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IN PURSUIT OF “OPTIMUM”: FORTY YEARS OF FEDERAL FISHERIES MANAGEMENT UNDER THE MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT

Prologue: Pre-1976

During the 1960s and 70s, the laws passed in the United States, including the Fishery Conservation and Management Act,¹ pertaining to management of public trust resources reflected the divergence of perspectives and values between the desire for preservation and the desire for wise use. Some laws promoted one perspective over the other. Others contained dual purposes that at times could manifest as internally conflicting.² It was in this political context that Congress first addressed federal management of our nation’s fishery resources.

**210 In 1976, Congress passed the groundbreaking Fishery Conservation and Management Act (FCMA),³ the goal of which was to eliminate foreign fishing in U.S. waters and replace that effort with domestic fishing.⁴ Both ecological considerations and economic concerns underlie this legislation.⁵ At the heart of the FCMA’s fishery management program was its primary policy driver, National Standard 1, which read: “Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery.”⁶*

The FCMA straddled the debate between wise use and preservation, creating a law with dual policy drivers of achieving “optimum yield”--a concept which itself embodied both use and sustainability goals and preventing overfishing. It gave broad discretion to user-level constituents (i.e., regional fishery management councils) to develop management priorities within these parameters.⁷ The debate of how to balance and interpret the dual goals of achieving “optimum yield” (OY) while preventing overfishing would take the forefront in the evolution of U.S. fishery management decisions over the next forty years.

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*212 “They flee from me that sometime did me seek”

--Sir Thomas Wyatt

I. INTRODUCTION

This Article reviews the concept of OY as mandated, interpreted, and applied over the past 40 years. It describes the approaches and forms used for describing OY as well as the challenges managers have faced in applying it. At the heart of this discussion are the issues of the evolving relationship between the concepts of OY and overfishing, changing perceptions and mandates pertaining to annual versus long-term interpretations of these concepts, and a consideration of how and where we realistically have opportunities to provide for factors other than the biologically based “maximum sustainable yield” (MSY) mandate in establishing OY.

From the beginning, the concepts of OY and overfishing have been intertwined within the single, complex policy mandate of National Standard 1. Early interpretations strove to keep the concepts independent of each other and used different standards for measuring each. Over time, many factors have influenced our understanding of OY, from lessons learned through applied management to changing biological conditions, improved data, changing political perspectives, and new legislative and regulatory requirements. In recent years, as regulatory and statutory definitions have linked both concepts to MSY, as more fisheries were identified as overfished, and as management mandates became increasingly annualized, approaches for achieving OY began to *213 look similar to, or even identical to, approaches for ending overfishing.⁸ This Article examines that evolution and asks whether today’s OY is anything more than the absence of overfishing, and, if so, what opportunities it presents for further optimizing our fisheries management regimes.

The Article is organized into the following six time periods⁹ defined by the legal guidance in effect at the time:

- Time Period 1--1976-1983: Initial Interpretations and Implementation;
- Time Period 2--1984-1989: The Push for a Conservation Standard;
- Time Period 3--1990-1995: Effects of Early Overfishing Definitions and SAFE Reports;
- Time Period 4--1996-1998: The SFA’s Legislative Pendulum Swing;
- Time Period 5--1999-2008: Belt-Tightening and the Magnuson-Stevens Reauthorization Act (MSRA); and
- Time Period 6--2008-2016: Towards Annualized Management and Beyond

For each time period, this Article describes the relevant statutory and regulatory contexts, public dialogue where applicable, and the approaches used to express OY in the fishery management plans (FMPs) of the time, which over the years have ranged from simple numeric statements, to complex formulas and sliding scales, to abstract conceptual relationships. Developments in the key themes identified above (relationship between the concepts of OY and overfishing, changing perceptions regarding annual versus long-term interpretations of these concepts, etc.) are also highlighted within the discussion of each time period.

II. TIME PERIOD 1--1976-1983: INITIAL INTERPRETATIONS AND IMPLEMENTATION

Time Period 1 encompasses the passage of the FCMA, the National Oceanic and Atmospheric Administration’s (NOAA) initial regulatory *214 guidance (in 1976 and 1977), and the first revisions to that guidance (in 1983).

A. *Statutory and Regulatory Environment 1976-1983*

1. The FCMA

The FCMA declared U.S. jurisdiction over fishery resources out to 200 nautical miles (nm) and created a fishery management program designed to promote domestic fishing capacity, replace foreign fishing, and provide a form of user-group self-regulation never before seen in U.S. public trust resource statutes.¹⁰ The FCMA established eight regional fishery management councils (Councils) to develop FMPs and recommend fishery conservation and management measures, seven national standards with which the FMPs had to conform, and five specific types of provisions that must be included in the FMPs.¹¹ The FCMA charged the Secretary of Commerce with the responsibility of reviewing Council-recommended plans and approving and implementing plans that comply with the national standards and other applicable law.¹²

2. Optimum Yield in the FCMA

The FCMA defined OY as:

[T]he amount of fish--

A) which will provide the greatest overall benefit to the Nation, with particular reference to food production and recreational opportunities; and

B) which is prescribed as such on the basis of the maximum sustainable yield from such fishery, as modified by any economic, social, or ecological factor.”¹³

This statutory linkage to MSY would become a significant factor in interpretations of OY over the years. Until 1996, MSY served as a starting point that could be modified by three key considerations--economic, social, or ecological factors (ESE factors)--to establish OY, *215 and OY was flexible in that it could exceed MSY so long as overfishing did not occur. Because overfishing was calculated based on long-term information and was not statutorily linked to MSY, the potential for OY exceeding MSY did not necessarily equate to potential overfishing.

In addition to its key role in National Standard 1, OY appears in many aspects of the FCMA. Congress emphasized the centrality of OY to the new fisheries management program, finding that, “If placed under sound management *before overfishing* has caused irreversible effects, the fisheries can be conserved and maintained so as to provide optimum yields on a continuing basis.”¹⁴ Among the stated purposes of the FCMA is the goal of achieving and maintaining “on a continuing basis, the OY from each fishery.”¹⁵

Additional provisions required Councils to “review on a continuing basis, and revise as appropriate,” the specifications of OY from, and the total allowable level of foreign fishing (TALFF) in, each fishery.”¹⁶ The FCMA also required each FMP to “assess and specify” the MSY and OY from the fishery¹⁷ and further mandated that OY be analyzed in annual context for the purpose of specifying TALFF.¹⁸

The FCMA did not establish a clear relationship between OY and overfishing. The statute’s language was ambiguous as to whether it might be possible to achieve OY while allowing some amount of overfishing, as long as the level of overfishing did not cause irreversible effects.

Similarly, the FCMA was unclear whether OY should be defined and used in an annual or long-term context. Throughout the FCMA, references to OY are linked to concepts of overfishing and MSY. These references also suggest the importance of time frames (annual versus long-term interpretations) but do not provide clear direction on how to address OY in terms of time. The FCMA’s definition of OY as based on MSY, read in conjunction with regulatory interpretations of MSY as a *216 long-term average, suggested that OY may be a long-term concept. On the other hand, the FMCA requirement for annual assessments of the extent to which OY would be harvested (for purposes of TALFF) implied the opposite. Thus, the question of whether OY should be defined and used as a long-term or an annual value has remained ambiguous. Over time, Congress’s mandates have shifted, and regulatory interpretations have evolved in an attempt to clarify this issue.

The FCMA required Councils to develop FMP provisions, including OY, through an open public process that allowed interested parties to be heard.¹⁹ After the Council submitted an OY recommendation to the agency, the FCMA required a formal sixty-day review period for proposed FMPs and amendments and also required that proposed regulations to implement FMPs be published in the Federal Register.²⁰ The FCMA further required FMPs to include a summary of the information used in determining OY.²¹

The FCMA also established an aggressive schedule for exercising jurisdiction and imposing domestic management on fisheries from 3-200nm. The statute required that Councils be created by October 1976 and made the Fishery Conservation Zone (FCZ) and prohibition on foreign fishing (unless permitted) effective in March 1977.²² Section 1851(b) of the FCMA required the Secretary to establish guidelines based on the National Standards to assist the Councils in development of FMPs.²³ Thus, there was a rush to quickly provide guidance.

3. The First Interpretation: 1976 Interim Final Rule

NOAA published an interim final rule (IFR) on September 15, 1976.²⁴ The entire preamble to the IFR occupied only one column in the Federal Register, providing little insight into how interpretations were made.²⁵ Key provisions included definitions of the terms overfishing and MSY and expanded guidance on the “OY concept.”

*217 The IFR defined MSY as the “*largest average annual catch or yield in terms of weight* of, fish caught by both commercial and recreational fishermen that can be taken continuously from a stock under existing environmental conditions.”²⁶ The word “average” implies the concept of long-term management in conjunction with annual measurements.

The IFR provided a biomass-based interpretation of overfishing, defining it as when fishing reduces a stock’s population abundance “to the point where the stock cannot produce *maximum yield* on a sustained basis for the existing habitat and environmental conditions.”²⁷ The rule also stated that the determination of overfishing “is based on a scientific assessment of stock abundances, recruitment, and mortality rates over a *prolonged period of time*.”²⁸

The IFR described OY as a “concept” and as “non-static.”²⁹ It discussed when deviation from MSY might be appropriate and stated that management “on the basis of MSY” might be appropriate in some cases.³⁰ It did not address whether OY should be expressed as an annual or long-term amount.

The IFR acknowledged the importance of the FMP’s management objectives and included a paragraph on that relationship, which stated that the determination of OY will depend heavily on the Council’s objectives.³¹ It also stated that OY will “seldom if ever be a static quantity since both the condition of the resource and the desires of the users will change.”³²

While the FCMA stated that OY is prescribed on the “basis of MSY as modified” by additional factors, the IFR tied the determination of overfishing to the capacity to produce “maximum yield on a sustainable basis.” Thus, originally, the concepts of OY and overfishing were defined by similar, though not identical, language. Both included the concepts of “maximum,” “sustainable,” and “yield.” This would soon change.

The IFR implied that there could be short-term situations in which some amount of overfishing would be permissible, stating: “Factors (economic, social, and ecological) that modify MSY in defining *218 optimum yield should *not be used to institute* management measures which permit *overfishing on a continued basis*.”³³

At this point, the IFR did not characterize OY as either annual or long-term. However, the TALFF-related requirement to annually assess the amount of OY that would not be taken implied an annual characteristic of OY. On the other hand, OY was also to be based on MSY, which the IFR implied was a long-term average. The IFR clearly specified that the determination of overfishing was to be based on a “prolonged period of time.”³⁴

4. The 1977 Final Rule

NOAA considered public comment on the IFR and then published a final rule in July 1977, making several modifications and clarifications.³⁵

The 1977 Final Rule did not alter the IFR’s definition of MSY;³⁶ however, it did alter the definition of overfishing. The 1977 Final Rule changed the definition’s focus from a harvest level that “reduces population abundance” to a point at which the “stock” cannot produce “*maximum yield*” to a “reduction of capacity of the *management unit*”³⁷ to produce *maximum biological yield*.”³⁸ The instruction to base the overfishing determination on information over a “prolonged period of time” was removed.³⁹

In addition, the 1977 Final Rule removed the explicit statement that allowing overfishing on a continued basis was prohibited. It also removed the explicit statement that management based on MSY could be permissible. It simply no longer addressed either issue.⁴⁰ The 1977 Final Rule clearly distinguished the test for overfishing from the definition of OY, basing the overfishing definition on “biological yield” in contrast to OY’s basis in “maximum sustainable yield.” After the 1977 rule was published, there was still no explicit guidance characterizing OY as either *219 an annual or long-term value, and its relationships to TALFF and MSY continued to result in conflicting implications. Additionally, with removal of the specific language pertaining to “prolonged period of time,” the determination of overfishing was not clearly linked to a timeframe either.⁴¹ There was no additional guidance pertaining to the form of OY other than the FCMA’s statement that OY is an “amount of fish.”⁴² Councils immediately began developing their FMPs. Questions surrounding NOAA’s initial interpretations lingered,

and the agency continued with a public dialogue to further refine the guidance throughout this period.

B. OY in FMPs 1976-1983

This Article reviews nineteen⁴³ FMPs that were developed during this time,⁴⁴ as well as nine FMP amendments related to OY, eight of *220 which were established to adjust numerical OYs in the North Pacific and Mid-Atlantic fisheries.⁴⁵

Initial interpretive questions pertained to what form the specification of OY should take, whether OY should function as a management tool (e.g., quota or harvest guideline (HGL)), whether to set OY for individual species or for species groups, and how to include OY in the FMP while still allowing for management flexibility on an annual basis.

*221 Recall that the FCMA defined OY as “an amount of fish,” calculated based on MSY, and that the National Marine Fisheries Service’s (NMFS) interpretive regulations defined MSY in terms of “weight of fish.” This would imply that OY should be a weight or number of fish, but this did not translate to the FMPs. Many of these FMPs used different forms for specifying OY for different species or species groups within a single FMP. Their approaches for determining OY included calculations based on numeric amounts of fish, size limits, and annual procedures or formulas, or in the context of FMP objectives, overfishing, and numeric estimates.

Ten FMPs specified OY as a numeric amount, either as a weight in pounds, a number of fish (including zero), or as a locked percentage of MSY where MSY was a numeric range of amounts of fish.⁴⁶ One issue with specifying OY as a specific amount of fish was that it required an FMP amendment to make additions or adjustments. In some cases, multiple amendments were required. The most dramatic illustration of this issue was the North Pacific Fishery Management Council’s (NPFMC’s) Gulf of Alaska (GOA) Groundfish FMP, which was amended six times during this time period to modify the specified OYs.⁴⁷ The Mid-Atlantic Fishery Management Council (MAFMC) experienced this issue as well, amending both the Surf Clam/Ocean Quahog FMP and the Mackerel FMP to adjust specific numeric OYs.⁴⁸

Some FMPs specified OY as all fish caught of a certain size, annually or within a season.⁴⁹ The South Atlantic Fishery Management Council’s (SAFMC’s) Snapper-Grouper FMP defined OY as a size limit that was tied to the biomass-based objective of a percentage of yield per recruit (PR).⁵⁰ In mixed stock fisheries, some size limits were species-specific,⁵¹ while others applied to species groups.⁵²

*222 The PFMC’s Anchovy FMP established OY as a formula for annually calculating a sliding scale quantity of fish based on environmental and biological conditions.⁵³ Towards the end of this time period, the MAFMC amended its newly consolidated MSB FMP to create a precursor to modern frameworks for squid, whereby the Regional Director of the NMFS could annually modify the OY for squid.⁵⁴

Some FMPs defined their OYs as simply the amount of harvest that resulted from fishing pursuant to management under the FMP or regulations.⁵⁵ Since FMPs were designed to achieve OY, the management measures they included were designed to balance the various considerations and factors embodied in OY and the other National Standards. Therefore, the results of fishing pursuant to those management measures were presumed to be OY.

The Gulf of Mexico Fishery Management Council (GMFMC) directly connected OY for royal red shrimp to overfishing by specifying OY as all royal reds that could be taken without overfishing.⁵⁶ The FMP then provided a numeric estimate of OY for royal reds and stated that this estimate would serve as a quota, and that the fishery would close upon attainment of the quota.⁵⁷

*223 Several FMPs that specified non-numeric OYs also provided “numeric estimates.” Examples included the Gulf Shrimp FMP (for brown, white, and pink shrimp only),⁵⁸ the Stone Crab FMP,⁵⁹ and Western Pacific Fishery Management Council’s (WPFMC’s) Crustaceans FMP.⁶⁰ However, other than for royal reds, the numeric estimates were specifically not to be considered quotas.⁶¹

Initial efforts to establish OY as a specific number within an FMP created the burden of preparing formal FMP amendments to make adjustments each time new information became available.

A notable variation on the “amount of fish” approach was used in the Bering Sea and Aleutian Islands (BSAI) Groundfish FMP, which introduced the concepts of aggregate OY and OY as a fixed numeric range.⁶² The FMP established OY as an aggregate amount applicable to all species in the FMP on a long-term basis with annual management carried out using tools other than OY. Specifically, the FMP provided for annual review of fishery information and the establishment of “total allowable catch” (TAC) levels based on “acceptable biological catch” (ABC).⁶³ The aggregate amount was not a specific number but rather a fixed range tied to a numeric MSY, expressed as 85% MSY.⁶⁴

*224 The technique of specifying a process within an FMP for addressing future information without requiring modification of the FMP is now referred to as a “Framework.”⁶⁵ These early techniques were precursors to management approaches that further evolved to using formulas and Frameworks for annual management measures and incorporating OYs based on a fixed percentage of MSY.

For the most part, OY was established through the normal Council process for developing FMPs and amendments. The FCMA’s definition of OY provided context and factors for Councils to consider, such as food production and recreational opportunities when determining “net benefit to the Nation,” and economic, social, and ecological factors [ESE factors] when modifying MSY to derive OY.⁶⁶ Many of the early FMPs provided thorough summaries of the information used in making the OY determination.⁶⁷ Some organized this discussion around the three ESE factors by either including specific sections pertaining to each factor or simply discussing how the Council had considered the factors.⁶⁸ Others described the rationale for the selected OY without specifically discussing the ESE factors.⁶⁹

The NPFMC’s annual management based on ABC and TAC added an annual process for developing management measures derived from OY that did not require an FMP amendment. The MAFMC’s Framework allowing the Regional Director (RD) to make annual adjustments to OY and the PFMC’s formula for basing annual OY adjustments on environmental and biological conditions were early approaches to Frameworks. These Frameworks began moving some aspects of OY decision-making outside of the FCMA’s process for FMP development.

***225 C. Political Environment: Seeds for Change 1979-1983**

As Councils completed their initial FMPs, the Environmental Defense Fund (EDF) petitioned for revised guidance; meanwhile, NOAA continued its efforts to refine guidance through an advance notice of proposed rulemaking (ANPR) and public workshops, resulting in a 1983 Final Rule that revised the national standard guidelines.⁷⁰

1. The EDF Petition and Public Dialogue 1981-1983

In 1979, EDF petitioned NOAA for rulemaking, seeking, among other things, to:

- Define MSY to require “minimum populations”;
- Address long-term strategies for rebuilding and maintaining fish stocks; and
- Define overfishing to address impacts on nontarget and ecosystem species.⁷¹

NOAA granted the petition and issued an ANPR in 1980 soliciting public input that described the inherent tensions contained within National Standard 1.⁷² “The policy question centers on whether the primary responsibility under the Act is to the resource or to the users of the resource, on the ‘wise use’/preservation dichotomy inherent in the word ‘conservation.’”⁷³

Through workshops and the rulemaking process, the following themes emerged:

- Short-term versus long-term management and effects;

- Balancing the need for flexibility and accountability;
- The relationship between overfishing and OY;
- Continuing tension between human vs. resource needs;⁷⁴ and
- Impacts to non-target species.

***226 2. 1983 Final Rule**

The 1983 Final Rule addressed acceptable forms for expressing OY, annual versus long-term approaches, the relationship between OY and overfishing, and other concepts. It added new rebuilding provisions into the OY guidance. With respect to MSY and overfishing, the 1983 Final Rule added new terminology for use in adjusting MSY, and new interpretations, exceptions, and responsibilities pertaining to the prevention of overfishing.

The 1983 Final Rule explained that the “determination of OY is a decisional mechanism for resolving the Act’s multiple purposes and policies, for implementing an FMP’s objectives, and for balancing the various interests that comprise the national welfare.”⁷⁵

This rule expanded on previous OY guidance, stating that:

- *Form of OY*: OY need *not* be expressed in terms of weight or amount of fish. It could be a formula, which could later be converted to a quota or an HGL. The rule also provided a long list of potential forms in which OY could be expressed.⁷⁶
- *Target not Quota*: OY is a target and is not necessarily a quota.⁷⁷
- When data on MSY are lacking, OY should be defined based on the best available scientific information.⁷⁸
- Exceeding OY does not necessarily indicate overfishing.⁷⁹

The struggle to deal with annual versus long-term strategies for OY was apparent in the attempt to allow for long-term OYs while maintaining ability to calculate TALFF annually. The rule allowed for the creation of OY reserves (i.e., set asides for uncertainties) as long as there was a mechanism for releasing TALFF.⁸⁰ In addition, the rule stated *227 that OY “can” be annualized for calculating TALFF (implying that multi-year or long-term OY is acceptable).⁸¹ Although the rule itself did not specify that OY must be annual, NOAA addressed this issue in the preamble stating that “the Act requires an attempt to be made to *achieve OY on an annual basis* year after year.”⁸² Finally, the 1983 Final Rule stated that for “diminished” stocks, the OY analysis “should include a program for rebuilding.”⁸³

The section on MSY in the 1983 Final Rule grew from one paragraph in the Federal Register to four paragraphs and included the following:

- Definition of MSY is a long-term average;⁸⁴
- Possibility of MSY may be a range;⁸⁵

- A single MSY may cover a mixed species fishery;⁸⁶
- MSY estimation techniques (including YPR, past catch, models, spawner/recruitment, fishing mortality, ecosystem models);⁸⁷ and
- MSY adjustments through use of ABC, TAC, or Equilibrium Yield (EY) concepts.⁸⁸

The rule introduced into National Standard 1 guidance the terms ABC, TAC, and EY as methods of adjusting MSY, explaining: MSY may need to be adjusted because of environmental factors, stock peculiarities, or other biological variables, prior to the determination of OY. Examples are ABC, TAC, and EY.⁸⁹ ... ABC is an annually determined catch that may differ from MSY for biological reasons. It can be lower or higher to allow for fluctuating recruitment.⁹⁰

The rule significantly changed the regulatory treatment of overfishing, and emphasized that overfishing and OY were two separate, but related, concepts.⁹¹ It also reaffirmed that overfishing was to be considered a *long-term* concept.⁹²

*228 EDF proposed amending the overfishing definition to include “significant adverse impacts on species or stocks not included in the management unit.”⁹³ After vetting this suggestion, NOAA determined that it was sufficient to address these factors in the OY considerations and pursuant to National Standard 6.⁹⁴ NOAA amended the overfishing definition by adding in the concept of “economic value,” so that the 1983 definition read: “Overfishing is a level of fishing mortality that jeopardizes the capacity of a stock(s) to recover to a level at which it can produce *maximum biological yield* or *economic value* on a *long-term basis* under prevailing biological and environmental conditions.”⁹⁵

The rule explained that some types of fishing that appear to be overfishing are not in fact covered by National Standard 1 (localized, pulse, and growth overfishing)⁹⁶ and thus created an exception to the prohibition on overfishing for mixed stocks,⁹⁷ explaining: “NOAA believes that the proposed sections ... are resilient enough to allow ‘*wise use*’ and precise enough to permit *preservation* of the stocks before overfishing has caused irreversible harm.”⁹⁸

NOAA discussed incorporating “risk” considerations into management.⁹⁹ It also addressed the issue of how to respond to fisheries that exhibit “downward trends,”¹⁰⁰ directing that for such stocks, Councils “must” reduce fishing effort, unless they “assert” that such a measure would not help the situation.¹⁰¹

In the 1983 Final Rule, NOAA continued to emphasize the distinction between the bases for determining OY and overfishing: NOAA believes it is important to keep the distinction clear between the two separate parts of standard 1: the directive is to prevent overfishing, and to achieve OY. ... [E]xceeding OY does not constitute overfishing when the *229 fishery is not depressed. On the other hand, exceeding OY may constitute overfishing when the margins of tolerance are low Whether exceeding OY is overfishing is a separate issue from continual harvest at a level above a fixed-value OY. The latter violates the other half of the standard (which is to achieve OY), whether or not overfishing is the result.¹⁰²

At this time, the standards for measuring overfishing and OY had been further distinguished: OY was to be based on MSY, and at least able to be converted to an annual expression if not itself annual, while overfishing was determined based on the different concepts of maximum biological yield (MBY) and economic value (EV) over a long period of time.

D. “Optimum” in Time Period 1. Go Fish

Time Period 1 was a time of opportunity for domestic fisheries. In many cases, there were more fish than domestic fishermen could harvest.¹⁰³

There was an ongoing push to build domestic capacity.¹⁰⁴ Between 1970 and 1979, the number of documented fishing vessels

built each year grew from 592 to a peak of 2404.¹⁰⁵ More than half of the 30,503 new vessel documentations filed between 1950 and 1997 were filed between 1973 and 1984.¹⁰⁶ Allowing OY reserves illustrated the prevailing concern was derived from fear that U.S. fishermen would not harvest maximum OY, rather than a fear of overfishing.

III. TIME PERIOD 2: 1984-1989. THE PUSH FOR A CONSERVATION STANDARD

Between 1984 and 1989, Councils operated pursuant to the 1983 Final Rule. The public policy dialogue continued among NMFS and its divergent constituencies.

**230 A. OY in FMPs 1984-1989*

Councils developed ten new FMPs and fifteen OY-related amendments.¹⁰⁷ While some of the amendments changed the form of OY, others merely adjusted, and/or added species or areas to, numeric OYs. The continued frequency of FMP amendments making only minor adjustments to numeric OYs again highlights one of the practical issues associated with specifying within the FMP-OY as a particular amount of fish.

Approaches used during this time period included amounts of fish,¹⁰⁸ size limits,¹⁰⁹ and other approaches previously used in Time Period *231 1.¹¹⁰ However, Councils started to develop OY definitions that required less frequent amendments of FMPs, such as specifying OY as a range,¹¹¹ or changing from a specified size limit to a generalized size limit requirement that could be modified as needed.¹¹² Some ranges were numeric, and some were as broad as between zero and MSY.¹¹³ In addition, some new techniques appeared to utilize concepts set forth in the 1983 Final Rule, including the use of escapement goals,¹¹⁴ ABC,¹¹⁵ and TAC.¹¹⁶ The new approaches to OY highlighted several issues that challenged management throughout the years.

Following the lead of the NPFMC, additional FMPs began separating long-term OY goals from annual management approaches. The SAFMC amended its portion of the Joint CMP FMP to change OY from an annual amount of fish to a long-term average designed to achieve MSY.¹¹⁷ The FMP then provided for annual management using TAC, ABC, and the prevention of overfishing. The MAFMC's MSB FMP established OY as a long-term goal and established a Framework for addressing annual management utilizing an "initial" OY (IOY) and ABC.¹¹⁸ The NEFMC's Multi-Species FMP addressed long-term and annual needs by defining OY as "that level of yield which results on an *232 annual basis from implementation of the management program over time."¹¹⁹

Some FMPs allowed for catches to exceed MSY. For example, the CMP FMP allowed annual TAC to exceed MSY by 10%, as long as the fishery was not overfished.¹²⁰

The NPFMC's GOA GF FMP, which specified OY as amounts of fish for specific species and areas and was amended six times in Time Period 1 to make adjustments, was amended twice more in Time Period 2 to make species, numeric, and area adjustments.¹²¹ Finally, in 1987, the Council moved to an "aggregate" OY similar to that used for the BSAI Groundfish fishery (i.e., a specific numeric amount applicable across the entire fishery).¹²²

Different FMPs provided different approaches for specifying OY in mixed stock fisheries. While some provided aggregate OYs for mixed stocks, others provided separate OYs for comanaged species. For example, in both North Pacific groundfish fisheries as well as in the Pacific groundfish fishery, OY was set at an aggregate level for the fishery and then allocated via specifications.¹²³ The Gulf Reef Fish FMP specified OY as different amounts of fish for three different groups of species.¹²⁴

Many of the new and existing FMPs continued to specify OY as a result of management under the FMPs.¹²⁵ Some FMPs further emphasized the linkages of OY and management measures to the goals or objectives of the FMP. Some even listed specific goals or objectives within the expression of OY. For example, the PFMC amended the Pacific Salmon FMP to change from its original OY of specific amounts of fish for certain species,¹²⁶ with management-based OY for others, to *233 OY is equal to all fish harvested under the FMP regulations with the goal of achieving listed objectives.¹²⁷

Some FMPs during this period used ABC to determine OY. For example, in addition to the SAFMC's use of ABC described above as a limit to prevent overfishing, the PFMC amended the Groundfish FMP to add jack mackerel and used ABC as a component of its OY definition. It specified OY as an amount of fish, and linked OY to ABC, stating that OY = ABC, and OY

and ABC were to be less than MSY.¹²⁸

The 1983 Rule’s recognition of the “determination of OY” as a “decisional mechanism” highlights the important role the Council process plays in providing a forum for interested parties to balance the competing values and policies contained within National Standard 1, the other National Standards, and each FMP’s objectives.¹²⁹

FMPs continued to document the considerations used in determining OY. Some explicitly addressed the three ESE factors, and others did not. The effects of Frameworks in specifying OY was to reduce the amount of discussion of rationale contained within the FMP document itself and move that discussion into the more fluid and responsive Council process. Direct linkages of OY to FMP objectives was another way to assure OY addressed the Council’s priorities.

B. Political and Scientific Environment: The 1986 NOAA Study and the Push for a “Conservation Standard”

In June 1986, NOAA issued the “NOAA Fishery Management Study,” recommending ways to improve the fishery management system.¹³⁰ The intent was to maintain stocks at a level that “protects the *234 minimum spawning stock from recruitment overfishing.”¹³¹ The study recommended implementing a “conservation standard” to prevent stocks from being continually driven to, or maintained at, the threshold of overfishing.¹³² Pursuant to this standard, ABC¹³³ and maximum fishing mortality (MFM) would be used to establish a cap on OY. NOAA would establish the ABC, which would serve as a limit on OY and as the maximum allowable harvest level.¹³⁴ This was a different application of the ABC concept than its optional use described in the 1983 Final Rule.¹³⁵ The study also recommended requiring periodic stock assessments and evaluations of social and economic considerations for fisheries, which NOAA termed “stock assessment/fishery evaluation reports” (SAFE reports),¹³⁶ to provide benchmarks of progress.¹³⁷

Publication of these recommendations initiated a renewed debate within and outside the agency and ultimately led to a revised approach to National Standard 1 guidelines.¹³⁸ The 1989 Final Rule was an action-forcing regulation that would aggressively begin pushing management towards longer-term sustainability.

C. The 1989 Final Rule: Foreshadowing Sustainability

The 1989 Final Rule pertained primarily to overfishing. While the 1986 Study proposed centralizing control over fishing mortality by requiring NOAA to establish maximum harvest levels (ABCs), the rule kept the use of ABC optional and retained management responsibility at the Council level.¹³⁹ However, it included other provisions designed to promote sustainability.¹⁴⁰ The Rule changed the regulatory definition of *235 overfishing, required Councils to include an “objective and measurable definition of overfishing for each stock or stock complex,” provided for regular monitoring of stock status through SAFE reports, and addressed prevention of overfishing and rebuilding.

Although it focused on overfishing, this Rule had a big effect on many FMPs’ OY definitions as well. In many ways, the 1989 Final Rule was the regulatory precursor to the Sustainable Fisheries Act of 1996 (SFA).¹⁴¹

The 1989 Final Rule continued to describe the “determination” of OY as a “decisional mechanism.” No changes were made to guidance regarding annual versus long-term requirements, or form of OY expression.¹⁴² Under the 1983 guidance, MSY remained the “largest average annual catch ... that can be taken over a significant period of time from each stock under prevailing ecological and environmental conditions. ... Since MSY is a *long-term average*, it need not be specified annually, but must be based on the best scientific information available.”¹⁴³ The 1989 Rule changed the standard for determining whether overfishing was occurring. The revised standard for determining overfishing was phrased in terms of a stock’s “long-term capacity” for “achieving *MSY* on a continuing basis,” as opposed to previous versions of the definition that focused on *maximum yield*, *MBY*, and *economic value*.¹⁴⁴ As a result, OY and overfishing were now aligned by the same unit of measure, i.e., MSY.

During rulemaking, one commenter suggested that the phrase “long-term” should be deleted from the overfishing definition because it was redundant with “on a continuing basis.” NOAA disagreed, and retained both “long-term” and “continuing basis” for the following reason:

A catch equal to MSY may be harvested for a short time, even from a severely depleted stock. ... It is important to note that the phrase “long-term” is not used to qualify the production of MSY on a continuing basis (which

would be redundant), but rather to qualify a stock’s capacity to produce MSY on a continuing basis. NOAA believes that it is possible for *236 a stock to lack the short-term capacity to produce MSY on a continuing basis without being overfished in the sense of the Act.¹⁴⁵

The rule required FMPs to include the following measures to assess and prevent overfishing and to rebuild overfished stocks:

- “Objective and measurable” overfishing definitions expressed in terms of:
 - a minimum level of spawning biomass;
 - a maximum rate of fishing mortality; or
 - a formula, model, or other measurable standard;¹⁴⁶
- Management measures to prevent overfishing;¹⁴⁷
- Rebuilding programs for overfished stocks, including specified timelines;¹⁴⁸ and
- Reduction of fishing effort for “downward trending” stocks, unless the Council asserts, and supports with evidence, that reducing effort will not help the problem.¹⁴⁹

The rule provided additional guidance for the optional use of ABC, imposing limitations on ABC when biomass thresholds are reached. The 1989 Final Rule explained:

[ABC] may be used as a step in deriving OY from maximum sustainable yield (MSY). ... In this context, the ABC is set by a Council, not NOAA. Since the ABC concept is not necessarily applicable to all fisheries, Councils may establish an ABC level, but are not required to do so.¹⁵⁰

The deadline for compliance with new overfishing definition mandates was February 1991.¹⁵¹ By the beginning of the next time period in 1990, changes were becoming apparent.

D. “Optimum” in Time Period 2: How Many Fish Are Left?

The dialogue and thinking during Time Period 2 reflected a sense that the boom launched during Time Period 1 needed to be better accounted for and controlled. The public Council process for determining OY was the decisional tool for achieving balance. As *237 Councils found more efficient approaches for specifying OY, a key takeaway message from this time period was that Councils, managers, and the public needed additional information about stocks and fisheries before the mandate to prevent overfishing that would constrain OY. It was time to address unanswered questions about what overfishing looked like.

IV. TIME PERIOD 3: 1990-1995. EFFECTS OF EARLY OVERFISHING DEFINITIONS AND SAFE REPORTS

A. The 1994 Rosenberg Report: Overfishing Definitions in FMPs

A 1994 report completed by Rosenberg et al. (Rosenberg Report) provided a scientific review of FMPs’ overfishing definitions

and sheds light on how Councils responded to the 1989 Rule.¹⁵² As of 1994, there were over 100 definitions of overfishing contained within FMPs.¹⁵³

The FMP overfishing definitions focused on targets, thresholds, and recruitment, and were expressed in terms of both fishing mortality (F) and biomass (B). They included:

- F (RANGING FROM F5%-F42%);

- Three-year average recruitment down;

- Three-year average failure to meet escapement goals;

- Numbers of spawners;

- F_{Max} ; and

- Overfishing=Landings exceeding OY.¹⁵⁴

In at least one case, the FMP's definition of overfishing was linked directly to exceeding OY.¹⁵⁵

B. OY in FMPs 1990-1995

Between 1990 and 1995, Councils developed four new FMPs¹⁵⁶ and fourteen OY-related FMP amendments. Many of the forms of OY *238 reflected an evolution in management approaches. Although some FMPs continued to employ familiar OY strategies, such as broad numeric ranges or the “results of management,”¹⁵⁷ many others either directly incorporated references to overfishing or moved the fishery towards more conservative targets to avoid overfishing.¹⁵⁸ OY expressions began expanding the use of biological measurements such as spawning potential ratio (SPR), spawning stock biomass per recruit (SSBR), yield per recruit (YPR), and reproductive capacity.¹⁵⁹ Two FMPs utilized ABCs.¹⁶⁰ Although for most FMPs, the definitions of overfishing and *239 OY were different, similarities were appearing. The use of B-based and F-based expressions of OY was increasing, which echoed the approaches used to define overfishing. During this time period, six Councils developed OY definitions that included some form of F or B target.

Most of the amendments to OY definitions shifted towards increased use of B and F targets¹⁶¹ and increased use of annual management strategies either specifying OY as an annual number or using another annual management approach such as TAC or HGL.¹⁶² Some explicitly tied the definition of OY to avoidance of one or more types of overfishing.¹⁶³ In the South Atlantic, there is an OY definition specified in terms of rebuilding.¹⁶⁴

The GMFMC added the requirement to prevent “recruitment overfishing” into its Shrimp FMP.¹⁶⁵ The MAFMC amended the Summer Flounder FMP's OY definition, adding to its existing management-based approach linkages to F_{Target} and Recruitment. In 1991, the WPFMC amended its Crustaceans FMP OY from size-based OY to 0.5SPR designed to prevent overfishing.¹⁶⁶ This is still the OY definition.

During this time period, Councils continued to wrestle with the dichotomy between the long-term goals and short-term management needs of OY. The Gulf Reef Fish FMP established a Framework process *240 for using annual TACs and ABCs.¹⁶⁷ In moving towards more annualized OYs, the MAFMC amended the MSB FMP, replacing its previous long-term OY-

implemented through annual “IOY” and ABC-to the statement that OY is less than or equal to ABC.¹⁶⁸ However, specifications for mackerel were to be made for a three-year period, instead of one.¹⁶⁹ The PFMC moved from an amount/range of fish for many species to an annual process for reviewing the SAFE Report and using ABCs to set HGLs.¹⁷⁰

Mixed species fisheries continued to face special issues as well. The Snapper-Grouper and Gulf Reef Fish FMPs moved towards single species management within their mixed stock fisheries. The Gulf Reef Fish FMP had previously set OY as amounts of fish for groupings of species. In amendment 1 (1990), the approach changed to a biomass approach of 20% SSBR and it allowed for establishing OY at specific species levels.¹⁷¹ This was replaced by amendment 3 in 1993, establishing OY for Reef Fish as 20% SPR.¹⁷² Similarly, the SAFMC amended its Snapper Grouper FMP, changing its OY from size limit variations for different species groups on YPR goals for snappers, seabasses, and groupers, and management-based OY for jewfish, to SBR FOR ALL, INCLUDING SPECIFYING TWO FOR INDIVIDUAL SPECIES THAT REQUIRED REBUILDING (JEWFISH AND WRECKFISH).¹⁷³

Some of the OY provisions in new FMPs and amendments documented consideration of various factors, including the ESE factors.¹⁷⁴ Others began shifting more of the OY consideration process outside of the FMP process through the use of Frameworks. The Gulf Reef Fish and Pacific Groundfish FMPs moved the specification of OY into an annual Framework process. The MAFMC MSB FMP’s annual process for specifying annual OY addressed the ESE factors by first *241 allowing for reductions based on biological factors (ABC)¹⁷⁵ and then allowing further modification to account for economic considerations.¹⁷⁶

Two FMPs demonstrated that overfishing had become the overriding, or even the only, consideration in determining OY. In the amendments to the Summer Flounder FMP, there is no discussion of the ESE factors per se; however, the prevention of overfishing is discussed. An amendment to the Snapper-Grouper FMP changed the OY for jewfish to mirror the overfishing definition and did not discuss further ESE factors.

C. “Optimum” in Time Period 3. Not Enough Fish

It was clear that there were no longer more fish than the domestic fleet could harvest. NMFS began the first of several “buy back” programs in 1994 intended to reduce domestic fishing capacity in certain fisheries.¹⁷⁷

Although the 1989 Rule moved OY and overfishing standards closer together by making them both MSY-based determinations and weaving the requirement to prevent overfishing into the determination of OY, the two determinations remained mostly distinct and separate tests when implemented in the FMPs. Thus, management improvements were underway in developing a foundation to measure and respond to overfishing. However, the continued interpretations of OY as an annual goal that could exceed MSY, and overfishing as a long-term determination, sent the message that it was acceptable to fish now and pay later.¹⁷⁸

V. TIME PERIOD 4: 1996-1998: THE SFA’S LEGISLATIVE PENDULUM SWING

A. Major Statutory Changes: The 1996 SFA

The 1996 SFA built on the progress that fishery managers had made pursuant to the 1989 Rule and gave statutory teeth to many of the regulatory concepts while adding several new requirements to eliminate *242 management discretion regarding response to overfishing and overfished stocks.¹⁷⁹ With these changes, the connection between overfishing and OY became even more pronounced and would set the stage for a reversal in dominance between the two competing goals of National Standard 1.

The SFA dramatically changed the statutory definition of OY in three ways that seemed to hold promise for more conservation-minded and/or ecosystem-based approaches to determining “optimum.” First, the SFA added the requirement that, in determining “greatest overall benefit to the Nation,” Councils take into consideration “the protection of marine ecosystems.”¹⁸⁰ Second, the SFA changed the relationship between MSY and OY. Whereas OY was previously defined based on MSY as “modified” by economic, social, and ecological considerations, which allowed for OY to be set above MSY in some cases,¹⁸¹ the SFA mandated that OY be based on MSY as “reduced” by relevant considerations, thereby eliminating any possibility of OY being set above MSY.¹⁸² Finally, the SFA added a third paragraph to the definition of OY requiring that, in addition to

providing the greatest overall benefit to the Nation and being based on MSY, OY, for overfished fisheries, must “[provide] for *rebuilding* to a level consistent with producing the [MSY] in such fishery.”¹⁸³ Thus the two concepts of OY and overfishing were now statutorily connected within the MSA’s definition of OY itself. Further, MSY was now the statutorily mandated standard for the biomass level to achieve when rebuilding stocks.

The rebuilding component in the OY definition then linked to a change in the required FMP provisions. The SFA amended section 303(a)(1) to require that FMPs not only contain measures to prevent overfishing but also to “[rebuild] overfished fisheries.”¹⁸⁴ It also added an entire new section 304(e) establishing rebuilding timelines and Secretarial duties if Councils failed to act.¹⁸⁵ It also added a requirement that FMPs include “objective and measurable criteria for determining when the fishery ... is overfished.”¹⁸⁶

The SFA’s changes to OY (i.e., that OY may not exceed MSY, must take into account marine ecosystems, and must provide for rebuilding to *243 a level that can produce MSY), combined with its time period for rebuilding, created significant new constraints for FMPs. For overfished fisheries, OY must be set at a level that would accommodate rebuilding within ten years. The overfishing thresholds would become overtly constraining on OY definitions.

The SFA defined the terms “overfishing” and “overfished” as “a rate or level of fishing mortality that jeopardizes the capacity of a fishery to produce the *maximum sustainable yield* on a continuing basis.”¹⁸⁷ Thus, NMFS’s 1989 regulatory interpretation basing the overfishing determination on MSY became statutory.

Building on the concept of the 1989 Final Rule’s requirement for SAFE reports, the SFA required the Secretary of Commerce to report annually to Congress and the Councils on the status of fisheries. When a Council is notified that its fishery is overfished or undergoing overfishing, it has one year to prepare a plan, amendment or regulation to end or prevent overfishing.¹⁸⁸

B. OY in FMPs 1996-1998: Change Is Coming

Between 1996 and 1998, NMFS developed guidance to assist Councils in complying with the new SFA mandates. During this time period, there were not many new FMPs or amendments that addressed OY. Some FMPs that were in the development process made their way to completion. However, some Councils did undertake initial efforts to revise their FMPs for SFA compliance during this time, and some of the changes affected OY. In total, this time period saw two new FMPs¹⁸⁹ and nine OY-related amendments.

There was a noticeable increase during this time period in the use of F and B targets for specifying OY. For the new Queen Conch FMP, the Caribbean Fishery Management Council (CFMC) utilized a B-based approach to OY.¹⁹⁰ The New England Fishery Management Council *244 (NEFMC) modified its Multispecies FMP expression of OY from a more general expression (i.e., results of management over time), to a specific target-based formula of $OY = F_{\text{Target}} \times B_{\text{Target}}$, with reference to achieving FMP objectives.¹⁹¹ The MAFMC amended the Summer Flounder FMP twice to include scup and black sea bass,¹⁹² but the approach to OY did not change--it remained management-based in light of variable F_{Targets} and recruitment.¹⁹³

In another case, OY was equated to MSY. The SAFMC amended the South Atlantic Shrimp FMP retaining the definition that OY is the amount of harvest that can be taken by U.S. fishermen without reducing the spawning stock below the level necessary to ensure adequate reproduction, but it added that $OY=MSY$.¹⁹⁴

Some FMPs adopted more risk-averse OY calculations. The SAFMC specified OY as 40PR FISHERY-WIDE FOR SNAPPER-GROUPER.¹⁹⁵ THIS REPRESENTED A CHANGE AWAY FROM SPECIFYING OY IN TERMS OF SBRs including individualized percentages applicable to some species. The reason for the change was explained as follows:

The Councils propose to revise the definition of OY to conform with the proposed overfishing definitions and SPR targets. The SAFMC’s and Gulf Council’s targets would be set at OYs of 40 and 30 percent static SPR, respectively. ABCs would be calculated based on each Council’s chosen OY target. Currently, the OY definition in the FMP states that the long-term OY goal for mackerels and cobia is MSY. The Councils believe that this definition may drive spawning stock levels toward the overfished level. They consider the newly proposed definition to be more risk-averse, i.e., revising and resetting OY targets at SPRs of 30 and 40 percent would decrease the risks of overfishing more than setting them at MSY.¹⁹⁶

One Council commented on the change in alignment between OY and overfishing. In amendment 10 to the Snapper-Grouper FMP, written to comply with the new requirements, the SAFMC noted there was *no longer a distinction between OY and overfishing*.¹⁹⁷

***245** An overt example of the SFA’s effect on OY in FMPs can be seen in the GMFMC’s 1996 amendment to the Shrimp FMP, which would have allowed OY to exceed MSY. The amendment allowed OY to be set at MSY +30% for a two-year period to obtain better information about MSY.¹⁹⁸ NMFS approved this amendment, and its regulations became effective in January 1996,¹⁹⁹ but when the SFA was signed into law later that year, it prohibited OY from being set above MSY and rendered the amendment unusable.

The SAFMC completed two amendments to its portion of the Joint CMP FMP in amendments 8 and 11. These amendments moved away from defining OY with the previous formulas that allowed TACs to fluctuate above MSY and returned to specifying OY for cobia as an amount of fish and OY for King and Spanish mackerel as PR. THIS FMP REFERRED TO OY AS A “MANAGEMENT TARGET.”²⁰⁰

Difficulties revising OY arose with respect to the mixed stock Gulf Reef Fish fishery. Between 1995 and 2003, NMFS and the Council struggled with efforts to revise OY for the Gulf Reef Fish FMP, while working with various versions of PRS.²⁰¹ THEY WERE NOT ABLE TO RESOLVE CONCERNS, ESPECIALLY THOSE PERTAINING TO HERMAPHRODITIC SPECIES. IT WOULD NOT BE UNTIL 2003 AND 2004 THAT NMFS AND THE COUNCIL FINALLY AMENDED THESE OYS, AND BY THEN IT WAS IN THE CONTEXT OF REBUILDING PLANS.²⁰²

The PFMC amended its Groundfish FMP’s OY adding a series of “if/then” scenarios providing OY values that changed in relationship to biomass and ABC. This was a change from the previous approach, which relied on annual specifications of ABC and use of HGLs, to three different default values based on biomass.²⁰³

***246** The SAFMC’s Golden Crab FMP, approved prior to enactment of the SFA,²⁰⁴ specified OY as:

[A]ll golden crab that are harvested legally under the provisions of the golden crab fishery management plan which is equivalent to that level of golden crab harvest that would minimize user conflict among vessels, minimize the cost of fishing, produce a stable level of landings that would maximize returns to the fishermen, provide for a stable supply, and minimize management costs.²⁰⁵

Thus, OY was based on results of management and achieving objectives specified in the FMP.

C. Process and Considerations in Establishment of OY

Given the timing requirements for developing new FMPs and amendments, there were not many new examples to indicate the effects of the SFA. The FMPs and amendments considered various factors in determining OY during this time period. For example, the Snapper-Grouper FMP amendment considered both the ESE factors and the prevention of overfishing. The Gulf Shrimp FMP’s amendment also included a detailed discussion of the ESE factors considered. There was not yet any evidence of increased consideration for the marine environment.

D. The First Status of the Stocks Reports

In 1997, NMFS submitted its first Status of the Stocks Report to Congress.²⁰⁶ The report listed 86 species as overfished, 183 as not ***247** overfished, 10 as approaching an overfished condition, and 448 of unknown status.²⁰⁷ The report predicted that as additional FMPs were amended to comply with the SFA’s new overfishing requirements, additional species would be found to be overfished.²⁰⁸

The 1998 Status of the Stocks Report showed a moderate increase in all numbers (except those approaching an overfished status), listing 90 as overfished, 200 as not overfished, 10 as approaching overfished, and 544 of unknown status.²⁰⁹

E. The 1998 SFA Rule

In 1998, NMFS published a final rule²¹⁰ providing guidance on SFA implementation. It created new terminology for determining when a fishery is overfished. Significantly, it modified previous interpretations of OY and the overfished/overfishing concepts with respect to their long-term or annual determinations.

The 1998 Final Rule retained the long-standing description of MSY as a long-term average and the description of the “determination” of OY as a “decisional mechanism.”²¹¹ However, in a noteworthy turn of events, the rule reversed NMFS’s longstanding position that attempts should be made to achieve OY on an *annual basis* and stated instead that OY itself was to be cast as a *long-term average*.²¹² The rule stated: “In national standard 1, use of the phrase ‘achieving, on a continuing basis, the OY *248 from each fishery’ means ‘producing, from each fishery, a long-term series of catches such that the average catch is equal to the average OY and such that status determination criteria are met.’”²¹³ The rule also provided for establishing OY and MSY “control rules,” which meant harvest strategies expected to result in long-term average catch approximating OY and MSY.²¹⁴

As the description of OY was being shifted from an annual to a long-term target, the interpretation of overfishing was beginning to shift in the opposite direction. The 1989 rule described “overfishing” as “a level or rate of fishing mortality that jeopardizes the *long-term* capacity of a stock or stock complex to produce MSY on a continuing basis.”²¹⁵ The 1998 rule eliminated the word “long-term” from this description.²¹⁶ Although the preamble stated that this was not a significant change,²¹⁷ looking back at the change in combination with the addition of subsequent new requirements, this appears to have been the beginning of a powerful reversal in policy.

The 1998 rule also shifted away from the previous unequivocal statement that OY *need not* be expressed in terms of number or weight of fish,²¹⁸ as had been stated in the 1989 rule. Instead, it stated that OY “*should* be expressed in terms of numbers or weight of fish.”²¹⁹ However, it allowed OY to be expressed as a *formula* that converts periodic stock assessments *into target harvest levels*; in terms of an annual harvest of fish or shellfish having a minimum weight, length, or other measurement; or as an amount of fish taken only in certain areas, in certain seasons, with particular gear, or by a specified amount of fishing effort.²²⁰ That said, the rule further stated that OY “should be translatable into an *annual* numerical estimate for the purposes of establishing any TALFF and analyzing impacts of the management regime.”²²¹

The 1998 Final Rule also required an analysis of how OY will prevent overfishing.²²² This resulted in a de facto regulatory mandate for “OY” to prevent overfishing.²²³ The once separate dual components of *249 National Standard 1, to “prevent overfishing” while “achieving OY,” had become interpreted in such a way that the prevention of overfishing was incorporated into the definition of OY itself. Yet, OY was not interpreted as a quota.

Whereas earlier rules discussed the importance of buffers and of decreasing risk in the face of uncertainty,²²⁴ particularly with reference to the relationship between OY and overfishing, the 1998 rule added a new section on the precautionary approach that explained that targets should be set safely below limits, stocks with B below MSY should be harvested at a lower rate, and greater uncertainty should correspond to greater caution in setting target catch levels.²²⁵ The 1998 rule does not include the term ABC, but the preamble notes that ABC is one of many targets that Councils can use in adjusting MSY.²²⁶

The 1998 rule addressed the SFA’s requirement for FMPs to contain “objective and measurable criteria” for determining the overfished status by interpreting this to mean that each FMP must include “status determination criteria” (SDCs) for *both* biomass and fishing mortality.²²⁷ Previous guidance had allowed using either of these approaches.²²⁸ The 1998 rule labelled these SDCs “maximum fishing mortality threshold” (MFMT) and “minimum stock size threshold” (MSST).²²⁹

F. The 1998 Restrepo Report²³⁰

Another important piece of guidance pertaining to National Standard 1 was a 1998 report developed by Restrepo and others. Entitled *Technical Guidance on the Use of Precautionary Approaches to *250 Implementing National Standard 1 of the Magnuson-Stevens Fishery Conservation and Management Act (Restrepo Report)*, this guidance subsequently helped shape many expressions of OY. This guidance was developed by scientists for an audience of stock assessment scientists who would be involved in application of the precautionary approach under National Standard 1.²³¹ The report provides technical guidance on developing control rules, status determination criteria, targets and reference points, default control rules, and proxies.²³² It

recommended a default OY control rule of fishing at 75% of FMSY.²³³ Many of the OY definitions developed after dissemination of this guidance adopted this default.

The introduction notes that the report’s guidance pertains only to the biological aspects of fishery management, “such as the response of fish populations to exploitation,”²³⁴ and further notes that “there are many other important aspects to managing fisheries, such as socioeconomic factors, which are key to defining optimum yield, and which Fishery Management Councils must consider.”²³⁵ However, this guidance, and the use of biologically based control rules, would come to play a dominant role in the development of future OY definitions.

G. “Optimum” in Time Period 4. Turn on the Lights, the Party’s Over

In a sense, Time Period 4 is when the fisheries world turned the lights on and faced the problem that stock statuses were not where they needed to be for many species. The struggle with how to respond, however, was just beginning.

The requirement that OY be set below MSY immediately manifested its effects on several fisheries. It would remain to be seen whether modifications to the OY considerations would shift the balance towards a more conservation-based perspective.

VI. TIME PERIOD 5: 1999-2008. BELT-TIGHTENING AND THE MSRA

Time Period 5 ranges from 1999-2008. It begins with the main wave of SFA implementation, and it includes the passage of the Magnuson-Stevens Reauthorization Act (MSRA) in 2007.²³⁶ However, *251 due to MSRA deadlines and the timing of NMFS’s interpretative regulations, significant implementation of the MSRA did not appear widely in FMPs until post-2008.

Annual Status of the Stocks reports provided benchmarks of management progress.²³⁷ As managers gained experience implementing the SFA, additional issues came to light. NMFS continued to engage in public dialog through an ANPR to revise the National Standard 1 guidelines²³⁸ and, in 2005, published a proposed rule intended to address these issues.²³⁹ In 2007, the MSRA was enacted and the 2005 proposed rule did not go forward.²⁴⁰ It was not until 2008 that NMFS proposed new guidance or the impacts of the MSRA manifested in OY definitions.²⁴¹

A. OY in FMPs 1999-2008

In the wake of the 1996 SFA, NMFS’s 1998 final rule, and the institution of the annual Status of the Stocks reports,²⁴² there were twenty-nine OY-related amendments (two of which were Secretarial). In some cases, these were the first amendments to long-standing OY specifications.²⁴³ Eleven new FMPs went into effect, several of which applied to fisheries that were identified as overfished before the FMP was developed.²⁴⁴ While a few FMPs continued to specify OY as a *252 number,²⁴⁵ or as the “results of management,”²⁴⁶ a relatively large number of FMPs used some form of F- or B-based target or control rule.²⁴⁷ Notable issues during this period include the widespread application of the *Restrepo Report*; increasing use of Frameworks; overt linkages among OY, overfishing, and rebuilding; limited use of the ABC concept; and challenges pertaining to multispecies management.

Many of the changes to OY definitions relied on the technical recommendations contained in the *Restrepo Report*.²⁴⁸ The CFMC used this approach in three of its four FMPs, adopting a definition of *253 OY=75SY.²⁴⁹ The WPFMC used this approach as well in its new WPFMC Coral Reef FMP.²⁵⁰ The GFMC established OY as 75SY and 85SY for Spanish mackerel and cobia, and King mackerel respectively.²⁵¹ The SAFMC established OY in its new Dolphin-Wahoo FMP as less than or equal to 75SY.²⁵² The GMFMC also established that in the future, after completion of rebuilding, OY would be set at 75SY for several of its Reef Fish species (red grouper, red snapper, and vermilion snapper).²⁵³

As the MSY-based linkages between OY and overfishing became more pronounced, more FMPs began to reflect these linkages in their OY definitions. Several FMPs equated OY to MSY²⁵⁴ or defined OY as less than or equal to MSY.²⁵⁵ One FMP stated that OY was equal to the overfishing threshold.²⁵⁶ The Monkfish FMP defined long-term OY as based on the targets in the overfishing definition.²⁵⁷ Several specified OY as fishing pursuant to the rebuilding plan.²⁵⁸

Several Councils took steps to address the competing needs for annual versus long-term understandings of OY. One approach they used was to provide for the use of Frameworks. The GMFMC amended its Reef Fish and Red Drum FMPs to provide for establishing OY via a Framework process.²⁵⁹ The NEFMC established a process within the *254 Herring FMP for annually specifying OY.²⁶⁰ The SAFMC provided an OY Framework process for the Dolphin-Wahoo FMP.²⁶¹ The PFMC provided for biennial specifications for its Pacific Groundfish FMP.²⁶²

As some Councils implemented rebuilding plans, they anticipated the need for modifications once rebuilding was achieved and established provisions in their FMPs for a different OY to apply after completion of rebuilding. For example, the Gulf Reef Fish FMP specified OY for red snapper as:

Until recovery, the harvest for red snapper will be defined as consistent with the rebuilding strategy selected in this amendment. After achieving the rebuilding target, the OY for red snapper shall correspond to a fishing mortality rate (FOY) defined as: $FOY = 0.75 * FMSY = 0.069$ This is the average yield available on a continuing basis from fishing at 75 percent of FMSY (using 75% * F26PR AS A PROXY).²⁶³

The SAFMC implemented a similar planning mechanism for several species in its Snapper-Grouper FMP.²⁶⁴

The NEFMC addressed long-term/short-term dichotomies by establishing two separate forms of OY in its Atlantic Scallop and Monkfish FMPs. From 1999 to 2004, the Scallop FMP’s amendment 7 defined a “long-term OY” as the yield from an OY control rule and defined “annual OY” as the yield from an F_{Target} that achieves a B_{Target} and MSY objectives, taking into account the MSA’s OY considerations.²⁶⁵ In 2004, amendment 10 modified the definition to focus on long-term factors.²⁶⁶ The 1999 Monkfish FMP also provided dual definitions: long-term OY was based on F_{Target} and B_{Target} set forth in the overfishing definition, whereas annual OY was updated annually as $OY_{Target} = F_{Target} \times B_{Target}$.²⁶⁷

*255 Few FMPs used the ABC concept as described in the 1989 Rule.²⁶⁸ The PFMC’s Coastal Pelagics FMP and the NEFMC’s Herring FMP both employed ABC in determining OY using it as a basis for reducing OY below MSY to account for various management objectives and uncertainties.²⁶⁹ The PFMC also used ABC in its Pacific Groundfish FMP, reducing OY below ABC based on available information and additional factors including: whether abundance has fallen below a certain threshold; degree of uncertainty about the biomass estimate and other parameters; bycatch in other fisheries, and the catch of species for research purposes; and other social, economic, or ecological considerations.²⁷⁰

Several FMPs that covered multiple species were facing increasing challenges to cohesive management. For the Reef Fish and Snapper-Grouper fisheries in the Southeast, the GMFMC and SAFMC began breaking out individual species, or small subsets of species, for separate management in order to implement rebuilding plans. The GMFMC developed individual rebuilding programs for four species (amberjack, red grouper, red snapper, and vermilion snapper),²⁷¹ and the SAFMC developed rebuilding programs for red porgy, snowy grouper, and black sea bass.²⁷² On the West Coast, the PFMC struggled to address overfished species that co-occur with healthy species, seeking ways to allow some form of limited fishing on overfished stocks, that would not rise to the level of overfishing, in order to allow fishing on healthy stocks.²⁷³

*256 The NEFMC’s Red Crab FMP took a completely different approach to OY than any of the preceding NEFMC plans and amendments. It defined OY as a formula that specifically incorporates the statutory OY considerations for reductions below MSY and provides a numeric amount that reflects a reduction from MSY to account for uncertainty. The formula quantifies the combined consideration of the three ESE factors (economic, social, and ecological). If the resulting number is less than zero, then $OY = MSY$ as reduced by that amount. If the sum of the three considerations is greater than zero, then $OY = MSY$. The FMP also provides for further reductions to account for uncertainty. The formula is expressed in the FMP as follows: $OY = MSY + (C_{ECON} + C_{SOC} + C_{ECOL})$, if $C_n < 0$, or $OY = MSY$, if $C_n > 0$, where C_{ECON} , C_{SOC} , and C_{ECOL} denote economic, social, and ecological considerations, respectively.²⁷⁴ The FMP’s current expression of OY includes a rationale for reducing MSY by 5% to account for “current uncertainties about the status of the resource, its vulnerability to overfishing, and the levels of fishing effort in the fishery” and results with an annual amount of fish.²⁷⁵

B. Process and Considerations for Establishment of OY 1999-2008

Ironically, the addition of “marine environment” as a consideration in determining OY was overshadowed by the mandates to prevent overfishing and rebuild. For fisheries near or in an overfishing/overfished status, the biological constraints of the SFA

became the overriding focus. With widespread reliance on the biologically based recommendations in the *Restrepo Report*, in some cases fishing mortality goals became the sole factors considered in establishing OY. The role of OY as the “decisional mechanism” for balancing competing fishery management policy mandates had been overtaken by the policy determinations set forth in the SFA. The buck stopped at overfishing.

C. Status of the Stocks 1999-2008

During this time period, NMFS refined its classifications of species and status categories, sorting stocks into major and minor categories, and distinguishing between “overfished” and “subject to overfishing.”²⁷⁶ Rebuilding plans and measures to end overfishing went into place and began taking effect. Many stocks were removed from the overfished/overfishing lists, although in some cases this was due to refinements in ***257** reporting rather than an actual change in status.²⁷⁷ As new stock assessments were completed and the number of “unknown” stocks decreased, additional stocks were added to the lists of overfished and subject to overfishing. Even with these changes and additions, the long range assessment of success over this period of time showed an overall improvement from the 2000 numbers (which was the first year overfished and overfishing were separated) from seventy-two subject to overfishing and ninety-two overfished, to the 2008 numbers of forty-one subject to overfishing and forty-six overfished.²⁷⁸

D. The MSRA of 2006: Annual Accountability

The MSRA increased accountability, emphasized use of annual measures, and made changes to timelines for ending overfishing and implementing rebuilding plans. Key changes included requirements for:

- Ending overfishing *immediately*;²⁷⁹
- New Council functions (to develop annual catch limits that do not exceed the recommendations of the SSCs);²⁸⁰
- New requirement for SSC to recommend ABC;²⁸¹
- New FMP requirements (for annual catch limits (ACLs) and accountability measures (AMs));²⁸²
- Modified rebuilding timeline;²⁸³ and
- Modification of TALLF provisions.²⁸⁴ ***258** The MSRA made no direct changes to OY, but its new requirements for annual management had major implications for how OY is defined in FMPs.²⁸⁵

The MSRA required Councils to develop ACLs that did not exceed the recommendations of its SSC²⁸⁶ and to include in their FMPs a “mechanism, for specifying--either within the FMP, its implementing regulations, or the specification process--ACLs “at a level such that overfishing does not occur in the fishery, including measures to ensure accountability.”²⁸⁷

Note that the MSRA did not specify whether the timeline for determining whether overfishing was occurring was annual or long-term; however, NMFS’s 1998 regulatory interpretation of OY as a long-term average was the existing interpretation regarding OY. Congress did not override that interpretation of OY. Instead, Congress established a new annual quota-like tool in the form of the ACL. In some ways, the ACL is similar to the ABC concept described as part of the “Conservation Standard” proposed in the 1986 Study in that the ACL serves as a limit on Council discretion. However, instead of NMFS establishing the ACL, the MSRA provided for the Council to establish the ACL so that it does not exceed “the fishing level recommendations” of the SSCs or a peer review.²⁸⁸ NMFS would have to interpret how the requirements to prevent overfishing (no specified timing for making this determination) and to utilize ACLs (annual limits) were to fit with the requirement to achieve OY (a long-term goal per regulation).

E. “Optimum” in Time Period 5. Repaying the Biological Debt

In Time Period 5, it was time to make payments on the biological debt we had been accruing. We could see what overfishing looked like, and it was happening in many places. Our understanding of “optimum” *259 for many fisheries meant doing what we could to prevent overfishing and/or rebuild. As federal “buy backs” continued,²⁸⁹ the impacts of belt-tightening and new mandates to address sustainability of communities left no room for additional consideration of buffers for the marine environment. In stressed fisheries, the potential for expanding OY considerations to proactively address broader ecosystem needs, as the SFA had seemed to promise, was overtaken by the focus on fish stock status and fishing mortality.²⁹⁰ The utility of the OY determination as a “decisional mechanism” for balancing competing priorities was overshadowed by the legislative priority of ending overfishing and the growing information about stocks in need of rebuilding.

VII. TIME PERIOD 6: 2009-2016. TOWARDS ANNUALIZED MANAGEMENT AND BEYOND

A. Interpreting the MSRA Requirements: 2009 Final Rule²⁹¹

In January 2009, NMFS published a final rule providing guidance on the ACL and AM requirements.²⁹² Whereas the 1998 Final Rule had provided for the use of MSY control rules and had promoted the setting of targets safely below limits (i.e., generalized application of the precautionary approach),²⁹³ the 2009 Final Rule provided explicit instructions for utilizing limits, targets, and buffers.²⁹⁴ The 2009 Final Rule interpreted the MSRA to require use of a control rule based on ABC, a new term used once and not defined within the MSRA, rather than based on MSY or OY as in the past.²⁹⁵ The net impact was that the 2009 Final Rule created new concepts and terminology that pushed management further into the realm of required annual management responses.

The 2009 Final Rule introduced several new terms. The rule created the term “overfishing level” (OFL) and described it as “the *annual* amount of catch that corresponds to the estimate of MFMT *260 applied to a stock or stock complex’s abundance and is expressed in terms of numbers or weight of fish. The OFL is *an estimate of the catch level above which overfishing is occurring*.”²⁹⁶ Thus, the OFL became an annual indication of overfishing.²⁹⁷

The MSRA used the phrase ABC once, as a phrase in a list of topics on which SSCs provide advice to Councils, and did not define it. NMFS’s 2009 rule added an ABC definition back into the National Standard 1 guidelines, defining it as an annual level as follows: “[A] level of a stock or stock complex’s annual catch that accounts for scientific uncertainty in the estimate of OFL and any other scientific uncertainty, and should be specified based on the ABC control rule.”²⁹⁸ The rule then established the ABC as a limit on the ACL²⁹⁹ and based annual management on an ABC Control Rule.³⁰⁰ NMFS’s guidance pertaining to ABC control rules states:

For stocks and stock complexes required to have an ABC, each Council must establish an ABC control rule that accounts for scientific uncertainty in the OFL and for the Council’s risk policy, and that is based on a comprehensive analysis that shows how the control rule prevents overfishing.³⁰¹

The 2009 rule noted that when determining its “risk policy,” a council “*could* consider the economic, social, and ecological trade-offs between being more or less risk-averse.”³⁰² In all, the 2009 Final Rule established ABC and ABC control rules as a dominant factor in fisheries management.³⁰³

*261 The 2009 Final Rule created the term Annual Catch Target (ACT). The 2008 Proposed Rule had proposed ACTs to be mandatory targets that would also be limited by the ABC.³⁰⁴ After taking public comment, NMFS determined that ACTs are more appropriate for use as AMs.³⁰⁵ The final guidelines provide: “For fisheries without in season management control to prevent the ACL from being exceeded, AMs should utilize ACTs that are set below ACLs so that catches do not exceed the ACL.”³⁰⁶

The regulatory definition of overfishing remained as written in 1998: “Overfishing (to overfish) occurs whenever a stock or stock complex is subjected to a level of fishing mortality or annual total catch that jeopardizes the capacity of a stock or stock complex to produce MSY on a continuing basis.”³⁰⁷

Recall that in the preamble to the 1998 rule, NMFS indicated that removal of the word “long-term” before the word “capacity” was not significant.³⁰⁸ Yet in 2009, this became very significant in combination with the statement that exceeding the *annual*

OFL constituted overfishing. In light of the annual OFL serving as a limit on ABC, which serves as a limit on ACLs, which in turn trigger AMs when exceeded, the limitations imposed by the mandate to prevent overfishing had become completely annualized.

With respect to form and timing, the regulation continued to state that OY was a *long-term average amount* of yield.³⁰⁹ Exceeding OY was not necessarily overfishing, but exceeding OY continually does not achieve OY.³¹⁰ The rule stated that OY should be expressed in terms of *numbers or weight of fish*, as either a *range or a single value*.³¹¹ The OY specification should be *translatable into an annual numerical estimate* for the purposes of establishing any TALFF and analyzing impacts of the management regime.³¹²

The 2009 Final Rule brought no changes to the MSY calculation. MSY remained a long-term average.³¹³

***262** The 2009 Final Rule inserted “*prevention of overfishing*” into the regulatory definition of OY.³¹⁴ Whereas the 1998 rule had stated that OY must be defined to produce a long-term series of catches “such that status determination criteria are met,”³¹⁵ the 2009 Final Rule specified that OY must prevent overfishing and provide for maintaining the average long-term biomass (B) at the MSY level (B_{msy}):

In NS1 [National Standard 1], use of the phrase “achieving, on a continuing basis, the optimum yield from each fishery” means producing, from each stock, stock complex, or fishery: a long-term series of catches such that the average catch is equal to the OY, *overfishing is prevented*, the *long term average biomass is near or above B_{msy}* , and overfished stocks and stock complexes are rebuilt consistent with timing and other requirements of section 304(e)(4) of the Magnuson-Stevens Act³¹⁶

In sum, the 2009 rule required that OY had to prevent overfishing, and overfishing was determined annually based on the OFL and ABC control rule. Thus, despite being described as a long-term average, OY had become, in effect, annually limited by the OFL and ABC control rule. Therefore the question arises as to the significance of a long-term OY in developing management decisions.

B. OY in FMPs Under the MSRA Rule: Adapting to Annualism

This was a period of sweeping changes to OY definitions. All but fifteen FMPs underwent amendments to OY definitions, some multiple times.³¹⁷ Many of the same issues present during Time Period 5 continued to arise: conversions to annualized approaches and/or the use of Frameworks for establishing OY increased dramatically as did the use of ABC as a step in establishing OY. The linkages between OY, overfishing, and rebuilding continued to evolve. There were several additional appearances of the *Restrepo Report* influencing OY definitions, but for the most part, FMPs had shifted OY definitions to be based on ABC and/or ACL, and, in some cases, OY was essentially determined by the SSC’s recommendation.

***263** During this time, many Councils revised their OYs, defining them in terms of the new annual concepts through expressions such as:³¹⁸

- OY=ABC
- OY=ABC=ACL
- OY=C
- OY=ACL=OY=ACT

- OY=ACT=L

In some cases where the OY was set as equal to the ACL, the FMPs provided for reducing the ACLs below the ABC by considering the ESE factors set forth in the MSA as considerations for reducing OY from MSY and/or considering management uncertainty in reducing the ACL below the OFL. Thus ACLs were beginning to function as surrogate OYs and the MSA’s ESE factors could be, but were not necessarily, considered through the ACL process.

Another approach was to define OY as a long-term average based on the annual concepts--either of average ACLs, or as an average falling somewhere between two or more of the ACT, ACL, and ABC levels.³¹⁹

***264** A third approach was to link OY to OFL. Two FMPs directly linked OY to OFL: both the Alaska Scallop FMP and the BSAI Crab FMP defined OY as a range between zero and the OFL.³²⁰

Several of the SAFMC’s FMPs defined OY as equal to both the ABC and the ACL.³²¹ For these species, the SSC recommends an ABC based on an ABC control rule. The ABC control rule determines what amount of buffer to provide between the OFL and the ABC based on stock assessment information, characterization of uncertainty, stock status, and productivity/susceptibility of the stock.³²² The SSC’s recommended ABC essentially becomes the OY. Although ESE factors may still enter the picture, either as considerations addressed in the underlying stock assessments³²³ or as permissive considerations when councils adopt their risk policies, specification of OY through this approach appears to be de-linked from the MSA procedures for development of FMP components. When OY is specified in this manner, and the Council does not follow the MSA’s procedures for developing FMP components, the process may not be fully functioning as the “decisional mechanism” for balancing the multiple objectives of the MSA and the FMPs that were envisioned in the National Standard 1 guidelines.

OY definitions that did not incorporate the new annual concepts included:

***265** • Variations on the *Restrepo* approach³²⁴

- F_{Targets} and B_{Targets} ³²⁵
- $OY = F_{\text{rebuild}}$; or $OY = F_{\text{rebuild}}$, then after rebuilding reverted to $\%F_{\text{msy}}$, or combinations of F and B_{Targets} .³²⁶
- Aggregate OY with annual implementation³²⁷
- Amounts of fish³²⁸

Accompanying the shift towards annualized expressions of OY was the widespread adoption of Framework procedures for review and specification of management measures, including OY, without requiring an FMP amendment. OY could now be specified through a Framework process in all four CFMC FMPs,³²⁹ in all five GMFMC FMPs,³³⁰ as well as in the Joint Spiny Lobster and CMP FMPs,³³¹ SAFMC Snapper- ***266** Grouper and Dolphin-Wahoo FMPs,³³² NEFMC’s Herring FMP,³³³ and PFMC’s Pelagics,³³⁴ Salmon,³³⁵ and Groundfish FMPs.³³⁶

In most cases, these Framework procedures established OY as a formula into which current scientific data could be inserted to produce an amount of fish. Some FMPs provided for OY to be calculated by the SSCs.³³⁷ The MAFMC, in 2016, explicitly removed the definition of OY from its Surf Clam/Ocean Quahog FMP completely, explaining that commercial quotas for surfclam and ocean quahog would be set under the existing system of catch limits.³³⁸ For MAFMC’s summer flounder specifications, the specifications make adjustments to catch limits but never again have to deal with OY per se, because OY is encapsulated within the range provided for by ACL/ACTs.³³⁹

Some of the Frameworks provided extensive policy guidance as well. For example, NEFMC’s Atlantic Herring FMP (amendment 4 (2010)) provides a list of considerations to be used to reduce ACL from ABC.³⁴⁰ Amendment 16 to the Pacific Salmon FMP provides for specifying biological and management reference points and ***267** accountability measures that account for uncertainty in the fishery management process, reduce the probability of overfishing, and include clear and

objective status determination criteria, while integrating with existing management processes and capabilities to the degree possible.³⁴¹

The Pacific Groundfish FMP’s harvest specification Framework is designed to account for scientific and management uncertainty, and to prevent overfishing, by basing OY on three tiers of abundance.³⁴²

In a similar approach to that taken for the NEFMC’s Red Crab FMP, the NPFMC’s FMP for Fish Resources of the Arctic Management Area (Arctic FMP) describes OY with a formula that incorporates the MSA’s listed considerations for OY. The formula calculates OY as an amount of fish following reductions from MSY, after accounting for uncertainty, nonconsumptive value, fishing costs, and ecological factors.³⁴³ Currently, the formula results in OY being zero for the three species managed under the FMP.³⁴⁴

The FMP explains:

On the basis of these analyses, OY would be an annual de minimis catch, sufficient only to account for bycatch in subsistence fisheries for other species. Because this FMP applies to the management of commercial fishing, the OY for commercial fishing for each of the target species is zero based on the nearly 100 percent reduction from MSY for each target fishery. This reduction allows for OY to be available for subsistence bycatch. In the event that new scientific information becomes available suggesting that the conditions estimated or assumed in the process of making this specification are no longer valid, a new analysis should be conducted and the FMP amended to change OY based on the new information.³⁴⁵

The MSA does not require the same procedures for development of ACLs that it does for OY. The establishment of OY is a mandatory FMP component, and as such, must be developed through the MSA’s public *268 council process that includes formal public comment periods. However, with respect to establishing ACLs, the MSA only requires that the FMP establish a “mechanism” for specifying ACLs.³⁴⁶

For many of the FMPs that define OY in terms of annual management concepts, it is unclear how, if at all, socioeconomic and ecological considerations are factored into the final decision. If, for example, OY=ABC and ABC is determined by a council’s SSC, which considers various factors, including uncertainty in assessment inputs, overfishing status, quality of assessment information, and the status of a stock’s vulnerability and productivity, where is the room for consideration of the ESE factors?

The approach taken in the Arctic FMP provides an example of how an OY Framework could be designed to more explicitly incorporate the ESE factors into the OY determinations.

C. 2009-2016 Status of the Stocks

According to the Status of the Stocks Reports from 2009 to 2016, summarized in the table below,³⁴⁷ management and stock health have been on an overall positive trajectory:

SUMMARY OF CHANGES	2009	2010	2011	2012	2013	2014	2015	2016
Overfishing	38	40 (16%)	36 (14%)	29 (10%)	28 (9%)	26 (8%)	28 (9%)	30 (9%)
Overfished	46	48 (23%)	41 (21%)	41 (19%)	40 (17%)	37 (16%)	38 (16%)	38 (16%)
Rebuilt	4	21	27	32	34	37	39	41

Further, according to NMFS’s system for rating the sustainability of fish stocks,³⁴⁸ significant improvements can be seen for the most important stocks, with the 2015 numbers representing an all-time high in terms of success rates.³⁴⁹ As our understanding of stock status improves, and as the health of many stocks improves, the concerns that have driven *269 us to increasingly annualized constraints and OYs focused solely on fishing effort and/or stock biomass may begin to fade and increase opportunities for consideration of ecological and socioeconomic factors when determining OY.

D. NMFS’s 2016 Rule Revising National Standard 1 Guidelines

In 2016, NMFS published revised guidance interpreting National Standard 1, including provisions that modified some of the annualized requirements pertaining to ACLs and overfishing, allowing overfishing determinations to take place over a multi-year period.³⁵⁰ Some of the changes echo back to positions taken in older guidance such as the 1989 Final Rule. The preamble to the 2016 Final Rule explained:

Since 2007, fisheries management within the U.S. has experienced many changes, in particular the development and implementation of annual catch limits (ACLs) and accountability measures (AMs) under all fishery management plans to end and prevent overfishing. Due to a number of concerns raised during the implementation of ACLs and AMs, NMFS initiated a revision of the NS guidelines ... in order to improve the utility of the guidelines for managers and the public.³⁵¹

Among other changes, the 2016 Final Rule allows the use of multi-year overfishing determinations in certain cases, provides that ABC control rules can phase-in adjustments to the ABC, allows for carryover of all or some of an unused portion of the ACL, describes the relationship between OY and ACLs, and addresses the use of “aggregate” MSY estimates.³⁵²

***270** The 2016 Final Rule included a shift away from strict annual requirements allowing overfishing determinations to be made over three-year intervals in certain circumstances. The 2009 Final Rule based overfishing determinations on exceeding thresholds in a single year. It provided two options for determining whether the stock was subject to overfishing: either (1) F exceeds MFMT over one year, or (2) catch exceeds annual OFL for one year. The 2016 rule added an option for using either calculation over a time period longer than one year as follows:

(3) in certain circumstances, a Council may utilize a multi-year approach to determine overfishing status based on a period of no more than 3 years. The Council should identify in its FMP or FMP amendment, circumstances when the multi-year approach is appropriate and will be used. Such circumstances may include situations where there is high uncertainty in the estimate of F in the most recent year, cases where stock abundance fluctuations are high and assessments are not timely enough to forecast such changes, or other circumstances where the most recent catch or F data does not reflect the overall status of the stock.³⁵³

Addressing the rationale for this change, NMFS stated in the preamble to the final rule: “Small amounts of excess effort or catch in a single year may not jeopardize a stock’s ability to produce MSY over the long term, thus an overfishing stock status determination based on that single year’s reference point may not be the most appropriate characterization of stock status.”³⁵⁴ This observation echoes an earlier interpretation documented in the materials supporting the 1989 rule.³⁵⁵

***271** In 2016, NMFS stated that OY still retained an independent existence despite the requirement for ACLs. In the preamble to the final rule, NMFS provided the following description of the relationship between the two:

ACLs and other annual reference points are annual limits and cannot be defined in terms of OY, which is a long-term average. While the ACL Framework supports achieving OY, OY (as well as annualized OY values) and the ACL Framework are two separate concepts which cannot be defined in terms of one another. Thus, an ACL may not be set to exceed the stock’s ABC/OFL reference points in order to achieve OY and correspondingly, annual catch reference points such as ABC cannot be used to specify OY.³⁵⁶

With respect to form and time frame, OY can still be expressed in terms of numbers or weight of fish, and either as a single value or a range. When it is not possible to specify OY quantitatively, OY may be described qualitatively. OY is still described as a long-term average; however, the rule adds that a Council may choose to provide an expression of an “annual OY,” which cannot exceed the ACL.³⁵⁷

The 2016 rule added guidance on the use of aggregate MSYs and fishery-level OYs. As early as 1982, the NPFMC had established an aggregate OY for the BSAI groundfish fishery as a fixed numeric range.³⁵⁸ National Standard 1 guidance has evolved over the years from promoting single stock MSYs whenever possible in 1983³⁵⁹ to allowing MSY for a “stock or stock complex” in 1998.³⁶⁰ The 2016 guidance takes this concept a step further stating: “Estimating MSY for an aggregate group of

stocks (including stock complexes and the fishery as a whole) can be done using models that account for multi-species interactions, composite properties for a group of similar species, biomass (energy) *272 flow and production patterns, or other relevant factors”³⁶¹ However, the preamble to the 2016 Final Rule explains that aggregate MSY’s are an optional tool for facilitating ecosystem-based fishery management (EBFM). They do not eliminate the need for single-species MSY for stock management purposes.³⁶²

This rule also modified guidance on ABC control rules to allow adjustments to the ABC to be phased in over a three-year period as long as overfishing is prevented and to allow carryover of unused portions of an ACL from one year to increase the ABC in the following year, based on an increase in stock abundance.³⁶³

The pendulum appears to be swinging back in a limited way. To the extent that the 2009 rule promoted annualism through its provisions regarding ABCs and OFLs, the 2016 rule allowed a bit of relaxation under certain circumstances for three key aspects: phasing-in changes to catch levels over an up-to-three year period; carrying over unused quota into the next year; and allowing multi-year overfishing status determinations.³⁶⁴

E. Recent Actions Utilizing Phase-ins and Aggregates

The WPFMC recently took action demonstrating the use of phased-in reduction of catch levels in response to new information.³⁶⁵ The 2015-2017 specifications for bottomfish phased in reductions to the ACL over a three-year period. In 2015, a stock assessment update indicated that the OFL needed to be reduced for certain bottomfish, which resulted in the need to reduce the ACL as well. The Council recommended the revised ACLs after consideration of the risk of overfishing, past fishery performance, the acceptable biological catch recommendation from its Scientific and Statistical Committee, and input from the public.³⁶⁶

Although this action demonstrates a new level of flexibility in moving management to a less annualized system, it also highlights *273 limitations resulting from equating OY to an ACL. Because the FMP defines OY as the amount caught under the management measures of FMP to achieve the FMP objectives, effectively OY is equal to the ACL.³⁶⁷ Therefore, this action demonstrates how the factors that may be altering OY may not be based on the ESE factors and other “net benefit to the Nation” considerations.

A recent amendment to the Gulf Shrimp FMP demonstrates the potential value of aggregate MSYs and OYs as tools for ecosystem-based planning and explicit consideration of ESE factors.³⁶⁸ The Gulf shrimp fishery is managed under a moratorium on new permits and is subject to effort thresholds that address bycatch of sea turtles and juvenile red snapper in a specific area of the Gulf.³⁶⁹ High fuel costs and competition with imports had led to economic losses and a reduction in effort. With the moratorium in place, as the number of participants in the fishery decreased, effort decreased significantly while landings decreased to a lesser degree.

The Council decided to establish aggregate OY and determine the appropriate number of permits necessary to achieve it on a continuing basis in the Gulf shrimp fishery. Amendment 17B took a broad-based look at the fishery with the goals of achieving a relatively high catch-per-unit effort (CPUE) and relatively high landings (at or near aggregate OY) at effort levels that would not exceed the thresholds for sea turtle or juvenile red snapper bycatch.

As a result, the amendment established an aggregate MSY for all species of shrimp harvested in offshore waters.³⁷⁰ Even though MSY at the individual species level is only established for the four federally managed species in the Gulf, the aggregate MSY is less than the sum of the MSYs for the individual species because the individual species MSYs are based on a broader geographic scope that includes both state and federal waters combined.³⁷¹ The aggregate OY was set below the aggregate MSY to address ESE factors.³⁷² The key factors taken into consideration included landings, CPUE, the sea turtle bycatch effort *274 threshold, and the juvenile red snapper bycatch effort threshold. Greater weight was given to the sea turtle bycatch effort threshold because exceeding that threshold would result in a closure of the entire fishery. A model was used to estimate the minimum number of vessels and thus permits necessary to achieve aggregate OY on a continuing basis.³⁷³

Note, however, that because shrimp are an annual crop, they are not subject to the same annual requirements for ACLs that other fisheries are. Establishing aggregate OYs may be more complicated and have less relevance for other fisheries that are managed under ACLs, particularly in multispecies fisheries (e.g., Gulf reef fish).

F. “Optimum” in Time Period 6: Is OY Still Relevant?

During this time period, for many FMPs, the value of OY as a tool for balancing the multiple mandates of National Standard 1, the MSA, and the objectives of various FMPs is questionable. In many FMPs, OY became functionally nonexistent as it was equated to the annual calculation of ABC, ACL, and/or ACT. In the case of surf clam/ocean Quahogs, the Council explicitly removed OY from the FMP altogether. Yet in a sense, Time Period 6 is a preamble to what happens next. It leaves us with revised National Standard 1 guidelines, healthy and improving fish stocks, and innovative thought about new applications of OY. It also leaves us with the lingering question: will we finally be able to “pay it forward” with respect to fisheries management?

VIII. CONCLUSION

This review of the past 40 years’ of fisheries management leaves us with lingering questions: Are we still pursuing OY? Should we be?

In 1976, Congress left fishery managers, Councils, and constituents a huge challenge: to define what is “optimum” with respect to the use and conservation of our public trust fishery resources. Born in the midst of the “wise use” versus “preservationist” debates of the 1960s and 1970s, the concept of OY was designed to give managers flexibility in setting these priorities at the user-group level. However, its relationship with its counterpart, the requirement to prevent overfishing, and the evolving public, regulatory, and legislative perspectives on that relationship have constrained discretion with the determination of OY. Statutory and regulatory requirements pertaining to ACLs have, in some cases, rendered OY almost meaningless. Since the enactment of the *275 MSRA in 2007, OY and overfishing are more closely connected than ever. Based on the common standard of MSY, and determined annually, in many cases they appear to be mere flip-sides of the OFL determination.

A. Balancing Competing Policy Priorities

Initial specifications of OY took place in a context of burgeoning U.S. fisheries. In the early years of FCMA management, there were more fish available than U.S. effort could harvest. Early interpretations of OY as an annual goal based on MSY, and overfishing as a long-term determination based on other standards, prevented considerations pertaining to potential overfishing from becoming overly constraining on expressions of OY.

In 1996, the passage of the SFA began a reversal of those initial characterizations. OY became a long-term goal, constrained by obligations to rebuild to MSY. With the 2007 MSRA and NMFS’s regulatory interpretations, the reversal was complete: annual OFLs would take precedent over long-term OY.

In 1996, Congress seemed to still view the process of specifying OY as the “decisional mechanism” for balancing competing priorities pertaining to food production, recreational opportunities, and economic, social, and ecological issues. Adding the “marine environment” to the list of considerations in specifying OY should have expanded the public dialog on EBFM. However, the SFA’s requirements pertaining to prevention of overfishing and rebuilding, combined with information on stock status, created an urgent and overriding need to constrain fishing effort. This resulted in dialog, and OYs, focused predominantly on only constraining fishing mortality rates and levels. The approaches suggested in the *Restrepo Report* became widespread defaults.

As progress is made towards achieving rebuilt, healthy fisheries, it will be interesting to see whether NMFS’s original assessment of the relationship between OY and overfishing can still ring true: that overfishing and OY are separate standards, and that their identities become more distinct as confidence about stock sustainability increases. NMFS’s 2016 adjustments to the National Standard 1 guidelines accompany a strengthening management record with respect to the status of our stocks. As the health of our fisheries improves, the ability to use the policy considerations in the MSA’s OY provisions offers potential for a future where managers and Councils truly do play that role envisioned for them by the original FCMA--determining what is optimum while preventing overfishing.

***276 B. Procedure and Considerations**

Early on, Councils recognized the challenges of specifying OY as a particular “amount” of fish and workload concerns associated with frequent FMP amendments to incorporate new information about OY. The use of Frameworks developed as a reasonable form of adaptive management and provided for public participation outside of the FMP process.

However, in the world of ACLs, some FMPs have extended the use of Frameworks for specifying OY in ways that stretch the linkage back to MSA’s provisions for FMPs. In cases where OY equals the ACL and ACL equals ABC, which is recommended by the SSC based on a preconstructed control rule based on science, the linkages to the FMP process and ESE factors are further attenuated. Although ABC control rules themselves are developed through the public Council process, the MSA does not require the same level of public procedure, nor apply the same range of considerations that apply to the specification of OY. ABC control rules are designed exclusively to prevent overfishing. Council discretion is limited by input from the SSC, and potential modifications pertain only to acceptable levels of risk of overfishing. While the Council may incorporate ESE factors into the risk policy, the question arises as to what extent, and how frequently, there is opportunity for meaningful public input into balancing factors relevant to “net benefit to the Nation.”

C. Closing Thoughts

Throughout this evolution, the concept of OY--an idealistic expression of our combined competing policy objectives as defined through the MSA’s public process--continues to exist. However, in some ways it seems we have abandoned the ideal of achieving an OY target, deferring instead to the annual management quotas. The controversial concept of annual caps, as described in the 1986 NOAA study and required by the MSRA’s ACLs and NMFS’s OFL and annual ABC control rules, have in many ways rendered OY less significant and cause us to question the usefulness of continuing to pursue OY. Many FMPs appear to have given up the chase of OY, while one has straightforwardly removed it from the FMP.

Today we have greater understanding than ever about stock status, and we have successfully rebuilt many stocks. However, we face new challenges as stocks are affected by the impacts of climate change. We have many reasons and increasing opportunity to embrace OY and use it *277 to express what is optimum for our fisheries in a balanced and proactive way as was designed for us by the original drafters of the FCMA. At a minimum, in terms of long-range planning, the concept of OY can give structure to balancing goals for not just healthy fisheries, but ecosystems and communities. With the new National Standard 1 guidelines and possible changes to MSA on the horizon, there could be greater relevance for long-term OYs. A renewed commitment to using that process of specifying OY to be the “decisional mechanism” for balancing our competing priorities can enhance dialog as well as management.

Based on this review, we should conclude that OY can and should continue to be relevant. It is whether and how we choose to use it as a tool that will determine that answer.

Footnotes

^{a1} © 2018 Marian Macpherson. Marian Macpherson is a Management and Program Analyst for the National Marine Fisheries Service (NMFS). The views expressed in this Article are strictly her own and in no way reflect the opinions of the agency. The author would like to express gratitude to valuable contributions from Erin Schnettler, Deb Lambert, and Stephanie Hunt and also to acknowledge the earlier research completed by Abigail Franklin, Mark Miller, Deb Lambert, and Wesley S. Patrick, on which this Article builds. Marian Macpherson has an LL.M. in Environmental Law from George Washington University Law School (1996), a J.D. from Tulane Law School (1991), and a B.A. (English) from the University of the South (1988).

¹ Fishery Conservation and Management Act of 1976, Pub. L. No. 94-265, 90 Stat. 331 (codified at 16 U.S.C. §§ 1801-1884 (2012)). In 1976, the law was simply named the Fishery Conservation and Management Act (FMCA). The name Magnuson was added in 1980 by Pub. L. No. 96-561, 94 Stat. 3300 (codified at 16 U.S.C. § 1801 (2012)), and then changed to Magnuson-Stevens by the Sustainable Fisheries Act (SFA) of 1996, Pub. L. No. 104-297 (codified at 16 U.S.C. § 1801 (2012)).

² For example, the Multiple Use Sustained Yield Act of 1960, Pub. L. No. 86-517, 74 Stat. 215 (codified at 16 U.S.C. §§ 528-531

(2012)), directed that national forests be managed under principles of multiple use and to produce a sustained yield of products and services. The National Forest Management Act of 1976, Pub. L. No. 94-588, 90 Stat. 2949 (codified as amended at 16 U.S.C. §§ 1600-1614) called for the management of renewable resources on national forest lands. The Federal Land Policy and Management Act of 1976, Pub. L. No. 94-579, 90 Stat. 2743 (codified at 43 U.S.C. ch. 35), was intended to manage and preserve public lands to protect “the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values,” while accommodating multiple uses and sustained yields of their resources and authorized the Secretary of the Interior to withdraw certain lands for preservation. The Endangered Species Act of 1973, Pub. L. No. 93-205, 87 Stat. 884 (codified at 16 U.S.C. §§ 1531-1544), protects endangered and threatened species and the ecosystems upon which they depend. The Marine Mammal Protection Act of 1972, Pub. L. No. 92-522, 86 Stat. 1027 (codified at scattered sections of 16 U.S.C.), protects marine mammals from becoming extinct or depleted as a result of human activities. The Wilderness Act of 1964, Pub. L. No. 88-577, 78 Stat. 890 (codified at 16 U.S.C. §§ 1131-1136), defined “wilderness” as, “in contrast with those areas where man and his own works dominate the landscape, [wilderness] is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain.” Section 2(a) of the Wilderness Act allows for designation of certain lands as Wilderness Areas, to be preserved for

[T]he use and enjoyment of the American people in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character, and for the gathering and dissemination of information regarding their use and enjoyment as wilderness.

³ 16 U.S.C. §§ 1801-1884.

⁴ *Id.* § 1801(a).

⁵ As described in one scholarly article from 1977:

[I]t is clear that overriding ecological considerations made the enactment of the Fisheries Conservation Act necessary to control the exploitation of certain overfished stocks Through the passage of the Act, the coastal fishing industry of the United States has been reassured that its economic interests will not be compromised due to uncontrolled overfishing by other nations.

The Fishery Conservation and Management Act of 1976: Its Effect on Coastal Fisheries, 2 WM. & MARY ENVTL. L. & POL'Y REV. 3, 4 (1977).

⁶ 16 U.S.C. § 1851(a)(1). In 1984, the words “for the United States fishing industry” were added to the end of this sentence. *Id.* § 1853(a)(1).

⁷ The eight fishery management councils are the Caribbean Fishery Management Council (CFMC), Gulf of Mexico Fishery Management Council (GMFMC), Mid-Atlantic Fishery Management Council (MAFMC), New England Fishery Management Council (NEFMC), North Pacific Fishery Management Council (NPFMC), Pacific Fishery Management Council (PFMC), South Atlantic Fishery Management Council (SAFMC), and the Western Pacific Fishery Management Council (WPFMC). *Id.* § 1852(a).

⁸ Many FMPs now define OY as either the rebuilding plan or the ACL that prevents overfishing. *See* Part VII of this Article.

⁹ In some cases there were significant time lags between when a fishery management council (Council) completed work on an FMP and when NMFS approved and implemented it. For purposes of this review, I have done my best to sort the FMPs into the time periods in which the Councils completed them. In some cases, data are limited with respect to the exact timing of final Council action.

¹⁰ *See* 16 U.S.C. §§ 1801-1884.

¹¹ *Id.*

¹² *Id.* The Secretary of Commerce delegated responsibility for administering the FCMA to the National Oceanic and Atmospheric Administration (NOAA). Several years later, NOAA delegated the authority to the National Marine Fisheries Service (NMFS). For this reason, NOAA is the party responsible for the rulemakings discussed in the Article that took place prior to 1996, and NMFS is

responsible for those after 1996.

¹³ *Id.* § 1801(a)(18) (emphasis added). This provision, read in conjunction with regulatory interpretations of MSY as a long-term average, created ambiguity as to whether OY should be a long-term or an annual amount.

¹⁴ *Id.* § 1801(a)(5) (emphasis added).

¹⁵ *Id.* § 1801(b)(4).

¹⁶ *Id.* § 1801(h)(5). In 1978, this section was amended to add consideration of U.S. processing capacity as well. *Id.* § 1852(h)(5). The FCMA mentions OY in defining TALFF as “that portion of the optimum yield of such fishery which will not be harvested by vessels of the United States.” *Id.* § 1801(d).

¹⁷ *Id.* § 1801(a)(3).

¹⁸ *Id.* This annual requirement at times required interpretive guidance pertaining to how it fit with interpretations of OY as a long-term average during some periods. In 1978, the FCMA was amended to include the additional following requirement that Councils assess and specify “the capacity and extent to which United States fish processors, on an annual basis, will process that portion of such optimum yield that will be harvested by fishing vessels of the United States.” *Id.* § 1853(a)(3).

¹⁹ *Id.* § 1801(h), (j).

²⁰ *Id.* § 1854(a).

²¹ *Id.* § 1853(a)(3).

²² *Id.* §§ 1811, 1821(a), 1852(a).

²³ In 1983, Congress amended this section to clarify that the guidance “shall not have the force and effect of law.” *Id.* § 1851(b).

²⁴ See Interim Final Rule on [Fishery Conservation and Management](#), 41 Fed. Reg. 39,436 (Sept. 15, 1976) (codified at 50 C.F.R. §§ 601-602 (1976)).

²⁵ The interim federal rule (IFR) established a new § 601 in title 50 of the Code of Federal Regulations (CFR) providing general definitions and guidance pertaining to Councils and a new § 602 providing guidance for development of fishery management plans.

²⁶ See 50 C.F.R. § 602.2(b)(2) (1976) (emphasis added).

²⁷ *Id.* § 602.2(b)(1) (1976) (emphasis added). Note that later interpretations become more focused on fishing mortality rates.

²⁸ *Id.*

²⁹ *Id.* § 602.2(b)(3)(i)(ii)

30 *Id.* § 602.2(b)(3)(i)(D).

31 *Id.* § 606.2(b)(4).

32 *Id.* § 602.2(b)(3)(ii).

33 *Id.* § 600.2(b)(2) (emphasis added).

34 *Id.* § 602.2(b)(1).

35 Final Rule on [Guidance to Regional Fishery Management Councils](#), 42 Fed. Reg. 34,450 (1977) [hereinafter 1977 Final Rule].

36 1977 Final Rule, 50 C.F.R. § 602.2(b)(2) (1977).

37 The 1977 Final Rule expanded the term “management unit” beyond the IFR’s “species”-level definition to include stocks and groups of stocks capable of being managed as a unit in a rational and timely way. *Id.* § 602.2(a)(2)(ii) (emphasis added).

38 *Id.* § 602.2(b)(1) (emphasis added). According to the preamble, these changes were intended to address perceptions that the 1976 definition might constrain Councils’ discretion in determining OY. 42 Fed. Reg. at 34,451.

39 50 C.F.R. § 602.2(b)(1) (1977) (emphasis added).

40 [Guidance for Regional Fishery Management Councils](#), 42 Fed. Reg. 34,450, 34,451-52 (July 5, 1977).

41 From 1977-1982, NOAA annually published codified TALFF specifications in the CFR. *See* 50 C.F.R. § 611.20 (1980-1985).

42 Fishery Conservation and Management Act of 1976, Pub. L. No. 94-265, § 3(18)(A), 90 Stat. 331 (codified at 16 U.S.C. §§ 1801-1884 (2012)).

43 This is the number of FMPs that were developed by 1983, are still in existence, and are reviewed in this Article. Of these, three were later consolidated into a single FMP. *See Fishery Management Plans & Amendments, Atlantic Mackerel, Squid, Butterfish*, MID-ATLANTIC FISHERY MGMT. COUNCIL amend. 3, <http://www.mafmc.org/fisheries/fmp/msb> (last visited Mar. 20, 2018) [hereinafter MSB FMP]. Another one was repealed, only to be recreated in 1999. For a discussion of this history, *see Atlantic Herring, Plan Amendments, Frameworks, and Specifications*, NEW ENGLAND FISHERY MGMT. COUNCIL amend. 1, <https://www.nefmc.org/management-plans/herring> (last visited Mar. 20, 2018) [hereinafter *Herring FMP*].

44 The FMPs developed during this time period include the FMP for Spiny Lobster in the Gulf of Mexico and South Atlantic, *Gulf of Mexico and South Atlantic Spiny Lobster Rulemakings*, NAT’L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES SE. REGIONAL OFF., http://sero.nmfs.noaa.gov/sustainable_fisheries/policy_branch/rules/gulf_sa/lobster/index.html (last visited Mar. 20, 2018) [hereinafter *Joint Spiny Lobster FMP*]; the FMP for Coastal Migratory Pelagic Resources (Mackerels) in the Gulf of Mexico and South Atlantic, *Coastal Migratory Pelagics Rulemakings*, NAT’L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES SE. REGIONAL OFF., http://sero.nmfs.noaa.gov/sustainable_fisheries/policy_branch/rules/gulf_sa/cmp/index.html (last visited Mar. 20, 2018) [hereinafter *Joint CMP FMP*]; the FMP for the Stone Crab Fishery of the Gulf of Mexico, *Gulf of Mexico Stone Crab Rulemakings*, NAT’L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES SE. REGIONAL OFF., http://sero.nmfs.noaa.gov/sustainable_fisheries/policy_branch/rules/gulf/stone_crab/index.html (last visited Mar. 20, 2018) [hereinafter *Stone Crab FMP*]; the FMP for the Shrimp Fishery of the Gulf of Mexico, United States Waters, *Gulf of Mexico Shrimp Rulemakings*, NOAA FISHERIES SE. REGIONAL OFF., http://sero.nmfs.noaa.gov/sustainable_fisheries/policy_branch/rules/gulf/stone_crab/index.html (last visited Mar. 20, 2018)

[hereinafter *Gulf Shrimp FMP*]; the FMP for Atlantic Surf Clam and Ocean Quahog, *Fishery Management Plan & Amendments, Surfclam and Ocean Quahog*, MID-ATLANTIC FISHERY MGMT. COUNCIL, <http://www.mafmc.org/fisheries/fmp/sc-oq> (last visited Mar. 20, 2018) [hereinafter *Surf Clam/Ocean Quahog FMP*]; Atlantic Mackerel, MSB FMP, *supra* note 43, at Atlantic Mackerel FMP; Squids, MSB FMP, *supra* note 43, at Squid FMP; Butterfish FMP, MSB FMP, *supra* note 43, at Atlantic Butterfish FMP (the Atlantic Mackerel, Squid, and Butterfish FMPs were consolidated in 1983); and Atlantic Herring FMP, *Herring FMP*, *supra* note 43.

For a discussion of this history, see MSB FMP, *supra* note 43, amend. 1, and for 1998-present, see the Atlantic Herring Plan Overview at *Herring FMP*, *supra* note 43. Other FMPs developed during this time include the Atlantic Sea Scallop FMP, *Sea Scallop, Plan Amendments, Frameworks, and Specifications*, NEW ENGLAND FISHERY MGMT. COUNCIL, <https://www.nefmc.org/management-plans/scallops> (last visited Mar. 20, 2018) [hereinafter *Atlantic Scallop FMP*]; FMP for Groundfish of the Gulf of Alaska, *Fishery Management Plan (FMP) Amendments, GOA Groundfish FMP*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES ALASKA REGIONAL OFF., https://alaskafisheries.noaa.gov/fmp-amendments?body_value=&field_fmp_type_nid=3176&field_amendment_numbers_value= (last visited Mar. 20, 2018) [hereinafter *GOA Groundfish FMP*]; FMP for Salmon Fisheries in the EEZ of the Coast of Alaska, *Fishery Management Plan (FMP) Amendments, Salmon FMP*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES ALASKA REGIONAL OFFICE, https://alaskafisheries.noaa.gov/fmp-amendments?body_value=&field_fmp_type_nid=3177&field_amendment_numbers_value= (last visited Mar. 20, 2018) [hereinafter *Alaska Salmon FMP*]; Bering Sea/Aleutian Islands King and Tanner Crabs, *Fishery Management Plan (FMP) Amendments, BSAI Crab FMP*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES ALASKA REGIONAL OFFICE, https://alaskafisheries.noaa.gov/fmp-amendments?body_value=&field_fmp_type_nid=3170&field_amendment_numbers_value= (last visited Mar. 20, 2018) [hereinafter *BSAI Crab FMP*]; Northern Anchovy Fishery, *Fishery Management Plan and Amendments: Northern Anchovy FMP*, PAC. FISHERY MGMT. COUNCIL (last visited Mar. 20, 2018) [hereinafter *Anchovy FMP*] (later renamed as the Coastal Pelagics Species FMP, *Coastal Pelagic Species: Fishery Management Plan and Amendments*, PAC. FISHERY MGMT. COUNCIL, <http://www.pcouncil.org/coastal-pelagic-species/fishery-management-plan-and-amendments/> (last visited Mar. 20, 2018) [hereinafter *Coastal Pelagics FMP*]; Commercial and Recreational Salmon Fisheries off the Coasts of Washington, Oregon, and California, *Fishery Management Plan and Amendments: Adopted/Approved Amendments*, PAC. FISHERY MGMT. COUNCIL, <https://www.pcouncil.org/salmon/fishery-management-plan/adoptedapproved-amendments/> (last visited Mar. 20, 2018) [hereinafter *Pacific Salmon FMP*]; Pacific Coast Groundfish FMP, *Groundfish: Fishery Management Plan and Amendments*, PAC. FISHERY MGMT. COUNCIL, <https://www.pcouncil.org/groundfish/fishery-management-plan/> (last visited Mar. 20, 2018) [hereinafter *Pacific Groundfish FMP*]; Snapper-Grouper Fishery of the South Atlantic Region FMP, *South Atlantic Snapper-Grouper Rulemakings*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. SE. REGIONAL OFF., <https://www.pcouncil.org/groundfish/fishery-management-plan/> (last visited Mar. 20, 2018) [hereinafter *Snapper-Grouper FMP*]; the WPFMC's Spiny Lobster FMP, subsequently renamed Crustaceans FMP, *Crustaceans Fishery Management Plan*, W. PAC. FISHERY MGMT. COUNCIL, <http://www.wpcouncil.org/fishery-plans-policies-reports/former-fishery-management-plans/crustaceans-fishery-management-plan/> (last visited Mar. 20, 2018) [hereinafter *Crustaceans FMP*]; and the Precious Coral Resources of the Western Pacific Region FMP, *Precious Corals Fishery Management Plan*, W. PAC. REGIONAL FISHERY MGMT. COUNCIL, <http://www.wpcouncil.org/fishery-plans-policies-reports/former-fishery-management-plans/precious-corals-fishery-management-plan/> (last visited Mar. 20, 2018) [hereinafter *Precious Corals FMP*].

⁴⁵ There were six FMP amendments adjusting OY for the GOA Groundfish FMP, one for the Mackerel FMP, and one for the Surf Clam/Ocean Quahog FMP.

⁴⁶ The FMPs for the Joint CMP FMP (for mackerels), the Surf Clam/Ocean Quahog FMP, the MAFMC three FMPs for Mackerel, Squid, and Butterfish (not consolidated until 1983), the Secretarial FMP for Atlantic Herring, the GOA Groundfish FMP, the PFMC's Pacific Salmon and Pacific Groundfish FMPs, and the WPFMC's Precious Coral FMP. In addition, the North Pacific's BSAI Groundfish FMP specified OY as 85% of MSY and specified MSY as a fixed numeric range.

⁴⁷ See *GOA Groundfish FMP*, *supra* note 44, amend. 2. Text of the amendments are available at *id.*

⁴⁸ See *Surf Clam/Ocean Quahog FMP*, *supra* note 44, amend. 2; MSB FMP, *supra* note 43, amend. 1.

⁴⁹ See *Joint Spiny Lobster FMP*, *supra* note 44; *Joint CMP FMP*, *supra* note 44; *Stone Crab FMP*, *supra* note 44; *Crustaceans FMP*, *supra* note 44.

⁵⁰ *Snapper-Grouper FMP*, *supra* note 44.

51 See, e.g., *GOA Groundfish FMP*, *supra* note 44; *Pacific Groundfish FMP*, *supra* note 44.

52 See, e.g., *Snapper-Grouper FMP*, *supra* note 44.

53 See *Anchovy FMP*, *supra* note 44. The FMP stated:
 [T]he optimum yield ... is a quantity which varies from year to year in response to environmentally caused fluctuations in anchovy spawning biomass. Due to the importance of anchovy as a live bait, and as a component of the food supply for predator fish, birds, and mammals, the harvest of anchovies for reduction to fish meal, oil, and soluble should be prevented when the population spawning biomass falls to a low level. Also the average biomass level expected to occur under the FMP should be large enough to support abundant predator populations. Those criteria are satisfied by the following summary statement of optimum yield.
 1. When ... spawning biomass is less than 100 thousand short tons, [OY] is zero.
 2. When ... spawning biomass is greater than 100 thousand but less than one million short tons, [OY] is 18 thousand short tons ... [(non-reduction only)].
 3. When ... spawning biomass is 1 million short tons or greater, the OY for both reduction and non-reduction fisheries is 18 thousand tons or one third of the biomass in excess of 1 million tons, whichever is greater.
 This FMP subsequently added species and its name changed. Subsequent sections of this Article refer to it as the FMP for Coastal Pelagics Species. *Coastal Pelagics FMP*, *supra* note 44.

54 Frameworks are explained in NMFS Policy Directive 01-101-03, *infra* note 65. See *MSB FMP*, *supra* note 43, amend. 1.

55 These included *Gulf Shrimp FMP*, *supra* note 44 (for brown, white, and pink shrimp only); *Atlantic Scallop FMP*, *supra* note 44; *Snapper-Grouper FMP*, *supra* note 44 (with respect to jewfish only).

56 *Gulf Shrimp FMP*, *supra* note 44.

57 *Id.*

58 *Id.*

59 See *Stone Crab FMP*, *supra* note 44.

60 See *Crustaceans FMP*, *supra* note 44.

61 See *Gulf Shrimp FMP*, *supra* note 44; *Stone Crab FMP*, *supra* note 44; *Crustaceans FMP*, *supra* note 44.

62 See *Fishery Management Plan (FMP) Amendments, BSAI Groundfish FMP*, NAT'L. OCEANIC & ATMOSPHERIC ADMIN. ALASKA REGIONAL OFF. app. A, https://alaskafisheries.noaa.gov/fmp-amendments?body_value=&field_fmp_type_nid=3172&field_amendment_numbers_value= (last visited Mar. 20, 2018) [hereinafter *BSAI Groundfish FMP*].

63 The BSAI Groundfish FMP and amendments are available at *id.*

64 *Id.* The BSAI Groundfish FMP explains that “MSY and OY are specified as fixed ranges in the FMP, and apply to the groundfish fishery as a whole. The harvest specifications and status determinations are made annually, and apply to individual stocks and stock complexes within the “target species” category.” It further explains that “the [OY] of the groundfish complex is specified as 85 percent of the historical estimate of the MSY range for the target species (1.4 to 2.0 million metric ton (mt)), to the extent this can be harvested consistently with the management measures specified in this FMP, plus the actual amount of the nonspecified species

category that is taken incidentally to the harvest of target species. This deviation from the historical estimate of MSY reflects the combined influence of ecological, social, and economic factors. The important ecological factors may be summarized as follows: The OY specification for BSAI groundfish was established as part of Amendment 1 to the BSAI Groundfish FMP. The final environmental impact statement (EIS) for the BSAI Groundfish FMP, which included analysis of amendment 1, was completed in August 1981 (NPFMC 1981). The EIS stated that the 15% reduction from MSY was “intended both to assure the continued health of the target species themselves and to mitigate the impact of commercial groundfish operations on other elements of the natural environment.” The EIS described a variety of direct and indirect impacts likely to result from this specification, including incidental harvest of other marine resources, direct stress to marine mammals and birds, competition for food with marine mammals and birds, direct stress to the ocean floor environment, and environmental pollution resulting from the dumping at sea by fishing vessels of fish processing and other wastes. The EIS’s consideration of ecological factors concluded with the statement, “The upshot of the preceding discussion is that commercial groundfish operations of the scale that is under active consideration for authorization under an FMP are not expected to affect significantly the long-term productivity of the environment of the eastern Bering Sea and Aleutians.”

⁶⁵ See NMFS Policy Directive 01-101-03, Operational Guidelines for the Magnuson-Stevens Fishery Management Act Fishery Management Process apps. 3, 3-3 (2017).

⁶⁶ Fishery Conservation and Management Act of 1976, Pub. L. No. 94-265, § 3(18), 90 Stat. 331 (codified at 16 U.S.C. §§ 1801-1884 (1976)).

⁶⁷ This was required by the FCMA. 16 U.S.C. § 1853(a)(3).

⁶⁸ There was wide variety in the degree of detail these sections contained. One example of a particularly thorough discussion can be seen in the Anchovy FMP, which included section headings for discussions of each of the three OY factors. See *Anchovy FMP*, *supra* note 44.

⁶⁹ See *Atlantic Scallop FMP*, *supra* note 44.

⁷⁰ *Guidelines for Fishery Management Plans*, 48 Fed. Reg. 7401 (Feb. 18, 1983) (codified at 50 C.F.R. § 602.1-.17 (1983)) [hereinafter 1983 Final Rule]. This history is described in the Proposed Rule on Guidelines for Fishery Management Plans. See *Proposed Rule on Guidelines for Fishery Management Plans*, 47 Fed. Reg. 27,228 (June 23, 1982) [hereinafter 1982 Proposed Rule].

⁷¹ See 1982 Proposed Rule, 47 Fed. Reg. at 27,229.

⁷² Advance Notice of Proposed Rulemaking to Revise National Standard *Guidelines*, 45 Fed. Reg. 8686 (Feb. 8, 1980).

⁷³ *Id.*

⁷⁴ See 1982 Proposed Rule, 47 Fed. Reg. at 27,229.

⁷⁵ 1983 Final Rule, 50 C.F.R. § 602.11(b) (1983).

⁷⁶ Specifically, the rule stated that OY forms could include: describing fish having common characteristics, the harvest of which provides the greatest overall benefit to the Nation. For instance, OY may be expressed as a formula that converts periodic stock assessments into quotas or guideline harvest levels for recreational, commercial, and other fishing. OY may be defined in terms of an annual harvest of fish or shellfish having a minimum weight length, or other measurement. OY may also be expressed as an amount of fish taken only in certain areas, or in certain seasons, or with particular gear, or by a specified amount of fishing effort. In the case of a mixed-species fishery, the incidental-species OY may be a function of the directed catch, or absorbed into an OY for related species.

Id. § 602.11(e)(4).

77 *Id.* § 602.11(f).

78 *Id.* § 602.11(c)(3).

79 *Id.* § 602.11(f)(2).

80 *Id.* § 602.11(g)(2).

81 *Id.* § 602.11(f)(4)(iv).

82 *See* 1983 Final Rule, 48 Fed. Reg. 7401, 7404 (Feb. 18, 1983) (emphasis added).

83 1983 Final Rule, 50 C.F.R. § 602.11(e)(5) (1983).

84 This is the first time this is stated in regulation (1983). *See id.* § 602.11(e)(4).

85 *Id.* § 602.11(c)(1).

86 *Id.*

87 *Id.* § 602.11(c)(2).

88 *Id.* § 602.11(c)(4).

89 *Id.*

90 *Id.*

91 *See* 1983 Final Rule, 48 Fed. Reg. 7401, 7403-04 (Feb. 18, 1983).

92 1983 Final Rule, 50 C.F.R. § 602.11(d)(1) (1983) (emphasis added).

93 *See* 1982 Proposed Rule, 47 Fed. Reg. 27,229 (June 23, 1982).

94 *See* 1983 Final Rule, 48 Fed. Reg. at 7403. National Standard 6 states, “Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.” 16 U.S.C. § 1851(a)(6) (2012).

95 1983 Final Rule, 50 C.F.R. § 602.11(d)(1) (1983). The preamble to the 1983 Final Rule states: “Three commenters wanted definitions added to this section, to cover ‘maximum biological yield,’ ‘maximum economic yield,’ and ‘growth, localized, pulse, and economic’ overfishing.” *See id.* (emphasis added).

96 *Id.* The mixed stock exception has never been invoked.

97 *Id.* § 602.11(d)(1)-(6).

98 *See* 1982 Proposed Rule, 47 Fed. Reg. at 27,230 (emphasis added).

99 1983 Final Rule, 50 C.F.R. § 602.11(d)(3) (1983). This guidance was the precursor to what became described as the precautionary approach in 1998 and incorporated MSY control rules, and what evolved into the ABC control rule approach in the post-MSRA guidance of 2008.

100 *Id.*

101 *Id.* This section also introduced the suggestion of Councils recommending habitat remediation.

102 *See* 1983 Final Rule, 48 Fed. Reg. 7401, 7403-7404 (Feb. 18, 1983).

103 *See* Fishery Conservation and Management Act of 1976, Pub. L. No. 94-265, 90 Stat. 331 (codified at 16 U.S.C. §§ 1801-1884 (1976)).

104 For a description of the history of federal financing in fisheries, see [Fisheries Financing Program; Construction of New Replacement Fishing Vessels](#), 79 Fed. Reg. 36,699 (June 30, 2014). *See also* FED. FISHERIES INV. TASK FORCE, REPORT TO CONGRESS (July 1999).

105 FED. FISHERIES INV. TASK FORCE, *supra* note 104, at 75-76 (July 1999).

106 *Id.* at 76.

107 The new FMPs included the CFMC’s Caribbean Spiny Lobster FMP, *Caribbean Spiny Lobster Rulemakings*, NAT’L. OCEANIC & ATMOSPHERIC ADMIN. SE. REGIONAL OFF., http://sero.nmfs.noaa.gov/sustainable_fisheries/policy_branch/rules/caribbean/lobster/index.html (last visited Mar. 20, 2018) [hereinafter *Caribbean Spiny Lobster FMP*]; the CFMC’s Caribbean Reef Fish FMP, *Caribbean Reef Fish Rulemakings*, NAT’L OCEANIC & ATMOSPHERIC ADMIN. SE. REGIONAL OFF., http://sero.nmfs.noaa.gov/sustainable_fisheries/policy_branch/rules/caribbean/reef_fish/temp_index.html (last visited Mar. 20, 2018) [hereinafter *Caribbean Reef Fish FMP*]; the Jointly Managed GMFMC/SAFMC Joint Coral FMP, *Caribbean Corals and Reef Associated Plants and Invertebrates Rulemakings*, NAT’L. OCEANIC & ATMOSPHERIC ADMIN. SE. REGIONAL OFF., http://sero.nmfs.noaa.gov/sustainable_fisheries/policy_branch/rules/caribbean/coral/index.html (last visited Mar. 20, 2018) [hereinafter *Joint Coral FMP*]; the GMFMC’s Gulf Reef Fish FMP, *Gulf of Mexico Reef Fish Rulemakings*, NAT’L. OCEANIC & ATMOSPHERIC ADMIN. SE. REGIONAL OFF., http://sero.nmfs.noaa.gov/sustainable_fisheries/policy_branch/rules/gulf/reef_fish/index.html (last visited Mar. 20, 2018) [hereinafter *Gulf Reef Fish FMP*]; the GMFMC’s Red Drum FMP, *Gulf of Mexico Red Drum Rulemakings*, NAT’L OCEANIC & ATMOSPHERIC ADMIN. SE. REGIONAL OFF., http://sero.nmfs.noaa.gov/sustainable_fisheries/policy_branch/rules/gulf/red_drum/index.html (last visited Mar. 20, 2018) [hereinafter *Red Drum FMP*]; the MAFMC’s FMP for the Summer Flounder Fishery (later becoming Summer Flounder, Scup, and Black Sea Bass), *Summer Flounder, Scup, Black Sea Bass, Fishery Management Plan and Amendments*, MID-ATLANTIC FISHERY MGMT. COUNCIL, <http://www.mafmc.org/sf-s-bsb/> (last visited Mar. 20, 2018) [hereinafter *Summer Flounder FMP*]; NEFMC’s FMP for the Northeast Multi-Species Fishery, *Northeast Multispecies (Groundfish) Plan Amendments, Frameworks, and Specifications*, NEW ENGLAND FISHERY MGMT. COUNCIL, <https://www.nefmc.org/management-plans/northeast-multispecies> (last visited Mar. 20, 2018) [hereinafter *Multispecies FMP*]; the NPFMC’s FMP for Bering Sea/Aleutian Islands King

and Tanner Crabs, *BSAI Crab FMP*, *supra* note 44; WPFMC’s Bottomfish FMP, *Bottomfish Fishery Management Plan*, W. PAC. REGIONAL FISHERY MGMT. COUNCIL, <http://www.wpcouncil.org/fishery-plans-policies-reports/former-fishery-management-plans/bottomfish-fishery-management-plan/> (last visited Mar. 20, 2018) [hereinafter *Bottomfish FMP*]; and WPFMC’s Pelagics FMP, *Pelagics Fishery Management Plan*, W. PAC. FISHERY MGMT. COUNCIL, <http://www.wpcouncil.org/pelagic/Pelagics%20FMP.html> (last visited Mar. 20, 2018) [hereinafter *Pelagics FMP*].

- 108 The Gulf Reef Fish FMP specified annual amounts of fish for three separate species groups (snappers, groupers, and seabasses: Snapper/Grouper OY=45 million lbs, Seabasses OY=.5 million lbs). *Gulf Reef Fish FMP*, *supra* note 107. The Joint Coral FMP specified OY=zero for stony corals (OY for other corals was specified as pursuant to management). *Joint Coral FMP*, *supra* note 107.
- 109 The CFMC’s Spiny Lobster FMP specified OY as a size limit. *Caribbean Spiny Lobster FMP*, *supra* note 107.
- 110 Other FMPs continued to define OY as “results of management” (see *Pacific Salmon FMP*, *supra* note 44, amend. 6) and an annual formula (see *Anchovy FMP*, *supra* note 44; *Anchovy FMP*, *supra* note 44, amend. 5). The Joint CMP FMP created an annual Framework-like process for establishing TAC based on annual stock assessments. It allowed TACs to exceed MSY by up to 10%, but it linked OY to objectives including avoidance of overfishing. See *Joint CMP FMP*, *supra* note 44, amend. 5, §§ 2.3-2.5.
- 111 The BSAI Crab FMP specified OY as the range $0 \leq OY \leq MSY$. *BSAI Crab FMP*, *supra* note 44. The Surf Clam/Ocean Quahog FMP was amended from specifying a numeric amount of fish (30 million pounds, or 3.0 million bushels) to specifying a numeric range. See *Surf Clam/Ocean Quahog FMP*, *supra* note 44, amends. 4-5. For surf clam, OY was set as a range bounded by the quota level that had been in effect since the first plan. The range for the Mid Atlantic area was 1.8 to 2.9 million bushels and for the New England area 25,000 to 100,000 bushels. The New England area OY was set to permit an exploratory fishery, in the absence of adequate stock assessments. The OY for ocean quahog was between 4.0 and 6.0 million bushels.
- 112 The size limit provisions in the OY definition for the Joint Spiny Lobster FMP were amended to allow for adjustments for consistency with state size limits. See *Joint Spiny Lobster FMP*, *supra* note 44, amend. 2.
- 113 See *BSAI Crab FMP*, *supra* note 44.
- 114 The Red Drum FMP expressed OY as an escapement goal for state water harvests, in addition to compliance with management measures. The FMP was amended to increase the escapement goal from 20% to 30% during this time period. See *Red Drum FMP*, *supra* note 107, amends. 1-2.
- 115 See *Joint CMP FMP*, *supra* note 44, amend. 1; see also *Pacific Groundfish FMP*, *supra* note 44, amend. 1.
- 116 Two FMPs were amended to utilize TAC in their expressions of OY. See *Joint CMP FMP*, *supra* note 44, amend. 1; see also *Red Drum FMP*, *supra* note 107, amends. 1-2.
- 117 See *Joint CMP FMP*, *supra* note 44, amend. 1.
- 118 See *MSB FMP*, *supra* note 43, amend. 2.
- 119 See *Multispecies FMP*, *supra* note 107.
- 120 See *Joint CMP FMP*, *supra* note 44, amend. 1. The FMP’s annual strategy was $0 \leq TAC \leq MSY + 10\%$, unless overfished, then $0 \leq TAC \leq ABC \text{ max}$.

¹²¹ See *GOA Groundfish FMP*, *supra* note 44, amends. 13-15, apps. A, A-1.

¹²² The FMP established the range as 116,000 mt to 800,000 mt. The Council selected this range based on historical estimates of MSY for the upper end and fishery performance for the lower end. The minimum value, 116,000 mt was approximately equal to the lowest historical groundfish catch during the twenty-one-year period 1965-1985 (116,053 mt in 1971). The upper end of the range is approximately equal to 92% of the mean MSY for the five-year period from 1983 to 1987. See *id.* amend. 15.

¹²³ See *id.*

¹²⁴ See *Gulf Reef Fish FMP*, *supra* note 107. For snappers and groupers, the FMP established OY=45 million pounds, and for seabasses OY=.5 million lbs.

¹²⁵ See, e.g., *Caribbean Reef Fish FMP*; *Summer Flounder FMP*; *Joint Coral FMP*, *supra* note 107.

¹²⁶ The original OY was 16.7 million pounds of Columbia River Fall Chinook and 35.9 million pounds of five stocks of Coho. See *Pacific Salmon FMP*, *supra* note 44.

¹²⁷ See *id.* amend. 6. Amendment 6 changed the OY to:
 [T]hat amount of salmon caught by the United States fishermen ... which will to the greatest extent practicable, fulfill the following:
 1. The spawning escapement goals for natural and hatchery stocks, as established by the Council;
 2. The obligation to provide for treaty Indian harvest opportunity, as mandated by applicable decisions of the federal court;
 3. The requirements of the Indian fishery for salmon on the Klamath River;
 4. The allocation goals between or among ocean fisheries as established by the Council;
 5. The allocation goals between ocean and “inside” fisheries conducted by other than treaty Indians, as recommended by the various states and the Council; and
 6. Other social/economic objectives of the FMP and its amendments.

¹²⁸ See *Pacific Groundfish FMP*, *supra* note 44, amend. 1.

¹²⁹ 1983 Final Rule, 50 C.F.R. § 602.11(b) (1983).

¹³⁰ UNDER SEC’Y OF COMMERCE FOR OCEANS & ATMOSPHERE, NOAA FISHERY MANAGEMENT STUDY (June 30, 1986), <http://www.gpo.gov/fdsys/pkg/CZIC-sh328-n62-1986/html/CZIC-sh328-n62-1986.htm> [hereinafter 1986 STUDY].

¹³¹ NMFS described this Study in the preamble to the 1989 Final Rule. 1989 Final Rule to Provide Guidelines for Fishery Management Plans, 54 Fed. Reg. 30,711, 30,826 pmb. (July 24, 1989) [hereinafter 1989 Final Rule].

¹³² *Id.*; see also Proposed Rule to Provide Guidelines for Fishery Management Plans, 53 Fed. Reg. 53,091 pmb. (Dec. 30, 1988) [hereinafter 1988 Proposed Rule].

¹³³ “By ABC the Study meant the total allowable removals from the resource which would maintain a healthy and productive resource into the future. As used in this context, the ABC would be the maximum possible quota for the species or species complex in the fishery.” *Id.* at 53,931.

¹³⁴ 1986 STUDY, *supra* note 130, at 29.

¹³⁵ The 1983 Final Rule suggested using ABC as factor in deriving OY from MSY, but not using it as a quota or cap. See 1983 Final Rule, 50 C.F.R. § 602.11(c)(4) (1983).

¹³⁶ See 1988 Proposed Rule, [53 Fed. Reg. at 53,032](#), pmb1.

¹³⁷ See 1986 STUDY, *supra* note 130, at 52.

¹³⁸ 1988 Proposed Rule, [53 Fed. Reg. at 53,031](#).

¹³⁹ It became clear that a mandatory ABC approach was not appropriate for all Councils. See 1989 Final Rule, [54 Fed. Reg. 30,711, 30,826](#) pmb1. (July 24, 1989).

¹⁴⁰ The 1989 Final Rule used compulsory terminology indicating NMFS’s intent to require action. The Rule explains its word choices: “Must is used to denote an obligation to act; it is used primarily when referring to requirements of the Act, the logical extension thereof, or of other applicable law.” 1989 Final Rule, 50 C.F.R § 602.2(c)(1) (1989). Where the 1989 Final Rule used the word “must,” this Article describes those provisions as “requirements” to reflect NMFS’s intent that they be mandatory. Where the mandates of the rule exceed those of the statute, it appears that NMFS is interpreting a logical extension of certain mandates.

¹⁴¹ See Sustainable Fisheries Act of 1996, [Pub. L. No. 104-297](#) (1996) (codified at [16 U.S.C. § 1801 \(2000\)](#)) [hereinafter SFA].

¹⁴² 1989 Final Rule, 50 C.F.R. § 602.11(b) (1989).

¹⁴³ *Id.* § 602.11(d) (emphasis added).

¹⁴⁴ See *id.* § 602.11(c)(1) (emphasis added).

¹⁴⁵ See 1989 Final Rule, [54 Fed. Reg. 30,711, 30,829](#) pmb1. (July 24, 1989).

¹⁴⁶ 1989 Final Rule, 50 C.F.R. § 602.11(c)(9) (1989).

¹⁴⁷ *Id.* § 602.11(c)(6).

¹⁴⁸ *Id.* § 602.11(c)(6)(iii).

¹⁴⁹ *Id.* § 602.11(c)(7)(ii).

¹⁵⁰ See 1989 Final Rule, [54 Fed. Reg. at 30,828](#) pmb1.

¹⁵¹ In 1990, Congress amended FCMA to address HMS issues, and said nothing about these requirements, implying assent. Fishery Conservation Amendments of 1990, [Pub. L. No. 101-627](#) (1990).

¹⁵² A. ROSENBERG ET AL., U.S. DEP’T OF COMMERCE, SCIENTIFIC REVIEW OF DEFINITIONS OF OVERFISHING IN U.S. FISHERY MANAGEMENT PLANS 205 (1994) [hereinafter ROSENBERG REPORT].

¹⁵³ *Id.*

- 154 *Id.* at 33-44. Note that OY at that time was zero. The OY for Royal Reds in the Gulf Shrimp FMP was the amount that could be taken without biologically or recruitment overfishing, with a numeric estimate of poundage and closure when attained.
- 155 *Id.*
- 156 The new FMPs were the CFMC’s Caribbean Coral FMP, *Fishery Management Plan, Regulatory Impact Review and Final Environmental Impact Statement for Corals and Reef Associated Plants and Invertebrates of Puerto Rico and the U.S. Virgin Islands*, CARIB. FISHERY MGMT. COUNCIL, http://caribbeanfmc.com/fmp_corals.html (last visited Mar. 20, 2018) [hereinafter *Caribbean Coral FMP*]; MAFMC’s Bluefish FMP, *Fishery Management Plans and Amendments, Bluefish*, MID-ATLANTIC FISHERY MGMT. COUNCIL, <http://www.mafmc.org/fisheries/fmp/bluefish> (last visited Mar. 20, 2018) [hereinafter *Bluefish FMP*]; the NPFMC’s Alaska Scallop FMP, *Fishery Management Plan (FMP) Amendments*, N. PAC. FISHERY MGMT. COUNCIL, https://alaskafisheries.noaa.gov/fmp-amendments?body_value=&field_fmp_type_nid=3178&field_amendment_numbers_value= (last visited Mar. 20, 2018) [hereinafter *Alaska Scallop FMP*]; and the SAFMC’s South Atlantic Shrimp FMP, *South Atlantic Shrimp Rulemakings*, S. ATLANTIC FISHERY MGMT. COUNCIL, http://sero.nmfs.noaa.gov/sustainable_fisheries/policy_branch/rules/sa/shrimp/index.html (last visited Mar. 20, 2018) [hereinafter *South Atlantic Shrimp FMP*].
- 157 The Alaska Scallop FMP set OY between zero and 1.1 million lbs. (*see* the Proposed Rule to Implement the FMP, 60 Fed. Reg. 24,822 (May 10, 1995) (as finalized by 60 Fed. Reg. 42,070 (Aug. 15, 1995)); the Bluefish FMP defined OY as the results of management (*Bluefish FMP*, *supra* note 156). OY continued to be based on size limits in three FMPs: *Caribbean Spiny Lobster FMP*, *supra* note 107; *Joint Spiny Lobster FMP*, *supra* note 44, amend. 2; *Stone Crab FMP*, *supra* note 44. OY continued to be based on compliance with management measures, and in some cases linked to achieving objectives in the following: *Caribbean Reef Fish FMP*, *supra* note 107; *Atlantic Scallop FMP*, *supra* note 44; *Multispecies FMP*, *supra* note 107; *Pacific Salmon FMP*, *supra* note 44; *Bottomfish FMP*, *supra* note 107. OY continued to be set as an amount of fish in the GMFMC’s portion in the following: *Joint CMP FMP*, *supra* note 44; *Surf Clam/Ocean Quahog FMP*, *supra* note 44; *GOA Groundfish FMP*, *supra* note 44; *BSAI Groundfish FMP*, *supra* note 62; *Precious Corals FMP*, *supra* note 44. The Red Drum FMP retained the use of TAC and escapement goals. *Red Drum FMP*, *supra* note 107. The Anchovy FMP retained an annual formula based on biomass and environmental conditions. *Anchovy FMP*, *supra* note 44. The SAFMC’s portion of the Joint CMP FMP retained OY as MSY + 10%, or based on TAC and ABC range if overfished. *Joint CMP FMP*, *supra* note 44.
- 158 The final rule implementing amendment 1 (an OY amendment) to the Gulf Reef Fish Plan stated its intention to bring the FMP into compliance with 1989 rule’s overfishing and rebuilding requirements. *See* 54 Fed. Reg. 41,297 (Oct. 6, 1989); *see also* *Crustaceans FMP*, *supra* note 44, amend. 6. Notably, for royal red shrimp in the Gulf Shrimp FMP, the overfishing definition in the FMP had become tied to OY as of 1994. *See* *Gulf Shrimp FMP*, *supra* note 44, amend. 5. For the rest of the FMPs, the overfishing definitions of this time period typically took different approaches than those for OY. For example, in the Gulf OY for red snapper was 20SBR, WHILE THE OVERFISHING DEFINITION WAS F20%. THE OY FOR MACKEREL IN THE GULF WAS EXPRESSED IN POUNDS OF FISH WHILE THE OVERFISHING DEFINITION WAS ALSO F20%. THIS DIVERGENCE WAS THE NORM ACROSS MOST FISHERIES AND FMPS.
- 159 *Gulf Reef Fish FMP*, *supra* note 107, amend. 1; *Snapper-Grouper FMP*, *supra* note 44, amends. 2-3, 6; *South Atlantic Shrimp FMP*, *supra* note 156; *Crustaceans FMP*, *supra* note 44, at amend. 6.
- 160 MSB FMP, *supra* note 43, amend. 4.
- 161 The MAFMC changed the Summer Flounder FMP’s OY definition to incorporate variability depending on recruitment and the F_{target} . *See* *Summer Flounder FMP*, *supra* note 107, amend. 2. The SAFMC amended the Snapper Grouper FMP three times and expressed OY in terms of SBR. *SEE* *SNAPPER-GROUPER FMP*, *SUPRA* NOTE 44, AMENDS. 2-3, 6. THE SOUTH ATLANTIC SHRIMP FMP DEFINED OY IN TERMS OF SPAWNING STOCK. *SEE* *SOUTH ATLANTIC SHRIMP FMP*, *SUPRA* NOTE 156. THE GULF REEF FISH FMP REVISED ITS NUMERIC OYS INTO A SINGLE 20% SSBP APPLICABLE TO ALL SPECIES BUT ALLOWING FOR CALCULATIONS AT THE SPECIES LEVEL. *SEE* *GULF REEF FISH FMP*, *SUPRA* NOTE 107, AMEND. 1. THE CRUSTACEANS FMP DEFINED OY IN TERMS OF AVOIDING RECRUITMENT OF AND SET IT AT .5SPR. *SEE* *CRUSTACEANS FMP*, *SUPRA* NOTE 44, AMEND. 6.

- ¹⁶² See *Gulf Reef Fish FMP*, *supra* note 107, amend. 1; *MSB FMP*, *supra* note 43, amend. 4; *Pacific Groundfish FMP*, *supra* note 44, amend. 4.
- ¹⁶³ See *Crustaceans FMP*, *supra* note 44, amend. 6; *Gulf Shrimp FMP*, *supra* note 44, amend. 5.
- ¹⁶⁴ See *Snapper-Grouper FMP*, *supra* note 44, amends. 2-3, 6.
- ¹⁶⁵ NOAA defines “recruitment overfishing” as “a situation in which the rate of fishing is (or has been) such that annual recruitment to the exploitable stock has become significantly reduced. The situation is characterized by a greatly reduced spawning stock, a decreasing proportion of older fish in the catch, and generally very low recruitment year after year.” *Recruitment Overfishing*, (“DEFINED TERM”), <https://definedterm.com/a/definition/194134> (last visited Feb. 26, 2018).
- ¹⁶⁶ NOAA defines “recruitment overfishing” as “a situation in which the rate of fishing is (or has been) such that annual recruitment to the exploitable stock has become significantly reduced. The situation is characterized by a greatly reduced spawning stock, a decreasing proportion of older fish in the catch, and generally very low recruitment year after year.” *Crustaceans FMP*, *supra* note 44, amend. 6.
- ¹⁶⁷ *Gulf Reef Fish FMP*, *supra* note 107, amend. 1.
- ¹⁶⁸ *MSB FMP*, *supra* note 43, amend. 4.
- ¹⁶⁹ *Id.*
- ¹⁷⁰ *Pacific Groundfish FMP*, *supra* note 44, amend. 4.
- ¹⁷¹ *Gulf Reef Fish FMP*, *supra* note 107, amend. 1.
- ¹⁷² NOAA defines SPR as the number of eggs that could be produced by an average recruit in a fished stock divided by the number of eggs that could be produced by an average recruit in an unfished stock. *Spawning Potential Ratio*, (“DEFINED TERM”), https://definedterm.com/spawning_potential_ratio (last visited Feb. 20, 2018).
- ¹⁷³ *Snapper-Grouper FMP*, *supra* note 44, amends. 2-3, 6.
- ¹⁷⁴ See, e.g., *Caribbean Coral FMP*, *supra* note 156. The CFMC’s Queen Conch FMP, which was under development in this time period and finalized the next year, also discussed these factors. See *infra* note 189.
- ¹⁷⁵ Note that the ABC acronym used in the MAFMC FMP has a different meaning from that used in NMFS’s regulation. However, the strategy of annually modifying TAC downward, based on ecological factors, is basically the same.
- ¹⁷⁶ See *MSB FMP*, *supra* note 43, amend. 4. Note that this Framework wires in a process for annual consideration of the FCMA’s OY factors.
- ¹⁷⁷ NAT’L MARINE FISHERIES SERV., U.S. NATIONAL PLAN OF ACTION FOR THE MANAGEMENT OF FISHING CAPACITY, NMFSPD 01-113, 22 (Aug. 4, 2004).
- ¹⁷⁸ The question of what the penalties were for failing to prevent overfishing is a topic for another discussion.

179 SFA, Pub. L. No. 104-297 (1996) (codified at 16 U.S.C. § 1801 (2000)).

180 16 U.S.C. § 1802(7)(A) (2000).

181 See 16 U.S.C. § 1803(18)); see, e.g., *Joint CMP FMP*, *supra* note 44, amend. 1 (establishing annual management as MSY plus 10%).

182 See 16 U.S.C. § 1802(33)(B).

183 *Id.* § 1803(33)(C) (emphasis added).

184 *Id.* § 1853(a)(1).

185 *Id.* § 1854(e).

186 *Id.* § 1853(a)(10).

187 *Id.* § 1802(34).

188 *Id.* § 1854(e).

189 The new FMPs were the CFMC’s FMP for Queen Conch Resources of Puerto Rico and the USVI, *CFMC Fishery Management Plans, Queen Conch*, CARIBBEAN FISHERY MGMT. COUNCIL, http://caribbeanfmc.com/fmp_queen_conch.html (last visited Mar. 20, 2018) [hereinafter *Queen Conch FMP*]; and SAFMC’s FMP for Golden Crab Fishery of the South Atlantic Region, *South Atlantic Golden Crab Rulemakings*, S. ATLANTIC FISHERY MGMT. COUNCIL, http://sero.nmfs.noaa.gov/sustainable_fisheries/policy_branch/rules/sa/crab/index.html (last visited Mar. 20, 2018) [hereinafter *Golden Crab FMP*].

190 See *Queen Conch FMP*, *supra* note 189. The FMP specified OY as “all queen conch commercially and recreationally harvested from the EEZ landed consistent with management measures set forth in this FMP under a goal of allowing 20% of the spawning stock biomass to remain intact.” Thus the OY approach was basically OY=management + a B goal of (20% SSB).

191 *Multispecies FMP*, *supra* note 107, amend. 9.

192 *Summer Flounder FMP*, *supra* note 107, amends. 8-9.

193 *Id.*

194 See *South Atlantic Shrimp FMP*, *supra* note 156, amend. 1.

195 *Snapper-Grouper FMP*, *supra* note 44, amend. 8.

196 Fisheries of the Caribbean, Gulf of Mexico, and South Atlantic; Coastal Migratory Pelagic Resources of the Gulf of Mexico and South Atlantic; Amendment 8, 62 Fed. Reg. 33,800, 33,804 (proposed June 23, 1997).

197 See Fisheries of the Caribbean, Gulf of Mexico, and South Atlantic; Coastal Migratory Pelagic Resources of the Gulf of Mexico and South Atlantic; Amendment 8, 63 Fed. Reg. 1813, 1815 (proposed Jan. 12, 1998) (emphasis added).

198 Gulf Shrimp FMP, *supra* note 44, amend. 8.

199 Shrimp Fishery of the Gulf of Mexico; Amendment 8, 60 Fed. Reg. 66,928 (proposed Dec. 27, 1995).

200 Joint CMP FMP, *supra* note 44, amend. 8.

201 For example, in the 1999 Sustainable Fisheries Act Amendments to the FMP, the Council proposed a definition of OY for all reef fish stocks, but NMFS disapproved it because it was based on SPR proxies rather than biomass based estimates. See Fisheries of the Caribbean, Gulf of Mexico, and South Atlantic; Fishery Management Plans of the Gulf of Mexico; Addition to FMP Framework Provisions; Stone Crab Gear Requirements, 65 Fed. Reg. 31,831, 31,832 (proposed May 19, 2000).

202 See *infra* notes 253 and 263 (Gulf Reef Fish Rebuilding Plans).

203 If B is above B_{msy} , $OY \leq ABC$; if B is unknown, proxy of 40%; if below B_{msy} , default OY below ABC and may be further reduced; if below Overfishing threshold, default Rebuilding takes effect, but allows Council to recommend an OY above the default. *Pacific Groundfish FMP*, *supra* note 44, amend. 1.

204 Golden Crab FMP, *supra* note 189.

205 Queen Conch FMP, *supra* note 189.

206 *The Status of U.S. Fisheries*, 1997, NOAA (1998), <https://repository.library.noaa.gov/view/noaa/15601>. The first report was titled “Status of Fisheries of the United States, Report to Congress.” Subsequent reports have used variations on this title. For consistency, this Article refers to them all as “Status of the Stocks” reports. NMFS provides online versions of the past three years’ Status of the Stocks reports at <https://www.fisheries.noaa.gov/national/population-assessments/fishery-stock-status-updates>. All reports, including the older one, are available through NOAA’s online library using the following addresses: *The Status of U.S. Fisheries*, 2016 NOAA (2017), <https://repository.library.noaa.gov/view/noaa/15620>; *The Status of U.S. Fisheries*, 2015, NOAA (2016), <https://repository.library.noaa.gov/view/noaa/15619>; *The Status of U.S. Fisheries*, 2014, NOAA (2015), <https://repository.library.noaa.gov/view/noaa/15618>; *The Status of U.S. Fisheries*, 2013, NOAA (2014), <https://repository.library.noaa.gov/view/noaa/15617>; *The Status of U.S. Fisheries*, 2012, NOAA (2013), <https://repository.library.noaa.gov/view/noaa/15616>; *The Status of U.S. Fisheries*, 2011, NOAA (2012), <https://repository.library.noaa.gov/view/noaa/15615>; *The Status of U.S. Fisheries*, 2010, NOAA (2011), <https://repository.library.noaa.gov/view/noaa/15614>; *The Status of U.S. Fisheries*, 2009, NOAA (2010), <https://repository.library.noaa.gov/view/noaa/15613>; *The Status of U.S. Fisheries*, 2008, NOAA (2009), <https://repository.library.noaa.gov/view/noaa/15612>; *The Status of U.S. Fisheries*, 2007, NOAA (2008), <https://repository.library.noaa.gov/view/noaa/15611>; *The Status of U.S. Fisheries*, 2006, NOAA (2007), <https://repository.library.noaa.gov/view/noaa/15610>; *The Status of U.S. Fisheries*, 2005, NOAA (2006), <https://repository.library.noaa.gov/view/noaa/15609>; *The Status of U.S. Fisheries*, 2004, NOAA (2005), <https://repository.library.noaa.gov/view/noaa/15608>; *The Status of U.S. Fisheries*, 2003, NOAA (2004), <https://repository.library.noaa.gov/view/noaa/15614>; *The Status of U.S. Fisheries*, 2002, NOAA (2003), <https://repository.library.noaa.gov/view/noaa/15606>; *The Status of U.S. Fisheries*, 2001, NOAA (2002), <https://repository.library.noaa.gov/view/noaa/15605>; *The Status of U.S. Fisheries*, 2000, NOAA (2001), <https://repository.library.noaa.gov/view/noaa/15604>; *The Status of U.S. Fisheries*, 1999, NOAA (2000), <https://repository.library.noaa.gov/view/noaa/15603>; *The Status of U.S. Fisheries*, 1998, NOAA (1999), <https://repository.library.noaa.gov/view/noaa/15602>; *The Status of U.S. Fisheries*, 1997, *supra*.

207 *The Status of U.S. Fisheries, 1997*, *supra* note 206. Before 2000, the reports did not distinguish between stocks that were “undergoing overfishing” and those that were “in an overfished condition.” *Id.*

208 *Id.*

209 *The Status of U.S. Fisheries, 1998*, *supra* note 206.

210 Final Rule on Magnuson-Stevens Act Provisions; National Standard Guidelines, 63 Fed. Reg. 24,212, 24,218 (May 1, 1998) (codified at 50 C.F.R. §§ 600.310(d-e) (1998)) [hereinafter 1998 Final Rule]. This interpretation had been implied since the initial IFR in 1976 and explicitly stated in regulations since the 1983 Final Rule.

211 50 C.F.R. §§ 600.310(b), 600.310(c)(1) (1998).

212 *Id.* § 600.310(f)(5)(i) (emphasis added).

213 *Id.* § 600.310(c)(1)(ii), (f)(4)(ii).

214 *Id.*

215 *Id.* § 600.310(c)(1)(iii)(C)(3) (emphasis added).

216 *Id.* § 600.310(d)(1)(ii).

217 *Id.* § 600.310(f)(4).

218 *Id.*

219 *Id.* § 600.310(f)(4) (emphasis added).

220 *Id.* (emphasis added).

221 *Id.*

222 *Id.* § 600.310(f)(6).

223 This went a step beyond the SFA’s requirement that OY provide for rebuilding in that it required preventative measures in advance of an overfishing situation.

224 1989 Final Rule, 50 C.F.R. § 602.11(c)(4) (1989).

225 1998 Final Rule, 50 C.F.R. § 610(f)(5) (1998).

226 The 1983 and 1989 Final Rules used the term “Acceptable biological catch” as an annual concept that could be used to make

reductions from MSY. The SFA added the term “allowable biological catch” into the FCMA with respect to research set-asides. The term is used once in the SFA but is not defined. SFA, [Pub. L. No. 104-297](#), § 108 (c)(7) (codified at [16 U.S.C. § 1853\(b\)\(11\)](#) (1996-2007)); Magnuson-Stevens Reauthorization Act, [Pub. L. No. 109-479](#), § 103(b)(1) (2007) (codified at [16 U.S.C. § 1852\(g\)\(1\)\(B\)](#) (2012)) [hereinafter MSRA]. The MSRA adds the term “acceptable biological catch” into the FCMA as an item on which SSC’s should provide advice to Councils.

- 227 *See* Preamble to 1998 Final Rule; Proposed Rule on [Magnuson-Stevens Act Provisions; National Standard Guidelines](#), 62 Fed. Reg. 41,907 (Aug. 4, 1997) [hereinafter 1997 Proposed Rule].
- 228 *See* 1998 Final Rule, 50 C.F.R. § 602.11(c)(2) (1998).
- 229 *See* 1989 Final Rule, 50 C.F.R. § 602.11(c) (1989).
- 230 RESTREPO, V. R, ET AL., TECHNICAL GUIDANCE ON THE USE OF PRECAUTIONARY APPROACHES TO IMPLEMENTING NATIONAL STANDARD 1 OF THE MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT, NOAA TECHNICAL MEMORANDUM NMFS-F/SPO-31 (July 17, 1998).
- 231 *Id.* at 1.
- 232 *Id.* at 1-44.
- 233 *Id.* at 34.
- 234 *Id.* at 1.
- 235 *Id.*
- 236 *See* MSRA, [16 U.S.C. § 1851](#) (2012). Congress enacted the MSRA in 2006, and the President signed it in January 2007.
- 237 *See supra* note 206.
- 238 Advance Notice of Proposed Rulemaking on [Fisheries of the United States, National Standard 1 Guidelines](#), 68 Fed. Reg. 7492 (Feb. 14, 2003) [hereinafter 2003 ANPR].
- 239 Proposed Rule on Magnuson-Stevens Act Provisions; National Standard Guidelines, 70 Fed. Reg. 32,640 (June 22, 2005) [hereinafter 2005 Proposed Rule].
- 240 *Id.*
- 241 *See* Proposed Rule on [Magnuson-Stevens Act Provisions; Annual Catch Limits; National Standard Guidelines](#), 73 Fed. Reg. 32,526 (June 9, 2008) (proposed to be codified at 50 C.F.R. § 600) [hereinafter 2008 Proposed Rule]; *see also* Final Rule on [Magnuson-Stevens Act Provisions; Annual Catch Limits; National Standard Guidelines](#), 74 Fed. Reg. 3178 (Jan. 16, 2009) (codified at 50 C.F.R. § 600 (2009)) [hereinafter the 2009 Final Rule].
- 242 *Supra* note 206.

- 243 For example, the CFMC’s Spiny Lobster and Reef Fish FMPs had not changed their OY approaches (size limit, and all caught pursuant to management with a numeric estimate, respectively) since implementation of the original FMPs in 1985. The Joint Spiny Lobster FMP had used a size limit approach since 1982 but changed to 30% SPR in 1999. The Gulf Stone Crab FMP had defined OY by size and season since 1979 but changed to OY=MSY in 1999. The NEFMC modified its 1982 OY for the Atlantic Scallop FMP from general results of management to a control rule based on F and T targets.
- 244 The new FMPS included the Spiny Dogfish FMP, *Spiny Dogfish, Fishery Management Plan and Amendments*, MID-ATLANTIC FISHERY MGMT. COUNCIL, <http://www.mafmc.org/dogfish/> (last visited Mar. 20, 2018) [hereinafter *Spiny Dogfish FMP*]; Tilefish FMP, *Tilefish, Fishery Management Plan and Amendments*, MID-ATLANTIC FISHERY MGMT. COUNCIL, <http://www.mafmc.org/tilefish/> (last visited Mar. 20, 2018) [hereinafter *Tilefish FMP*]; the Monkfish FMP, *Monkfish, Plan Amendments, Frameworks, and Specifications*, NEW ENGLAND FISHERY MGMT. COUNCIL, <https://www.nefmc.org/management-plans/monkfish> (last visited Mar. 20, 2018) [hereinafter *Monkfish FMP*]; the FMP for Small Mesh Multispecies, *Small-Mesh Multispecies (Whiting), Plan Amendments, Frameworks, and Specifications*, NEW ENGLAND FISHERY MGMT. COUNCIL, <https://www.nefmc.org/management-plans/small-mesh-multispecies> (last visited Mar. 20, 2018). The Small Mesh FMP was established through amendment 12 to the NE Multi-species FMP in 2000. The Final Rule implementing the original Small Mesh FMP was [65 Fed. Reg. 16,766 \(Mar. 29, 2000\)](#) [hereinafter Small Mesh FMP]; the Deep Sea Red Crab FMP, *Red Crab, Plan Amendments, Frameworks, and Specifications*, NEW ENGLAND FISHERY MGMT. COUNCIL, <https://www.nefmc.org/management-plans/red-crab> (last visited Mar. 20, 2018) [hereinafter *Red Crab FMP*]; the FMP for the Northeast Skate Complex, *Skates, Plan Amendments, Frameworks, and Specifications*, NEW ENGLAND FISHERY MGMT. COUNCIL, <https://www.nefmc.org/management-plans/skates> (last visited Mar. 20, 2018) [hereinafter *Skate FMP*]; the FMP for U.S. West Coast Fisheries for Highly Migratory Species, *Highly Migratory Species: Fishery Management Plan and Amendments*, PAC. FISHERY MGMT. COUNCIL, <https://www.pcouncil.org/highly-migratory-species/fishery-management-plan-and-amendments/> (last visited Mar. 20, 2018) [hereinafter *Pacific HMS FMP*]; the FMP for Pelagic Sargassum Habitat of the South Atlantic Region, *Sargassum, Fishery Management Plan / Amendments*, S. ATLANTIC FISHERY MGMT. COUNCIL, <https://safmc.net/sargassum-3/> (last visited Mar. 20, 2018) [hereinafter *Sargassum FMP*]; the FMP for the Dolphin and Wahoo Fishery of the Atlantic, *Dolphin/Wahoo, Fishery Management Plan/Amendments*, S. ATLANTIC FISHERY MGMT. COUNCIL, <http://safmc.net/fishery-management-plans-amendments/dolphinwahoo/> (last visited Mar. 20, 2018) [hereinafter *Dolphin-Wahoo FMP*]; the *Precious Corals FMP*, *supra* note 44; and the FMP for Regulating Offshore Marine Aquaculture in the Gulf of Mexico, *Aquaculture Management Plans*, GULF MEX. FISHERY MGMT. COUNCIL, http://archive.gulfcouncil.org/fishery_management_plans/aquaculture_management.php (last visited Mar. 20, 2018) [hereinafter *Aquaculture FMP*].
- 245 These included the Aquaculture FMP, the Sargassum FMP, the Surf Clam/Ocean Quahog FMP, the Atlantic Scallop FMP, and the Joint Corals FMP. Also, the NPFMC retained its OY as a range within the aggregate MSY numeric cap, and several additional FMPs retained OY as zero, such as both the Caribbean and Joint Corals FMPs (for corals other than Gorgonian).
- 246 *See, e.g., Scup, Management Plans & FMP Reviews*, ATLANTIC STATES MARINE FISHERIES COMMISSION, <http://www.asmfc.org/species/scup> (last visited Mar. 20, 2018). (amendment 8 to the Summer Flounder FMP incorporated the Scup FMP) *Pacific Salmon FMP*, *supra* note 44.
- 247 *See, e.g., Joint Spiny Lobster FMP*, *supra* note 44, amend. 2 (using 30PR); *GULF REEF FISH, SUPRA NOTE 107 (USING VARIOUS FORMS OF F- AND B-TARGETS)*; *RED DRUM FMP, SUPRA NOTE 107 (SAME)*; NEFMC’S SMALL MESH FMP (USING $F_{\text{TARGET}} \times B_{\text{TARGET}}$), [65 FED. REG. 766 \(MAR. 29, 2000\)](#); *SNAPPER-GROUPER FMP*, *SUPRA NOTE 44 (USING VARIOUS PRs)*; *Crustaceans FMP*, *supra* note 44, amend. 6 (using PR).
- 248 ROSENBERG REPORT, *supra* note 152.
- 249 *See Caribbean Spiny Lobster FMP*, *supra* note 107, amend. 2, *Caribbean Reef Fish FMP*, *supra* note 107, amend. 3; *Queen Conch FMP*, *supra* note 189, amend. 1.
- 250 Due to lack of data, the WPFMC used an effort-based proxy for setting MSY-based reference points. *See Coral Reef Ecosystems Fishery Management Plan*, W. PACIFIC REGIONAL FISHERY MGMT. COUNCIL, <http://www.wpcouncil.org/coralreef/Coral%20Reef%20FMP.html> (last visited Mar. 20, 2018) [hereinafter *Coral Reef FMP*]. The proxy for MFMT was set as the effort that produces MSY (Emsy) and the proxy for Foy was set at 0.75 Emsy. This is the functional

equivalent of Foy=75sy.

251 See *Joint CMP FMP*, *supra* note 44, July 2003 regulatory amend.

252 *Dolphin-Wahoo FMP*, *supra* note 244.

253 See *Gulf Reef Fish FMP*, *supra* note 107, secretarial amend. 1 (red grouper); *see also Gulf Reef Fish FMP*, *supra* note 107, amends. 22, 23 (vermillion snapper).

254 See *Stone Crab FMP*, *supra* note 44, SFA amend.; *Gulf Shrimp FMP*, *supra* note 44, amend. 13.; *South Atlantic Shrimp FMP*, *supra* note 156, amend. 6 (adding a species and retaining OY approach from 1996); *Multispecies FMP*, *supra* note 107, amend. 13 (defining OY for non-overfished species as OF=Fmsy).

255 See *Herring FMP*, *supra* note 43 (reinstated after hiatus in 1999).

256 MSB FMP, *supra* note 43, amend. 8 (defining OY_{Max} for loligo as fishing at F_{Max}, which was equated to the overfishing threshold (OT)).

257 See *Monkfish FMP*, *supra* note 244.

258 See *Bluefish FMP*, *supra* note 156, amend. 1; *Spiny Dogfish FMP*, *supra* note 244; *Tilefish FMP*, *supra* note 244; *see also Multispecies FMP*, *supra* note 107, amend. 13 (for overfished species).

259 See GULF OF MEX. FISHERY MGMT. COUNCIL, GENERIC SUSTAINABLE FISHERIES ACT AMENDMENT (Feb. 1999), <http://gulfcouncil.org/wp-content/uploads/Generic-SFA-amendment-1999.pdf>.

260 See *Herring FMP*; *supra* note 43 (reinstated after hiatus in 1999).

261 See *Dolphin-Wahoo FMP*, *supra* note 244.

262 See *Pacific Groundfish FMP*, *supra* note 44, amend. 6. This process established the FMP’s previous OY levels (from amendment 11), as the defaults, which could then be reduced.

263 See *Gulf Reef Fish FMP*, *supra* note 107, amend. 22.

264 See *Snapper-Grouper FMP*, *supra* note 44, amends. 12 (Red Porgy rebuilding), 15A (Snowy Grouper, Red Porgy, and Black Sea Bass Rebuilding).

265 *Atlantic Scallop FMP*, *supra* note 44, amend. 7.

266 *Id.* at amend. 10. Amendment 10 provided that OY is “a long term average, defined as the amount of biomass that can be landed when the stock biomass is at B by using regulated fishing gear in resource areas that are not managed as long term closures, at a rate equivalent to the open area fishing mortality target.”

267 *Monkfish FMP*, *supra* note 244.

268 This number does not include the NPFMC’s use of ABC, which predated the 1989 rule.

269 See *Coastal Pelagics FMP*, *supra* note 44, amend. 8.; *Herring FMP*, *supra* note 43.

270 Amendment 16-4 to the Pacific Groundfish FMP sorted species into three categories: for category I species, specifications can be based upon quantitative stock assessments that are based upon catch at age data; for category II species, some biological indicators are available, but a quantitative analysis cannot be conducted; category III species are considered “minor species,” and only have information on landed biomass. OY for category I and II species OY is adjusted downward from ABC based on whether abundance has fallen below a certain threshold, on uncertainty about the biomass estimate and other parameters, and on social, economic, or ecological considerations. OY can also be reduced to account for bycatch in other fisheries, and the catch of species for research purposes. Each biennial fishing period the Council will assess the biological, social, and economic condition of the fishery, make specifications, and then publish them in the SAFE report. The previous specification of OY from amendment 11 is made the “default harvest control rule” for the ABC adjustment process. *Pacific Groundfish FMP*, *supra* note 44, amend. 16-4.

271 See *Gulf Reef Fish FMP*, *supra* note 107, secretarial amend. 1; *Gulf Reef Fish FMP*, *supra* note 107, secretarial amend. 2.; *Gulf Reef Fish FMP*, *supra* note 107, amends. 22-23.

272 See *Snapper-Grouper FMP*, *supra* note 44, amends. 12, 15A.

273 See *Nat. Res. Def. Council v. Evans*, 243 F. Supp. 2d 1046 (N.D. Cal. 2003).

274 *Red Crab FMP*, *supra* note 244.

275 *Id.*

276 See *The Status of U.S. Fisheries, 2000*, *supra* note 206.

277 The 2003 and 2004 reports removed a net of eighteen Atlantic sharks previously listed as subject to overfishing and overfished primarily due to incorrectly listing individual stocks when it was the stock complex (only one complex) that had been assessed. Also, eleven stocks in the South Atlantic and Gulf of Mexico were removed from the overfished list in 2006 due to criteria being deemed not reliable for determining overfished status.

278 In 2005 NMFS began reporting a Fish Stocks Sustainability Index (FSSI) that provides scores for a subset of managed stocks listed as “important” based on various indicators such as overfishing/overfished/rebuilt status and biomass. This index has incorporated data for stocks going back to 2000 and provides another method of measuring progress. See *Assessment Summaries and Trends*, NAT’L OCEANIC & ATMOSPHERIC ADMIN. (Feb. 21, 2018), <https://www.st.nmfs.noaa.gov/stock-assessment/reports>. For comparisons of overall progress of “important” stocks, the FSSI may provide more helpful comparisons.

279 MSRA, Pub. L. No. 109-479, § 104(c)(1) (2007) (codified at 16 U.S.C. § 1854(e)(3)(A) (2012)) (emphasis added).

280 16 U.S.C. § 1852(h)(6).

281 *Id.* § 1852(g)(1)(B).

282 *Id.* § 1853(a)(15).

283 *Id.* § 1854(e)(5).

284 In 2007, the MSRA § 5 amended section 201(d) of the FCMA, describing TALFF, to make TALFF allocations discretionary and to set TALFF at zero where the Secretary determines there is adequate or excess harvest capacity in the fishery. It is not clear how this affects the tension between long-term and annual interpretations of OY, however, in that the requirement in section 303(a)(4) for FMPs to assess on an annual basis the capacity of the vessels and processors to harvest the OY still remains intact. The legislative history on this provision indicates Congress’s intent to further safeguard stocks from overfishing. *S. REP. NO. 109-229, at 16* (2006).

285 It should be noted that in 2004, Congress established a statutory cap on the BSAI Groundfish fishery. Whereas the FMP specified OY as a range that could go as high as 2.4 million metric tons (mmt), Congress restricted the upper limit to 2mmt. Departments of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations Act of 2004, *Pub. L. No. 108-199, 118 Stat. 46, § 803(c)* (codified at *42 U.S.C. § 250(g)* and *22 U.S.C. §§ 2078, 2349(b)* (2004).

286 MSRA, *Pub. L. No. 109-479, § 103(b)(1)* (2007).

287 *16 U.S.C. § 1853.*

288 *Id.*

289 *See NAT’L MARINE FISHERIES SERV., supra note 177.*

290 The SFA added new *National Standard 8*, which required “Conservation and management measures shall, consistent with the conservation requirements of the Magnuson-Stevens Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to: (1) Provide for the sustained participation of such communities; and (2) To the extent practicable, minimize adverse economic impacts on such communities.”

291 2009 Final Rule, *74 Fed. Reg. 3178, 3178.*

292 *Id.*

293 *See* 1998 Final Rule, *50 CFR § 602.11(c)(2)* (1998).

294 2009 Final Rule, *50 C.F.R. § 600.310* (2009).

295 *Id.* § 600.310(f)(4).

296 *Id.* § 600.310(f)(2)(i)(D) (emphasis added).

297 *Id.* § 600.310(f)(2)(i). The rule further explained:

The relationship of MSY to OFL is that MSY is the maximum yield that the stock can provide, in the long term, while OFL is an annual estimate of the amount of catch above which overfishing is occurring. The annual OFL varies above and below the MSY level depending on fluctuations in stock size. Since both MSY and OFL are related to the highest fishing mortality rate that will not result in overfishing, it is expected that the long-term average of OFLs would equate to MSY, provided that the stock abundance is high enough to support MSY. *Id.*

298 *Id.* § 600.310(f)(2)(ii).

299 *Id.*

300 *Id.* § 600.310(f)(2)(iv).

301 *Id.* § 600.310(f)(2).

302 *Id.* (emphasis added).

303 [Magnuson-Stevens Act Provisions; National Standard Guidelines, 63 Fed. Reg., 24,215 \(1998\)](#) (stating that this rule replaced MSY control rules with ABC control rules); 2009 [Final Rule](#), 74 Fed. Reg. at 3178 (Jan. 16, 2009) (stating that each Council “must establish an ABC control rule” because it needs to meet requirements of MSA §§ 303(a)(15) and 302(g)(1)(B)); *id.* (including ABC control rules as items to be included in FMPs); *id.* (defining “ABC control rule” to mean an approach to setting ABC for a stock or stock complex as a function of the scientific uncertainty in the estimate of OFL and any other scientific uncertainty).

304 *See* 2008 Proposed Rule, 73 Fed. Reg. 32,526, 32,544 (June 9, 2008).

305 2009 [Final Rule](#), 73 Fed. Reg. at 3178.

306 2009 [Final Rule](#), 50 C.F.R. § 600.310(g)(1) (2009).

307 *Id.* § 600.310(e)(2)(B).

308 *See* 1998 [Final Rule](#), 50 C.F.R. § 600.310(d-e) (1998).

309 2009 [Final Rule](#), 50 C.F.R. § 600.310(e)(3)(ii) (2009).

310 *Id.*

311 *Id.* § 600.310(e)(3)(v).

312 *Id.* § 600.310(e)(3)(v)(D).

313 *Id.* § 600.310(e)(1)(i).

314 *Id.* § 600.310(e)(3)(i)(B) (emphasis added).

315 1998 [Final Rule](#), 50 C.F.R. § 600.310(e)(2)(i)(A) (1998).

316 2009 [Final Rule](#), 50 C.F.R. § 600.310(e)(3)(i)(B) (2009) (emphasis added).

317 For example, the MAFMC’s Surf Clam/Ocean Quahog FMP, which had not amended its OY definition since the 1986 definition of OY as a range, was amended twice during this period to first characterize it as a long-term average between ACT and ACL, and then to remove it from the FMP altogether deferring to the specifications process for its determination. *See Surf Clam/Ocean Quahog FMP*, *supra* note 44, amends. 16-17.

- 318 The CFMC established OY in all four FMPs in context of ABC (ranging from $OY=ABC$ to $OY=75\% ABC$. See *Queen Conch FMP*, *supra* note 189, amend. 2; *Caribbean Reef Fish FMP*, *supra* note 107, amend. 5; see also *Caribbean Spiny Lobster FMP*, *supra* note 107, amend. 5; *Caribbean Coral FMP*, *supra* note 156, amend. 3. For Caribbean Reef Fish and Caribbean Spiny Lobster, OY was further defined as equal to the ACL. Amendment 5 to the Caribbean Spiny Lobster FMP set OY as equal to ACL as equal to 90C. The Caribbean Reef Fish FMP set OY as equal to the ACL and equal to 75-90C. The Caribbean Coral FMP set OY as 75C. The Queen Conch FMP set OY as equal to ABC. The NEFMC defined OY for the Herring FMP as equal to the ACL, defined the ACL as ABC minus management uncertainty, and defined OY for the Atlantic Scallop FMP as equal the ACL, with the ACL less than or equal to the ABC. See *Herring FMP*, *supra* note 43, amend. 4; *Atlantic Scallop FMP*, *supra* note 44, amend. 15. The SAFMC defined OY for both black sea bass and blueline tilefish in the Snapper-Grouper FMP as equal to the ACL with a yield at 75%Fmsy. See *Snapper-Grouper FMP*, *supra* note 44, regulatory amend. 10.; *Snapper-Grouper FMP*, *supra* note 44, amend. 25 (blueline tilefish). The SAFMC defined OY as equal to the ACL, with ACL equal to ABC for its portion of the CMP FMP, as well as for several species in the Snapper-Grouper FMP, the Golden Crab FMP, and the Dolphin-Wahoo FMP. See *Snapper-Grouper FMP*, *supra* note 44, amend. 24 (red grouper); *Snapper-Grouper FMP*, *supra* note 44, amends. 25 (all grouped, some non-grouped), 18A (black sea bass), regulatory amend. 18 (vermillion snapper); *Golden Crab FMP*, *supra* note 189, amend. 5; *Dolphin-Wahoo FMP*, *supra* note 244, amend. 2. In several cases, Councils based OY definitions on ACTs. For example, the NEFMC's Monkfish FMP defined OY as equal to the ACT. See *Monkfish FMP*, *supra* note 244, amend. 5. The Joint GFMC/SAFMC Spiny Lobster FMP defined OY as OY equal to the ACT, which was defined as 90% of the ACL, and ACL was equal to ABC. See *Joint Spiny Lobster FMP*, *supra* note 44, amend. 10.
- 319 The PFMC used this approach in the Pacific Groundfish FMP. See *Pacific Groundfish FMP*, *supra* note 44, amend. 23. The MAFMC used this approach in four of its six FMPs (Bluefish, Spiny Dogfish, Tilefish, and Summer Flounder FMPs) defining OY as the long-term average between ACL and ACT with $ACL=ABC$ in 2011. See *Bluefish FMP*, *supra* note 156, amend. 3; *Spiny Dogfish FMP*, *supra* note 156, amend. 2; *Tilefish FMP*, *supra* note 244, amend. 3; *Summer Flounder FMP*, *supra* note 107, amend. 15.
- 320 *Alaska Scallop FMP*, *supra* note 156, amend. 13; *BSAI Crab FMP*, *supra* note 44, amend. 38/39, at 3. Amendment 13, § 3.1.1.2, to the Scallop FMP stated that OY is established on the basis of MSY, and MSAY is bounded by the OFL. The proposed rule to implement amendment 13 to the Scallop FMP explained: “Amendment 13 would also clarify that, in the absence of a statewide estimate of spawning biomass for weathervane scallops, the overfishing level (OFL) is specified as the MSY.” 76 Fed. Reg. 40,674 (July 11, 2011).
- 321 These included the SAFMC's portion of the Coastal Pelagics FMP, as well as the Snapper-Grouper and Dolphin-Wahoo FMPs.
- 322 See *Fisheries of the Caribbean, Gulf of Mexico, and South Atlantic; Comprehensive Annual Catch Limit Amendment for the South Atlantic*, 77 Fed. Reg. 15,916, 15,917 (Mar. 16, 2012).
- 323 See, e.g., KELLI F. JOHNSON ET AL., STATUS OF THE U.S. SABLEFISH RESOURCE IN 2015 28 (section 1.2), 58 (section 4.4), 63, section 12; see also, SOUTHEAST DATA, ASSESSMENT, AND REVIEW (SEDAR), SEDAR 42 FINAL STOCK ASSESSMENT REPORT: GULF OF MEXICO RED GROUPEL 273-84 (Oct. 2015). See also the MAFMC's Fish Stock 101 Series that explains the stock assessment process. The Council's website states that the course will provide a detailed look at how stock assessment models work. The website states that “when possible, stock assessment models include information on ecosystem and environmental effects to improve the interpretation of historical information and the precision of forecasts.” NAT'L OCEANIC & ATMOSPHERIC ADMIN. FISHERIES, FISH STOCK ASSESSMENT 101 (2012), https://www.st.nmfs.noaa.gov/Assets/stock/documents/Fish_Stock_Assessment_101.pdf.
- 324 See the GFMC's portion of Joint GFMC/SAFMC CMP FMP, which retained the Restrepo-based 75% and 85% msy (*Joint CMP FMP*, *supra* note 44, at 2003 regulatory amend.); the Gulf Reef Fish FMP retaining the 75% and 85% MSY for some species (see *Gulf Reef Fish FMP*, *supra* note 107, amend. 30B (Gag grouper, $OY = 75\% F_{max}$ (Rebuilding Plan/then Restrepo-based)), *Gulf Reef Fish FMP*, *supra* note 107, amend. 37 (Gray triggerfish) (B- and MSY-based:75% F_{msy} , using F30PR AS PROXY); *SKATE FMP*, SUPRA NOTE 44, AMEND. 3, WHICH WAS REVISED TO SET OY AS 75SY; AND ALLOWS FURTHER ADJUSTMENT DOWN, CITES RESTREPO), *PACIFIC HMS FMP*, SUPRA NOTE 244, AMEND. 12.
- 325 See, e.g., *Red Drum FMP*, *supra* note 107, at 7 (30PR); *SMALL MESH MULTISPECIES FMP*, SUPRA NOTE 107, AT 3-33

$(OY = F_{TARGET} \times B_{TARGET})$.

- 326 See, e.g., Snapper-Grouper Rebuilding plans contained in the Snapper-Grouper FMP. *Snapper-Grouper FMP*, *supra* note 44, amends. 15B (gag grouper), 16 (gag and vermillion grouper), regulatory amend. 19 (black sea bass).
- 327 GOA Groundfish FMP, *supra* note 44 (aggregate numeric OY with annual implementation via ABCs, TACs, etc.), and the BSAI Groundfish FMP, *supra* note 62 (aggregate with fixed numeric range).
- 328 At the end of this time period, the following FMPs defined OY as “amounts of fish: South Atlantic Shrimp, GOA and BSAI Groundfish, Gulf Coral, Sargassum, Precious Corals, and Red Crab FMP (through a formula that produces a specific number as well).
- 329 See *Queen Conch FMP*, *supra* note 189, amend. 2; *Caribbean Reef Fish FMP*, *supra* note 107, amend. 5; *Caribbean Spiny Lobster FMP*, *supra* note 107, amend. 5; *Caribbean Coral FMP*, *supra* note 156, amend. 3; see also 50 C.F.R. §§ 622.440(a), 622.459(a), 622.474(a) (2017).
- 330 See 50 C.F.R. §§ 622.42, 622.60, 622.93, 622.109 (2016); GULF OF MEX. FISHERY MGMT. COUNCIL, GENERIC ANNUAL CATCH LIMITS AMENDMENT 65 (Sep. 2011), <http://gulfcouncil.org/wp-content/uploads/Final-Generic-ACL-AM-Amendment-September-9-2011-v.pdf> (describing the Generic Framework Procedure).
- 331 The Joint CMP FMP allows Framework adjustments of OY. See 50 C.F.R. § 622.389 (2017); see also Joint Spiny Lobster FMP regulations, *id.* § 622.412(a). The SAFMC’s portion of the Joint CMP FMP illustrates how control rules may now be the place to factor in additional policy considerations. Pursuant to amendment 18, $OY = ACL = ABC = 5.69mp$, the ABC was calculated by the SSC using a control rule. In 2014, Framework Am 1, to the Joint CMP FMP adjusted the numbers based on new information such that Atlantic Mackerel’s $OY = ACL = ABC$ (resulting in the higher number, 6.06mp).
- 332 *Snapper-Grouper FMP*, *supra* note 44; *Dolphin-Wahoo FMP*, *supra* note 244.
- 333 *Herring FMP*, *supra* note 43.
- 334 See *Coastal Pelagics FMP*, *supra* note 44, amend. 13. Regulations at 50 C.F.R. § 600.660 do not mention OY but refer to the “Framework process in the FMP.”
- 335 *Pacific Salmon FMP*, *supra* note 44, amend. 16.
- 336 *Pacific Groundfish FMP*, *supra* note 44, amend. 23.
- 337 See, e.g., *Golden Crab FMP*, *supra* note 189, amend. 5.
- 338 In amendment 17 to the Surf Clam/Ocean Quahog FMP, the Council removed the specification of OY from the FMP and provided for advisors to provide annual recommendations for OY through the specifications process. *Surf Clam/Ocean Quahog FMP*, *supra* note 44, amend. 17. The preamble to the proposed rule stated: “This action proposes to remove the optimum yield ranges from the FMP, but commercial quotas for surfclam and ocean quahog would continue to be set under the existing system of catch limits.” 81 Fed. Reg. 14,072, 14,075 (Mar. 16, 2016). The final rule explained: “As part of the normal specifications process, the Council’s Scientific and Statistical Committee will recommend Acceptable Biological Catch limits, and the Surfclam and Ocean Quahog Advisory Panel will develop recommendations for commercial quotas, including optimum yield recommendations. This information will be provided to the Council to inform its decisions regarding annual catch limits, catch targets, and commercial harvest quotas.” 81 Fed. Reg. 38,969, 38,971 (June 15, 2016).

- 339 See 2016 Proposed Specifications for Summer Flounder, [80 Fed. Reg. 80,689 \(Dec. 28, 2015\)](#).
- 340 Amendment 4 to the Herring FMP provided that $OY=ACL$, $ACL=ABC$ minus management uncertainty and provided a list of considerations to be used to reduce ACL from ABC: “The Atlantic herring fishery has been managed using hard TACs since the 2000 fishing year. The TACs are developed through the fishery specification process and are based on an ABC (allowable biological catch) that has been reduced to an Optimum Yield based on biological, economic, ecological, and other considerations.” *Herring FMP*, *supra* note 44, amend. 14. Management is implemented through a three-year specification process described at [50 C.F.R. § 648.200 \(2017\)](#), which incorporates the FCMA’s OY factors and prohibits exceeding the OFL.
- 341 *Pacific Salmon FMP*, *supra* note 44, amend. 16.
- 342 *Id.* According to amendment 16, $OY=\text{long-term average [of ACLs]}$; above precautionary threshold, $OY \leq ABC$; below precautionary threshold, OY is reduced by HCR; if overfished, OY is pursuant to the rebuilding plan.
- 343 For the FMP for Fish Resources of the Arctic Management Area, see N. PAC. FISHERY MGMT. COUNCIL, FISHERY MANAGEMENT PLAN FOR FISH RESOURCES OF THE ARTIC MANAGEMENT AREA 20-25 (Aug. 2009), <https://www.npfmc.org/wp-content/PDFdocuments/fmp/Arctic/ArcticFMP.pdf>.
- 344 *Id.*
- 345 *Id.*; see also ROBERT D. MECUM, NAT’L MARINE FISHERIES SERV., ENVIRONMENTAL ASSESSMENT/REGULATORY IMPACT REVIEW/FINAL REGULATORY FLEXIBILITY ANALYSIS FOR THE ARTIC FISHERY MANAGEMENT PLAN 18-19 (Aug. 2009), <https://alaskafisheries.noaa.gov/sites/default/files/analyses/earirfrfa0809final.pdf>.
- 346 Fishery Conservation and Management Act of 1976, [Pub. L. No. 94-265](#), § 303(a)(15), 90 Stat. 331 (codified at [16 U.S.C. §§ 1801-1884 \(2012\)](#)).
- 347 See *supra* note 206, for link to historic and current Status of the Stocks Reports.
- 348 The system is called the Fish Stock Sustainability Index (FSSI). The FSSI tracks 199 of the most important commercial and recreational fish stocks. These stocks account for about 85% of total catch. The FSSI reflects information about a whether a stock’s overfishing/overfished status is known, whether the stock is overfished or subject to overfishing, and whether the stock is at a sustainable level.
- 349 See *The Status of U.S. Fisheries, 2015*, *supra* note 206, at 1.
- 350 Final Rule on [Magnuson-Stevens Act Provisions; National Standard Guidelines](#), [81 Fed. Reg. 71,858 \(Oct. 18, 2016\)](#) (codified at [50 C.F.R. § 600.310\(b\)\(2\)\(3\) \(2016\)](#)) [hereinafter 2016 Final Rule].
- 351 *Id.* The preamble describes the public process for developing the modifications. NMFS published an Advance Notice of Public Rulemaking (ANPR) on May 3, 2012 ([77 Fed. Reg. 26,238](#), May 3, 2012) to solicit public comments on potential adjustments to the [National Standard guidelines](#). The comment period on the ANPR was extended once ([77 Fed. Reg. 39,459](#), July 3, 2012), and then reopened ([77 Fed. Reg. 58,086](#), Sept. 12, 2012), and ended on October 12, 2012. In March 2013, NMFS published a report that summarizes the comments received on the ANPR. NOAA FISHERIES, SUMMARY OF COMMENTS RECEIVED ON ADVANCE NOTICE OF PROPOSED RULEMAKING ON POTENTIAL ADJUSTMENTS TO THE NATIONAL STANDARD 1 GUIDELINES (2013).

- 352 The complete list of issues addressed in the rule is as follows:
Some of the major items covered in the proposed guidelines included the following: (1) Add a recommendation that Councils reassess the objectives of their fisheries on a regular basis; (2) consolidate and clarify guidance on identifying whether stocks require conservation and management; (3) provide additional flexibility in managing data limited stocks; (4) revise the guidance on stock complexes to encourage the use of indicator stocks; (5) describe how aggregate maximum sustainable yield (MSY) estimates can be used; (6) develop a definition for a depleted stock; (7) provide increased stability in fisheries by providing guidance on the use of multi-year overfishing determinations; (8) revise the guidance on optimum yield (OY) to improve clarity and better describe the role of OY under the ACL Framework; (9) clarify the guidance on acceptable biological catch (ABC) control rules, describe how ABC control rules can allow for phase-in adjustments to ABC, and allow for carry-over of all or some of an unused portion of the ACL; (10) revise the guidance on AMs to improve clarity; (11) clarify the guidance on establishing ACL and AM mechanisms in FMPs; (12) clarify the guidance on adequate progress in rebuilding and extending rebuilding timelines; and (13) provide flexibility in rebuilding stocks.”
2016 Final Rule, 81 Fed. Reg. 71,858 (Oct. 18, 2016).
- 353 2016 Final Rule, 50 C.F.R. § 600.310(e)(iii)(A)(3) (2016).
- 354 2016 Final Rule, 81 Fed. Reg. at 71,859.
- 355 This rationale is very similar to the language provided in the preamble to the 1989 Final Rule, as quoted earlier in this Article. *See* 1989 Final Rule, 54 Fed. Reg. 30,711, 30,829 pmb1. (July 24, 1989). The preamble to the 1989 Final Rule further states:
[E]xceeding OY does not necessarily constitute overfishing. If a stock is in good condition, the specification of OY may serve various goals besides prevention of overfishing. Exceeding the OY may interfere with achievement of those goals but not affect the reproductive potential of the stock. On the other hand, if OY is the amount of fish that can safely be removed from the stock from a biological standpoint, exceeding OY may well constitute overfishing.
Id. at 30,827.
Another familiar approach is the three-year time period, which is the time used in some of the OF definitions developed under the 1989 Rule. *See* ROSENBERG REPORT, *supra* note 152.
- 356 *See* 2016 Final Rule, 81 Fed. Reg. at 71,870.
- 357 2016 Final Rule, 50 C.F.R. § 600.310(e)(3)(1) (2016).
- 358 *See* discussion *supra* Section II.B.
- 359 1983 Final Rule, 48 Fed. Reg. 7401 (Feb. 18, 1983) (codified at 50 C.F.R. § 602.1-17 (1983)). While the 1983 guidance added an allowance for MSY to address related groups of species limited circumstances, it retained the 1976 and 1977 approach of requiring MSY at the stock level.
- 360 1998 Final Rule, 63 Fed. Reg. 24,212, 24,229 (codified at 50 C.F.R. § 600.310(c)(1) (1998)). The 1998 rule defined MSY as “the largest long-term average catch or yield that can be taken from a *stock or stock complex* under prevailing ecological and environmental conditions.” (emphasis added).
- 361 2016 Final Rule, 81 Fed. Reg. at 71,867, 71,896 (codified at 50 C.F.R. § 600.310(e)(1)(iv) (2016)).
- 362 *Id.* at 71,867.
- 363 *Id.* at 71,860.
- 364 *Id.* at 71,896, 71,900 (codified at 50 C.F.R. § 600.310(e)(ii)(A)(3), (g)(5)).

³⁶⁵ 82 Fed. Reg. 24,092, 24,093 (May 25, 2017).

³⁶⁶ The Omnibus Amendment for the Western Pacific Region to Establish a Process for Specifying Annual Catch Limits and Accountability Measures, established a process for the SSC to develop ABCs based on scientific considerations and uncertainty, and for the Council to set ACLs at or below the ABC. WESTERN PAC. FISHERY MGMT. COUNCIL, OMNIBUS AMENDMENT FOR THE WESTERN PACIFIC REGION TO ESTABLISH A PROCESS FOR SPECIFYING ANNUAL CATCH LIMITS AND ACCOUNTABILITY MEASURES, (2011), <http://www.wpcouncil.org/wp-content/uploads/2013/03/ACL-Amendment-RIN-0648-AY93-2011-02-24.pdf>.

³⁶⁷ *Bottomfish FMP*, *supra* note 107, at 3-11.

³⁶⁸ *Gulf Shrimp FMP*, *supra* note 44, amend. 17B.

³⁶⁹ See NAT'L OCEANIC & ATMOSPHERIC ADMIN., BIOLOGICAL OPINION (2014), http://sero.nmfs.noaa.gov/protected_resources/sea_turtles/documents/shrimp_biological_opinion_2014.pdf; *Gulf Reef Fish FMP*, *supra* note 107.

³⁷⁰ While only four species of shrimp are subject to federal management (brown, white, pink, and royal reds), shrimp fishermen frequently land additional species, such as rock shrimp and seabobs, concurrently with federally managed species.

³⁷¹ *Gulf Shrimp FMP*, *supra* note 44, amend. 17B, at 12.

³⁷² *Id.* at 15.

³⁷³ *Id.* at 18.

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