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Further action on bycatch could boost United States fisheries performance



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ABSTRACT

This paper examines the sustainability of United States fisheries managed under the Magnuson-Stevens Fishery Conservation and Management Act, the law that provides the framework for federal fisheries management. Sustainability across a broad suite of criteria, including health of the fished stock, bycatch, and effects on the habitat and ecosystem, was measured against the Monterey Bay Aquarium's Seafood Watch criteria for ecological sustainability. Seafood Watch ratings and numerical scores for U.S. federally managed fisheries were analyzed to elucidate strengths and weaknesses among federally-managed fisheries. Of U.S. federally managed fisheries assessed by Seafood Watch, only 2% are rated "Avoid", and strong ratings for stock health for nearly all fisheries indicate that the Magnuson-Stevens Act is fundamentally succeeding at maintaining or rebuilding the abundance of targeted stocks. The majority (79%) of U.S. fisheries earn the intermediate rating of "Good Alternative", and 19% earn the top rating of "Best Choice". Given that U.S. fisheries management is considered among the strongest in the world, this analysis assesses why the majority of U.S. fisheries are not rated "Best Choice". Fisheries for all variety of species, and using a wide range of fishing methods, can merit "Best Choice" status. However, the majority of U.S. fisheries do not achieve this rating due primarily to bycatch concerns. By improving performance with regard to bycatch, most "Good Alternative" U.S. federal fisheries could reach "Best Choice" status and reap rewards in the marketplace for that recognition. Findings suggest that current science-based management should be maintained in the Magnuson-Stevens Act reauthorization, managers should adopt best practices based on fisheries that are already performing well in the U.S., and more specific federal bycatch mitigation requirements should be implemented.

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1. Introduction

The wild-caught seafood industry in the United States supports about 1.3 million jobs and produces over 9 billion pounds of seafood annually [1]. The U.S. Congress is currently considering reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the law that provides the framework for the management of U.S. federal fisheries. In the process, Congress is evaluating current regulations and considering new

requirements, including standards regarding bycatch, food-web interactions, and habitat impacts. As lawmakers debate potential modifications, this paper examines whether fisheries managed under the current law meet ecological sustainability criteria recognized in the marketplace, and identifies where there is room for these fisheries to improve.

The MSA has undergone many changes over the years, seeking to strike a balance between commercial industry needs and the protection of stocks and the environment. In 1996, amendments to the MSA set timelines for rebuilding depleted stocks, defined optimum yield as no greater than maximum sustainable yield, and established requirements to protect essential fish habitat and minimize bycatch "to the extent practicable". Ten years later, given that overfishing had not been abated by rules set in place by the 1996 law, the 2006 reauthorization added strict regulations for rebuilding stocks, a requirement that federal fishery management plans set precautionary overfishing limits ("annual catch limits"), and accountability measures to ensure compliance. By 2012, all federally managed stocks were operating under science-based,

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annual catch limits aimed at ending and preventing overfishing. Recent reviews found that these requirements have helped rebuild stocks, although some historically depleted stocks have not recovered as quickly as hoped, or have even declined further [2,3]. Most recently, the iconic Gulf of Maine cod fishery was found to have reached its lowest recorded biomass to date, just 3–4 percent of sustainable levels, and emergency measures were put in place to immediately reduce overfishing [4]. Despite these remaining concerns, however, the MSA is recognized as having promoted progress towards reducing overfishing in U.S. fisheries. The performance of U.S. fisheries with regard to ecosystem-based fishery management strategies – which are also recognized by the MSA – is less clear.

This paper examines how closely current U.S. federal fisheries management aligns with the concept of “sustainable,” as defined by a third-party group: Monterey Bay Aquarium’s Seafood Watch (SFW) program. The SFW program uses academic, industry, and government data, including federal stock assessments, to develop science-based “Best Choice” (green), “Good Alternative” (yellow), and “Avoid” (red) recommendations for seafood based on a standardized set of sustainability criteria (Table 1). SFW recommendations provide an opportunity to compare performance of U.S. fisheries against sustainability metrics that go beyond just stock health and also consider ecosystem impacts. The suite of criteria considered by Seafood Watch align well with the goals of MSA, which include maintaining stock abundance and ending overfishing as well as minimizing impacts on bycatch species, the habitat and the ecosystem.

How well do U.S. federally-managed fisheries perform with respect to sustainability ratings by SFW? The science-based requirements of the MSA are fundamentally succeeding at rebuilding targeted stocks and improving sustainability. The majority (79%) of federal fisheries assessed to date are currently in the “Good Alternative” category, and only 2% are rated “Avoid.” However, only 19% of U.S. fisheries are a “Best Choice,” primarily because of bycatch concerns (the incidental mortality of non-target fish and other marine species). Fisheries that do merit the “Best Choice” designation include a wide range of species and gear

types ranging from handline to trawl, demonstrating that it is an achievable standard for any fishery, with the adoption of best practice mitigation strategies. Findings suggest that current science-based management should be maintained, managers should adopt best practices based on fisheries that are already performing well in the U.S., and more specific bycatch mitigation requirements should be implemented.

2. Methods

Of the wild-caught, federally-managed U.S. fisheries rated by SFW (selected by SFW because of their importance in the marketplace, see Supplementary Materials), the percentage of fisheries that were rated as “Best Choice”, “Good Alternative”, or “Avoid” according to SFW criteria was calculated (assessed by percent landings by weight and by number of recommendations).

2.1. Seafood Watch criteria

Seafood Watch criteria rely on performance-based metrics to assess performance. For wild-caught fisheries, Seafood Watch criteria include population impacts of the fishery on the stock being assessed, impacts on other species (including bycatch), effectiveness of management, and impacts on the habitat and ecosystem (see Table 1; full SFW criteria and recommendations are available at www.seafoodwatch.org). Fisheries that perform well in all four criteria are rated “Best Choice”, whereas those with multiple, significant conservation concerns (i.e., multiple red rated criteria) are rated “Avoid”. “Good Alternative” fisheries generally perform well in most criteria, but may have one significant conservation concern (denoted by a red rating in one criterion); for example, the stock may be overfished, or there may be regular bycatch of threatened species. The criteria are not prescriptive in requiring specific management strategies or fishing methods, and any type of fishery can achieve a “Best Choice” rating if strong performance in all criteria can be demonstrated.

Table 1

Summary of Seafood Watch criteria for fisheries. Full Seafood Watch criteria are available at <http://www.seafoodwatch.org/seafood-recommendations/our-criteria>.

Criterion and factor	Guiding principles
Criterion 1: Impacts on the stock under assessment	
● Factor 1.1: Inherent vulnerability of the stock	Ensure fishing mortality and other management measures are appropriate for the inherent vulnerability of the stock.
● Factor 1.2: Health of the stock	Stock abundance and size structure is maintained at a level that does not impair recruitment or productivity.
● Factor 1.3: Fishing pressure	Fishing mortality is appropriate for current state of the stock.
Criterion 2: Impacts on other species (includes bycatch and other retained species)	
● Factor 2.1: Inherent vulnerability of the stock	Ensure fishing mortality and other management measures are appropriate for the inherent vulnerability of the stock.
● Factor 2.2: Health of the stock	Stock abundance and size structure is maintained at a level that does not impair recruitment or productivity.
● Factor 2.3: Fishing pressure	Fishing mortality is appropriate for current state of the stock.
● Factor 2.4: Discards and bait use	Fishery optimizes the utilization of marine resources by minimizing post-harvest loss and by efficiently using marine resources as bait.
Criterion 3: Management effectiveness	
● Factor 3.1: Management of fishery's impacts on fished stocks	Management strategy has a high chance of preventing declines in stock productivity by taking into account the level of uncertainty, other impacts on the stock, and the potential for increased pressure in the future.
● Factor 3.2: Management of fishery's impact on bycatch species	Management strategy prevents negative population impacts on bycatch species, particularly species of concern.
Criterion 4: Impacts on the habitat and ecosystem	
● Factor 4.1: Impact of fishing gear on the substrate	The fishery does not adversely impact the physical structure of the seafloor or associated biological communities.
● Factor 4.2: Modifying factor: mitigation of fishing gear impacts	Damage to the seafloor is mitigated through protection of sensitive or vulnerable seafloor habitats, and limits on the spatial footprint of fishing on fishing effort.
● Factor 4.3: Ecosystem and food web considerations	All stocks are maintained at levels that allow them to fulfill their ecological role and to maintain a functioning ecosystem and food web. Fishing activities should not seriously reduce ecosystem services provided by any retained species or result in harmful changes such as trophic cascades, phase shifts or reduction of genetic diversity

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