelagic	1.35	136.90	80.00	
USEC-SE DORY, AMERICAN JOHN		USEC-SE	benthopelagic	1.15	1.80	80.00	
USEC-NE CLAM, ARC, BLOOD		USEC-NE	benthic	9.00	71.10	7.60	
USEC-SE CLAM, ARC, BLOOD		USEC-SE	benthic	12.86	5.10	7.60	
SE Alaska geoduck	1985	USWC-AK	benthic	2.10	0.10	17.50	
WA geoduck clam	1997	USWC-48	benthic	6.34	1294.30	17.50	
USEC-NE CLAM, SOFTSHELL		USEC-NE	benthic	6.29	6115.00	10.00	
USWC-48 CLAM, SOFTSHELL		USWC-48	benthic	2.60	416.40	10.00	
USWC-48 MUSSEL, CALIFORNIA		USWC-48	reef	6.23	52.50	25.50	
USEC-NE MUSSEL, BLUE		USEC-NE	reef	1.20	4801.30	11.00	
USEC-SE MUSSEL, BLUE		USEC-SE	reef	3.33	2.20	11.00	
USWC-48 MUSSEL, BLUE		USWC-48	reef	11.46	351.20	11.00	
USWC-AK MUSSEL, BLUE		USWC-AK	reef	18.01	76.00	11.00	
USWC-48 OYSTER, PACIFIC		USWC-48	reef	4.58	8914.00	45.00	
USWC-AK OYSTER, PACIFIC		USWC-AK	reef	6.30	45.60	45.00	
USWC-48 OYSTER, KUMAMOTO		USWC-48	benthic	55.05	85.70	8.00	
USEC-NE OYSTER, EASTERN		USEC-NE	reef	11.97	25264.80	30.00	
USEC-SE OYSTER, EASTERN		USEC-SE	reef	3.61	14413.20	30.00	
USWC-48 OYSTER, EASTERN		USWC-48	reef	10.93	169.80	30.00	
USEC-NE OYSTER, EUROPEAN FLAT		USEC-NE	reef	17.61	306.70	12.00	
USWC-48 OYSTER, EUROPEAN FLAT		USWC-48	reef	32.78	17.20	12.00	
USWC-48 OYSTER, OLYMPIA		USWC-48	benthic	41.72	65.00	8.00	
USWC-AK OYSTER, OLYMPIA		USWC-AK	benthic	2.22	0.90	8.00	
USEC-NE SCALLOP, CALICO		USEC-NE	benthic	18.61	0.40	5.20	
USEC-SE SCALLOP, CALICO		USEC-SE	benthic	2.02	19387.50	5.20	
USEC-NE SCALLOP, BAY		USEC-NE	benthic	17.01	1260.00	7.50	
USEC-SE SCALLOP, BAY		USEC-SE	benthic	4.17	354.40	7.50	
USEC-NE SCALLOP, ICELAND		USEC-NE	benthic	8.87	191.30	11.00	
Alaska scallop Bering Sea	only relative indices	USWC-AK	benthic	96.61	69.83	28.00	1
Alaska scallop Kodiak NE	only relative indices	USWC-AK	benthic	45.52	148.19	28.00	1
Alaska scallop Kodiak Shelikof	only relative indices	USWC-AK	benthic	25.75	261.92	28.00	1
Alaska scallop PWS	only relative indices	USWC-AK	benthic	91.01	74.12	28.00	1

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
Alaska scallop Yakutat Area D	only relative indices	USWC-AK	benthic	24.58	274.48	28.00	1
Alaska scallop Yakutat Dist 16	only relative indices	USWC-AK	benthic	241.22	27.96	28.00	1
GeBank/midAtl sea scallop	1978	USEC-NE	benthic	2.02	14587.30	20.00	4
USWC-AK SCALLOP, SEA		USWC-AK	benthic	20.24	218.30	20.00	
USEC ocean quahog	1978	USEC-NE	benthic	0.33	10348.80	12.70	4
USWC-48 COCKLE, NUTTALL		USWC-48	benthic	2.07	44.90	14.00	
USWC-AK COCKLE, NUTTALL		USWC-AK	benthic	0.56	33.20	14.00	
USWC-48 CLAM, MANILA		USWC-48	benthic	14.56	848.70	7.50	
USWC-48 CLAM, VARIABLE COQUINA		USWC-48	demersal	1.60	0.50	1.90	
USEC-NE CLAM, ARCTIC SURF (STIMPSON)		USEC-NE	benthic	1.97	137.50	14.00	
USEC-SE CLAM, ATLANTIC RANGIA		USEC-SE	benthic	0.67	39.00	5.00	
USEC Atlantic surfclam	1978	USEC-NE	benthic	0.39	43596.20	20.00	4
USEC-NE CLAM, ATLANTIC JACKKNIFE		USEC-NE	benthic	4.19	150.30	26.00	
USWC-AK CLAM, ATLANTIC JACKKNIFE		USWC-AK	benthic	1.39	139.40	26.00	
USWC-48 CLAM, CALIFORNIA JACKKNIFE		USWC-48	demersal	17.36	1.20	13.00	
USWC-48 CLAM, PACIFIC RAZOR		USWC-48	benthic	6.01	212.80	18.00	
USWC-AK CLAM, PACIFIC RAZOR		USWC-AK	benthic	1.03	1068.50	18.00	
USEC-SE CLAM, SUNRAY VENUS		USEC-SE	benthic	1.28	344.60	15.00	
USEC-NE CLAM, NORTHERN QUAHOG		USEC-NE	benthic	12.23	4428.40	13.00	
USEC-SE CLAM, NORTHERN QUAHOG		USEC-SE	benthic	11.22	79.30	13.00	
USWC-48 CLAM, PACIFIC LITTLENECK		USWC-48	benthic	4.15	212.80	7.50	
USWC-AK CLAM, PACIFIC LITTLENECK		USWC-AK	benthic	17.18	10.30	7.50	
USWC-48 CLAM, BUTTER		USWC-48	benthic	1.70	69.10	13.00	
USWC-AK CLAM, BUTTER		USWC-AK	benthic	0.42	71.90	13.00	
USWC-48 SHRIMP, BRINE		USWC-48	pelagic	2.47	842.90	1.50	
USWC-48 LAMPREY, PACIFIC		USWC-48	demersal	1.02	17.80	76.00	
USEC-NE LAMPREY, SEA		USEC-NE	demersal	0.19	0.40	120.00	
USEC-SE LAMPREY, SEA		USEC-SE	demersal	1.37	0.20	120.00	
USWC-48 LAMPREY, SEA		USWC-48	demersal	0.36	118.80	120.00	
USWC market squid	2001	USWC-48	pelagic	0.28	118902.70	19.00	2
USNE longfin inshore squid	1976	USEC-NE	pelagic	0.36	140.80	50.00	1
USWC-AK SQUID, JUMBO		USWC-AK	pelagic	0.07	2160.00	400.00	
USNE northern shortfin squid	1986	USEC-NE	pelagic	0.48	3605.30	27.00	2
WA green sea urchin	no published document	USWC-48	benthic	2.10	2851.51	10.00	
CA red sea urchin	minimal information	USWC-48	benthic	1.12	23570.80	19.00	
OR red sea urchin	only relative indices	USWC-48	benthic	1.13	4227.90	19.00	
SE Alaska red sea urchin	1990	USWC-AK	benthic	0.80	343.60	19.00	
WA red sea urchin	1994	USWC-48	benthic	1.97	1634.79	19.00	

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
sAtl blacknose shark	2002	USEC-SE	reef	0.96	99.80	200.00	4
USEC-SE SHARK, BLACKNOSE		USEC-SE	reef	1.43	22.70	200.00	
USEC-NE SHARK, BIGNOSE		USEC-NE	reef	0.64	8.40	300.00	
USEC-SE SHARK, SPINNER		USEC-SE	reef	0.85	40.50	300.00	
USEC-NE SHARK, SILKY		USEC-NE	reef	0.69	1.50	350.00	
USEC-SE SHARK, SILKY		USEC-SE	reef	1.37	11.00	350.00	
USEC-NE SHARK, FINETOOTH		USEC-NE	demersal	9.46	6.20	190.00	
USSE finetooth shark	2002	USEC-SE	demersal	0.85	168.20	190.00	3
USEC-NE SHARK, BULL		USEC-NE	reef	1.11	4.60	360.00	
USEC-SE SHARK, BULL		USEC-SE	reef	0.81	135.60	360.00	
GoMex blacktip shark	1998	USEC-SE	reef	0.86	157.10	275.00	4
USEC-NE SHARK, BLACKTIP		USEC-NE	reef	1.23	91.10	275.00	
USEC-SE SHARK, BLACKTIP		USEC-SE	reef	0.87	282.10	275.00	
USEC dusky shark	2006	USEC-SE	reef	0.74	91.40	420.00	4
Sandbar shark Atlantic	1998	USEC-SE	benthopelagic	0.69	1227.50	180.00	4
USEC-NE SHARK, NIGHT		USEC-NE	benthopelagic	1.15	0.10	280.00	
USEC-NE SHARK, TIGER		USEC-NE	benthopelagic	0.91	1.90	750.00	
USEC-SE SHARK, TIGER		USEC-SE	benthopelagic	0.71	32.80	750.00	
USEC-NE SHARK, LEMON		USEC-NE	reef	0.16	0.20	340.00	
USEC-SE SHARK, LEMON		USEC-SE	reef	0.82	47.80	340.00	
USSE Atlantic sharpnose shark	2002	USEC-SE	demersal	0.66	148.70	110.00	4
USEC-SE SHARK, GREAT HAMMERHEAD		USEC-SE	pelagic	0.54	17.30	610.00	
USSE bonnethead shark	2002	USEC-SE	reef	0.80	95.60	150.00	
USWC-48 SHARK, SOUPFIN		USWC-48	benthopelagic	0.95	135.30	193.00	
USEC smooth dogfish shark	2016	USEC-NE	demersal	0.78	4115.80	150.00	4
USWC-48 SHARK, LEOPARD		USWC-48	demersal	1.54	48.20	198.00	
USEC-NE SHARK, BIGEYE THRESHER		USEC-NE	pelagic	1.21	2.00	487.99	
USEC-SE SHARK, BIGEYE THRESHER		USEC-SE	pelagic	1.13	3.90	487.99	
USWC-48 SHARK, BIGEYE THRESHER		USWC-48	pelagic	0.99	96.10	487.99	
USEC-NE SHARK, WHITE		USEC-NE	pelagic	1.33	0.40	541.00	
USWC-48 SHARK, WHITE		USWC-48	pelagic	0.82	1.00	541.00	
USEC-NE SHARK, LONGFIN MAKO		USEC-NE	pelagic	1.63	12.40	417.00	
USEC-SE SHARK, LONGFIN MAKO		USEC-SE	pelagic	2.07	10.60	417.00	
USEC-NE SHARK, SAND TIGER		USEC-NE	reef	0.59	11.70	330.00	
USEC-SE SHARK, SAND TIGER		USEC-SE	reef	0.69	4.00	330.00	
USEC-NE RAY,COWNOSE		USEC-NE	benthopelagic	3.90	80.30	213.30	
USEC-NE SHARK, NURSE		USEC-NE	reef	1.20	0.80	430.00	
USEC-SE SAWFISH, SMALLTOOTH		USEC-SE	demersal	0.14	9.40	760.00	

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
USNE thorny skate	only relative indices	USEC-NE	demersal	0.87	12611.01	105.00	1
USNE little skate	only relative indices	USEC-NE	demersal	0.26	5007.30	54.00	1
USNE smooth skate	only relative indices	USEC-NE	bathy-	12.39	886.49	61.00	1
USWC-48 SKATE, BIG		USWC-48	demersal	0.66	20.50	244.00	
USWC-48 SKATE, CALIFORNIA		USWC-48	demersal	0.59	1.20	76.00	
USWC longnose skate	2007	USWC-48	bathy-	0.22	2521.20	180.00	4
USEC spiny dogfish	1994	USEC-NE	benthopelagic	0.18	21286.90	160.00	4
USWC spiny dogfish	2011	USWC-48	benthopelagic	0.29	4375.50	160.00	4
USWC-48 SHARK, PACIFIC ANGEL		USWC-48	demersal	0.90	1132.60	152.00	
USEC-NE SHARK, ATLANTIC ANGEL		USEC-NE	bathy-	1.12	0.10	152.00	
USEC-SE SHARK, ATLANTIC ANGEL		USEC-SE	bathy-	0.35	1.00	152.00	
USEC-NE WHELK, KNOBBED		USEC-NE	demersal	4.63	799.20	24.90	
USEC-SE WHELK, KNOBBED		USEC-SE	demersal	0.75	16.90	24.90	
USEC-NE WHELK, LIGHTNING		USEC-NE	benthic	4.70	1.60	40.00	
USEC-NE WHELK, CHANNELED		USEC-NE	demersal	10.07	1014.80	20.10	
USWC-48 RATFISH SPOTTED		USWC-48	demersal	0.24	1296.90	100.00	
USEC-NE CRAB, JONAH		USEC-NE	demersal	1.32	6928.90	16.00	
USEC-NE CRAB, ATLANTIC ROCK		USEC-NE	demersal	0.65	2178.10	13.30	
CA dungeness crab	no published document	USWC-48	benthic	2.37	15262.50	22.50	
OR dungeness crab	no published document	USWC-48	benthic	2.25	15099.70	22.50	
SE Alaska dungeness crab	only relative indices	USWC-AK	benthic	1.90	7114.70	22.50	
WA dungeness crab	no published document	USWC-48	benthic	2.34	15439.00	22.50	
USWC-48 CRAB, RED ROCK		USWC-48	benthic	1.43	874.80	20.00	
USEC-SE CRAB, DEEPSEA GOLDEN		USEC-SE	benthic	3.25	758.70	18.50	
USNE deep sea red crab	1977	USEC-NE	benthic	0.63	664.70	18.00	1
Bristol Bay red king crab	1994	USWC-AK	benthic	2.73	81861.02	22.00	4
Norton Sound red king crab	1996	USWC-AK	benthic	133.15	1784.51	22.00	4
St-Matthews blue king crab	1997	USWC-AK	benthic	583.11	417.47	25.00	4
USEC-NE CRAB, FLORIDA STONE CLAWS		USEC-NE	demersal	0.73	2.70	12.00	
USEC-SE CRAB, FLORIDA STONE CLAWS		USEC-SE	demersal	3.35	3214.20	12.00	
GeBank American lobster	1992	USEC-NE	benthic	10.60	3652.41	64.00	
GoMaine American lobster	1992	USEC-NE	benthic	4.03	19508.60	64.00	
sNEng American lobster	1992	USEC-NE	benthic	3.85	5225.62	64.00	
USEC-NE LOBSTER, AMERICAN		USEC-NE	benthic	5.73	1028.40	64.00	
USEC-SE LOBSTER, AMERICAN		USEC-SE	benthic	2.18	13.60	64.00	
EBS tanner crab	2012	USWC-AK	benthic	4.32	24871.30	15.00	4
USWC-48 CRAB, SOUTHERN TANNER		USWC-48	benthic	3.07	209.10	15.00	
EBS snow crab	2000	USWC-AK	benthic	1.73	147502.10	9.10	4

Continued on next page

Table B.1 – continued from previous page

Stock	Assessment year	Region	Habitat	Price (US$·kg^{-1})	Landings (t)	Length (cm)	SIS cat.
USEC-SE LOBSTER, CARIBBEAN SPINY		USEC-SE	demersal	5.63	5357.80	45.00	
CA spiny lobster	2011	USWC-48	benthic	9.31	423.40	60.00	
OR ocean shrimp	only relative indices	USWC-48	benthic	0.71	25703.60	3.00	
USWC-48 SHRIMP, OCEAN		USWC-48	benthic	0.71	8474.40	3.00	
USWC-AK SHRIMP, OCEAN		USWC-AK	benthic	0.10	19086.00	3.00	
WA pink shrimp	no published document	USWC-48	benthic	0.70	8267.10	3.00	
USWC-48 SHRIMP, SPOT		USWC-48	benthic	14.47	374.90	30.00	
USEC-NE SHRIMP, BROWN		USEC-NE	benthic	6.08	3.10	19.50	
USEC-SE SHRIMP, BROWN		USEC-SE	benthic	4.45	7414.10	19.50	
GoMex pink shrimp	1984	USEC-SE	benthic	2.43	25105.60	26.90	4
USEC-SE SHRIMP, PINK		USEC-SE	demersal	4.55	1531.20	26.90	
GoMex white shrimp	1984	USEC-SE	benthic	2.61	39185.10	17.50	4
USEC-SE SHRIMP, WHITE		USEC-SE	demersal	4.05	128449.40	17.50	
GoMex brown shrimp	1984	USEC-SE	benthic	2.10	72672.80	19.50	4
USEC-SE SHRIMP, SEABOB		USEC-SE	demersal	0.89	6592.50	11.50	
Chesapeake Bay blue crab	1997	USEC-NE	benthic	1.61	52075.60	22.70	
Eastern Gulf of Mexico blue crab	2007	USEC-SE	demersal	2.81	9348.30	22.70	
Florida South Atlantic blue crab	2007	USEC-SE	demersal	2.96	4227.80	22.70	
North Carolina blue crab	2004	USEC-SE	demersal	2.02	30427.40	22.70	
USEC-NE CRAB, BLUE		USEC-NE	demersal	1.75	7922.20	22.70	
USEC-SE CRAB, BLUE		USEC-SE	demersal	3.73	10586.60	22.70	
USWC-AK CRAB, BLUE		USWC-AK	demersal	0.45	41.20	22.70	
Western Gulf of Mexico blue crab	2013	USEC-SE	demersal	2.05	31242.90	22.70	
USEC-NE CRAB, GREEN		USEC-NE	benthic	0.78	128.10	6.00	
USWC-48 CRAB, RED PA		USWC-48	benthic	0.44	63.00	15.00	
USWC-48 SHRIMP, PACIFIC ROCK		USWC-48	demersal	3.28	739.70	6.60	
USEC-NE SHRIMP, ROYAL RED		USEC-NE	demersal	8.04	24.00	18.00	
USEC-SE SHRIMP, ROYAL RED		USEC-SE	demersal	3.51	588.30	18.00	
USWC-48 SHRIMP, BLUE MUD		USWC-48	demersal	2.64	25.40	15.00	
Delaware Bay horseshoe crab	1998	USEC-NE	benthic	0.23	3100.50	60.00	
USEC-SE CRAB, HORSESHOE		USEC-SE	benthic	0.44	134.20	60.00	

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 TRAC	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 Pacific cod	Gadus macrocephalus	Gadidae	Gadiformes	Actinopterygii
GeBank Atlantic cod TRAC	Gadus morhua	Gadidae	Gadiformes	Actinopterygii
GoMaine Atlantic cod	Gadus morhua	Gadidae	Gadiformes	Actinopterygii
GeBank haddock TRAC	Melanogrammus aeglefinus	Gadidae	Gadiformes	Actinopterygii

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
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
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
USNE offshore hake	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
nGeBank/GoMaine red hake	Urophycis chuss	Phycidae	Gadiformes	Actinopterygii
sGeBank/midAtl red hake	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-SE GOOSEFISH	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

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
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
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-NE PILOTFISH	Naucrates ductor	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

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
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
USEC-NE 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
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-NE SNAPPER, RED	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

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
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
USEC-NE 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
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

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
USEC-NE DRUM, BLACK	Pogonias cromis	Sciaenidae	Perciformes	Actinopterygii
USEC-SE DRUM, BLACK	Pogonias cromis	Sciaenidae	Perciformes	Actinopterygii
USEC-NE DRUM, RED	Sciaenops ocellatus	Sciaenidae	Perciformes	Actinopterygii
USEC-SE DRUM, RED	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 TRAC	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
sAtl red grouper	Epinephelus morio	Serranidae	Perciformes	Actinopterygii
USEC-SE GROUPER, MISTY	Epinephelus mystacinus	Serranidae	Perciformes	Actinopterygii

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
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-NE PORGY, RED	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, NOTHERN	Astroscopus guttatus	Uranoscopidae	Perciformes	Actinopterygii
USEC-NE POUT, OCEAN	Macrozoarces americanus	Zoarcidae	Perciformes	Actinopterygii
USNE ocean pout	Zoarces 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

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
USEC-SE FLOUNDER, SUMMER	Paralichthys dentatus	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
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
USEC-NE HALIBUT, ATLANTIC	Hippoglossus hippoglossus	Pleuronectidae	Pleuronectiformes	Actinopterygii
Pacific halibut (coastwide)	Hippoglossus stenolepis	Pleuronectidae	Pleuronectiformes	Actinopterygii
USWC-48 HALIBUT, PACIFIC	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 TRAC	Limanda ferruginea	Pleuronectidae	Pleuronectiformes	Actinopterygii
sNEng/midAtl yellowtail flounder	Limanda ferruginea	Pleuronectidae	Pleuronectiformes	Actinopterygii
USEC-SE FLOUNDER, YELLOWTAIL	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

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
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
GeBank/GoMaine windowpane flounder	Scophthalmus aquosus	Scophthalmidae	Pleuronectiformes	Actinopterygii
sNEng/midAtl windowpane flounder	Scophthalmus aquosus	Scophthalmidae	Pleuronectiformes	Actinopterygii
Alaska sablefish	Anoplopoma fimbria	Anoplopomatidae	Scorpaeniformes	Actinopterygii
USWC sablefish	Anoplopoma fimbria	Anoplopomatidae	Scorpaeniformes	Actinopterygii
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
GOA 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

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
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
GOA 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
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
USEC-SE REDFISH, ACADIAN	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-48 ROCKFISH, SHORTBELLY	Sebastes jordani	Sebastidae	Scorpaeniformes	Actinopterygii
USWC shortbelly rockfish	Sebastes jordani	Sebastidae	Scorpaeniformes	Actinopterygii
USWC cowcod	Sebastes levis	Sebastidae	Scorpaeniformes	Actinopterygii

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
USWC-AK ROCKFISH, BLACK	Sebastes melanops	Sebastidae	Scorpaeniformes	Actinopterygii
USWC black rockfish (Oregon)	Sebastes melanops	Sebastidae	Scorpaeniformes	Actinopterygii
USWC black rockfish (southern)	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
GOA yelloweye rockfish	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
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

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
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
USWC-48 OYSTER, KUMAMOTO	Crassostrea gigas kumamoto	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
Alaska scallop Bering Sea	Patinopecten caurinus	Pectinidae	Ostreoida	Bivalvia
Alaska scallop Kodiak NE	Patinopecten caurinus	Pectinidae	Ostreoida	Bivalvia
Alaska scallop Kodiak Shelikof	Patinopecten caurinus	Pectinidae	Ostreoida	Bivalvia
Alaska scallop PWS	Patinopecten caurinus	Pectinidae	Ostreoida	Bivalvia
Alaska scallop Yakutat Area D	Patinopecten caurinus	Pectinidae	Ostreoida	Bivalvia
Alaska scallop Yakutat Dist 16	Patinopecten caurinus	Pectinidae	Ostreoida	Bivalvia
GeBank/midAtl sea scallop	Placopecten magellanicus	Pectinidae	Ostreoida	Bivalvia
USWC-AK SCALLOP, SEA	Placopecten magellanicus	Pectinidae	Ostreoida	Bivalvia

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
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, MANILA	Corbicula manilensis	Corbiculidae	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
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
WA green sea urchin	Strongylocentrotus droebachiensis	Strongylocentrotidae	Echinoida	Echinoidea
CA red sea urchin	Strongylocentrotus franciscanus	Strongylocentrotidae	Echinoida	Echinoidea
OR red sea urchin	Strongylocentrotus franciscanus	Strongylocentrotidae	Echinoida	Echinoidea
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

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
USEC-NE SHARK, SILKY	Carcharhinus falciformis	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-SE SHARK, SILKY	Carcharhinus falciformis	Carcharhinidae	Carcharhiniformes	Elasmobranchii
USEC-NE SHARK, FINETOOTH	Carcharhinus isodon	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
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
USNE thorny skate	Amblyraja radiata	Rajidae	Rajiformes	Elasmobranchii
USNE little skate	Leucoraja erinacea	Rajidae	Rajiformes	Elasmobranchii
USNE smooth skate	Malacoraja senta	Rajidae	Rajiformes	Elasmobranchii
USWC-48 SKATE, BIG	Raja binoculata	Rajidae	Rajiformes	Elasmobranchii

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
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
CA dungeness crab	Cancer magister	Cancridae	Decapoda	Malacostraca
OR dungeness crab	Cancer magister	Cancridae	Decapoda	Malacostraca
SE Alaska dungeness crab	Cancer magister	Cancridae	Decapoda	Malacostraca
WA dungeness crab	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
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
OR ocean shrimp	Pandalus jordani	Pandalidae	Decapoda	Malacostraca
USWC-48 SHRIMP, OCEAN	Pandalus jordani	Pandalidae	Decapoda	Malacostraca

Continued on next page

Table B.2 – continued from previous page

Stock	Species	Family	Order	Class
USWC-AK SHRIMP, OCEAN	Pandalus jordani	Pandalidae	Decapoda	Malacostraca
WA pink shrimp	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
USEC-SE CRAB, HORSESHOE	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	
USNE barndoor skate	only relative indices	1
USNE winter skate	only relative indices	1
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
AI golden king crab	minimal information	1
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 formal assessment conducted, and susbequently, the year in which the first formal assessment occurred. Our definition of a formal 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. Assesssment 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

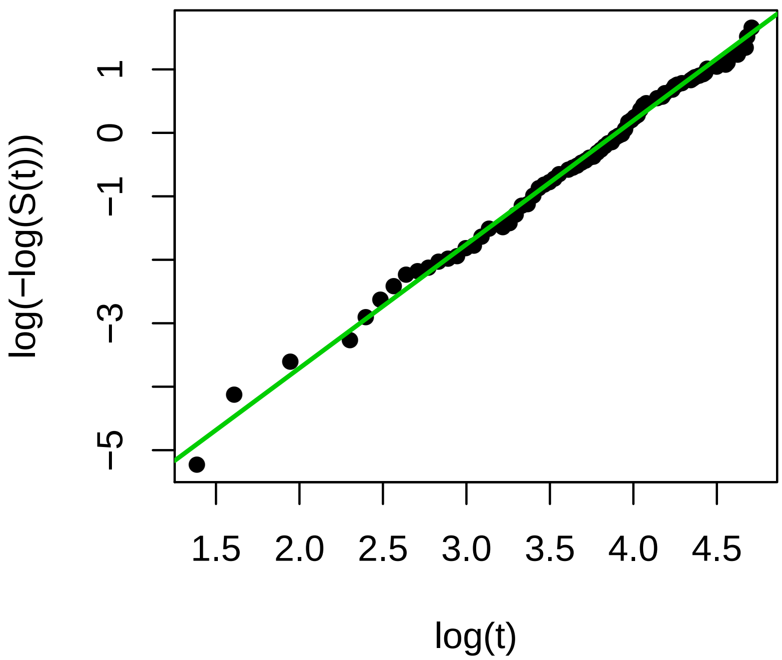

Figure D.1: Appropriateness of the Weibull event-time model for the time-to-assessment dataset. If the Weibull applies, the time from first landings (or from first quantitative stock assessments in 1960 if a stock was landed before 1960) to the year of first assessment should fall on a line with slope 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.

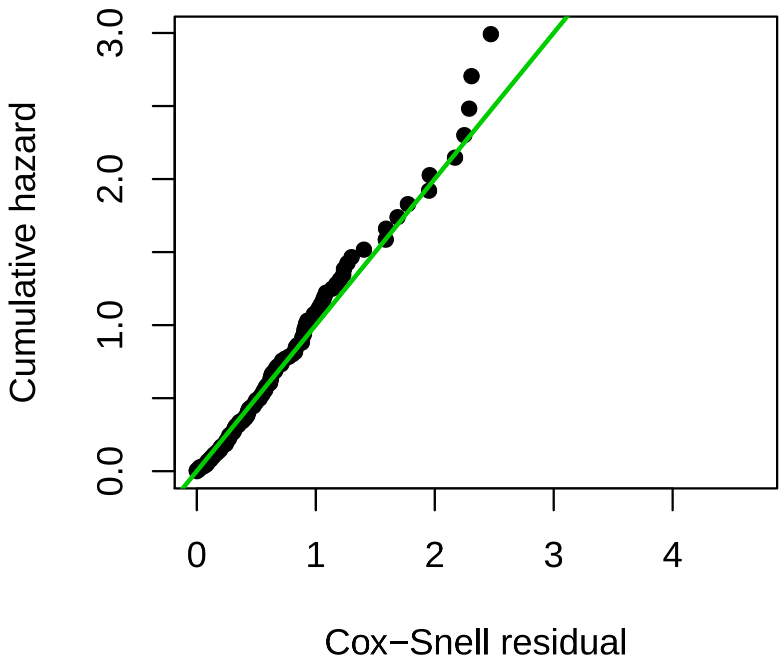

Figure D.2: Model fit of the Weibull survival model, based on Cox-Snell residuals calculated at the posterior mean of the linear predictor. For a perfect fit all data points would lie on the y=x (green) line.

E Model estimates and predictions

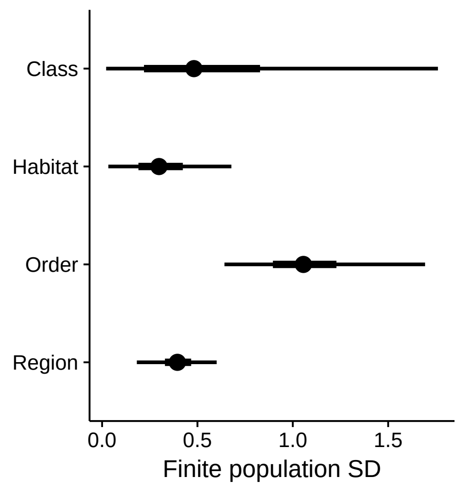

Figure E.3: Comparison of finite population standard deviation (i.e., variance attributed to each variable) for random effects in the Weibull survival model. Circles show posterior medians, thick bars show inter-quartile ranges of the posteriors, and thin lines show 95% confidence intervals.

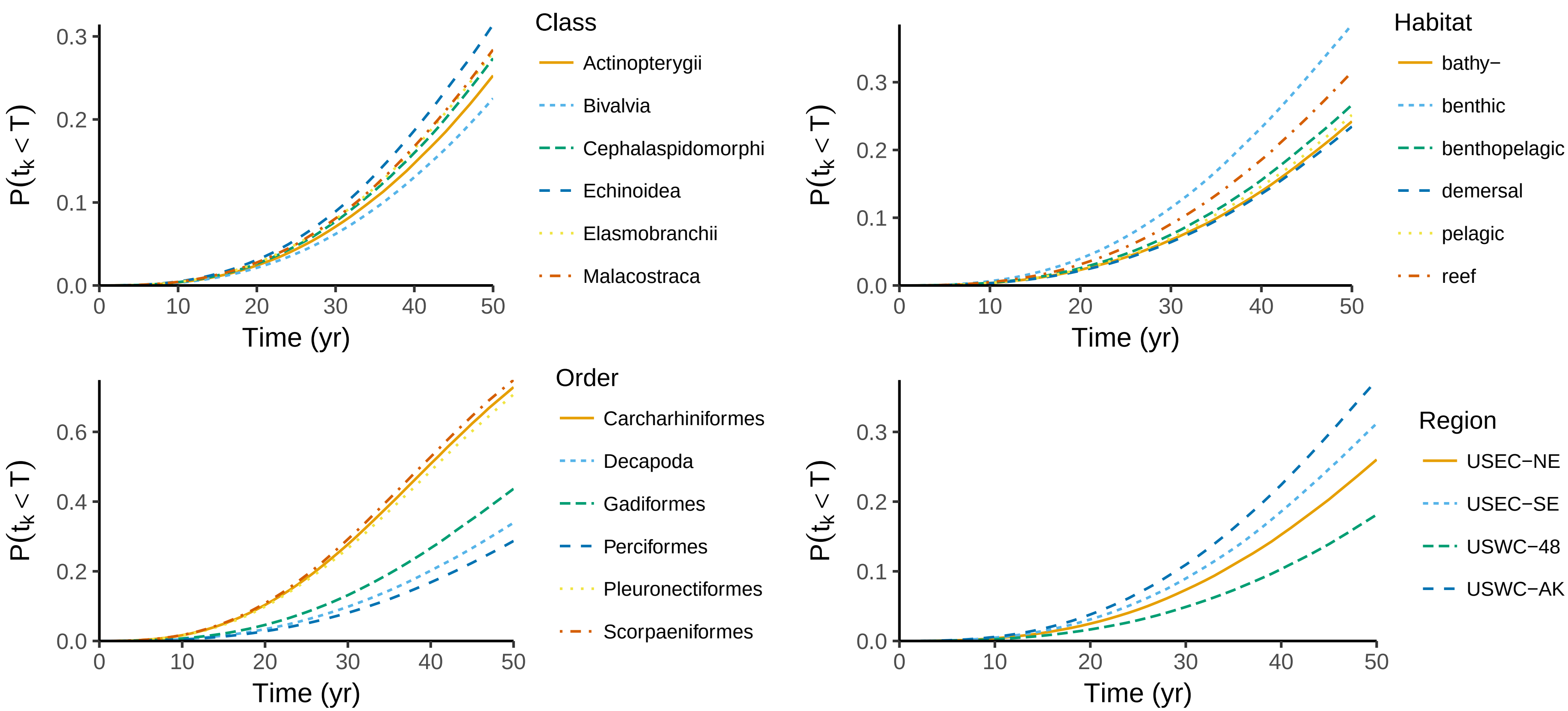

Figure E.4: Marginal probability of a stock in category k being assessed as a function of time ($P(T_k \leq t) = F_k(t) = \exp(-\lambda_k t^\tau)$), for stocks of various taxonomic orders, class, regions and habitats. For taxonomic variables, only the eight levels with the most stocks represented in 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	0.96	1.02	0.44
Region	USEC-SE	1.18	0.94	0.70
Region	USWC-48	0.64	1.18	0.09
Region	USWC-AK	1.43	0.88	0.85
Habitat	Bathy-	0.88	1.05	0.28
Habitat	Benthic	1.42	0.88	0.89
Habitat	Benthopelagic	0.98	1.01	0.45
Habitat	Demersal	0.83	1.07	0.16
Habitat	Pelagic	0.90	1.04	0.32
Habitat	Reef	1.16	0.95	0.76
Class	Actinopterygii	0.94	1.02	0.39
Class	Bivalvia	0.87	1.05	0.33
Class	Branchiopoda	0.99	1.00	0.48
Class	Cephalaspidomorphi	1.00	1.00	0.49
Class	Cephalopoda	1.34	0.89	0.76
Class	Echinoidea	1.05	0.98	0.58
Class	Elasmobranchii	1.00	1.00	0.49
Class	Gastropoda	0.99	1.00	0.49
Class	Holocephali	0.94	1.02	0.41
Class	Malacostraca	1.01	1.00	0.52
Class	Merostomata	1.00	1.00	0.50
Order	Acipenseriformes	0.84	1.07	0.43
Order	Anguilliformes	0.48	1.31	0.17
Order	Anostraca	0.94	1.02	0.48
Order	Arcoida	0.96	1.02	0.49
Order	Beloniformes	0.57	1.23	0.25
Order	Carcharhiniformes	3.87	0.61	0.99
Order	Chimaeriformes	0.66	1.16	0.33
Order	Clupeiformes	0.75	1.11	0.29
Order	Cypriniformes	1.02	0.99	0.51
Order	Cyprinodontiformes	0.75	1.11	0.38
Order	Decapoda	1.17	0.94	0.60
Order	Echinoida	1.57	0.85	0.72
Order	Elopiformes	0.44	1.36	0.14
Order	Gadiformes	1.92	0.79	0.94
Order	Lamniformes	0.75	1.11	0.38
Order	Lampriformes	0.93	1.03	0.47
Order	Lophiiformes	1.39	0.89	0.68
Order	Mugiliformes	0.56	1.24	0.16
Order	Myliobatiformes	1.03	0.99	0.51
Order	Myoida	2.26	0.74	0.84
Order	Mytiloida	0.57	1.23	0.26
Order	Neogastropoda	1.03	0.99	0.51
Order	Ophidiiformes	0.91	1.03	0.46

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	1.01	0.49
Order	Osmeriformes	0.61	1.20	0.28
Order	Ostreoida	0.36	1.46	0.07
Order	Perciformes	1.11	0.96	0.61
Order	Petromyzontiformes	0.91	1.03	0.46
Order	Pleuronectiformes	4.19	0.59	1.00
Order	Pristiformes	0.99	1.00	0.50
Order	Rajiformes	0.50	1.29	0.17
Order	Scorpaeniformes	4.64	0.57	1.00
Order	Squaliformes	1.00	1.00	0.50
Order	Squatiniformes	0.80	1.08	0.41
Order	Tetraodontiformes	1.05	0.98	0.52
Order	Teuthida	4.90	0.56	0.94
Order	Veneroida	1.07	0.98	0.53
Order	Xiphosura	1.08	0.97	0.53
Order	Zeiformes	0.93	1.03	0.46
Num.	Maximum length	1.79	0.81	0.99
Num.	Mean ex-vessel price	3.59	0.63	1.00
Num.	Maximum landings	4.55	0.57	1.00
Num.	Interaction	0.20	1.82	0.00