

A Practitioner's Handbook for Fisheries Social Impact Assessment

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Acronyms

ACL	Annual catch limit
ACS	American Community Survey
AHE	Affected human environment
AM	Accountability measures
CEQ	Council on Environmental Quality
CSVI	Community Social Vulnerability Indices
DAS	Days at sea
EIS	Environmental impact assessment
EO	Executive order
FEP	Fishery ecosystem plan
FMP	Fisheries management plan
IFQ	Individual fishing quota
ITQ	Individual transferrable quota
LAPP	Limited Access Privilege Programs
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OMB	Office of Management and Budget
OWB	Objective well-being
PRA	Paperwork Reduction Act
RFA	Regulatory Flexibility Act
SIA	Social impact assessment
TAC	Total allowable catch

Abstract

As United States fisheries managers develop and modify fisheries management plans that set catch limits for the Nation's commercially important fish stocks, the importance of including and weighing the social impacts associated with changes in management has gained increasing attention. In recognition of the potential for social impacts, social impact assessments have been made a requirement of the overall environmental impact assessment process under the National Environmental Policy Act. To date, there has not been a standardized way of conducting and presenting a fisheries social impact assessment (SIA). In addition, there is a need for a template that incorporates existing data streams and identifies potential new sources of information while being applicable to a wide range of fisheries management decisions. The objective of this Handbook is to provide technical advice for NOAA Fisheries and fishery management councils to streamline the SIA process while fully capturing relevant social impacts. The Handbook provides a primer on SIA in fisheries, the purpose of an SIA, key elements that should be included in SIAs, and common types of social impacts associated with particular management measures. It also reviews the legal requirements for conducting SIAs and provides a set of best practices and analytical tools for conducting SIAs. In addition, it describes the relationship of this Handbook to NMFS Guidance for Social Impact Assessment.

I. Introduction

Marine fisheries Social Impact Assessment (SIA) in the U.S. is required by law¹ and enacted by each of eight regional Fishery Management Councils (Councils), with oversight from National Marine Fisheries Service (NMFS) and final approval by the U.S. Department of Commerce. While overall these Councils perform the same functions (creating Fishery Management Plans (FMPs) and updates thereto), the process for creating these FMPs and their content will vary somewhat across fisheries and Councils. At least in part, this is due to species-based, social, and economic differences in the fisheries present in each region, as well as regional differences in preferred fishery management techniques. In addition, in some regions SIAs are prepared solely by NMFS social scientists, in others solely by Council staff, and in yet others by NMFS and Council staff in coordination, including sometimes through the use of contractors. The specific person or people charged with writing the SIA will therefore vary by region and/or action. For example, in the Northeast Region it is common for Councils to have groups composed of Council staff and NMFS staff who help to research and write up draft language for regulatory changes proposed by the Councils. To assure quality, regional representation, and legal accuracy, this document has been reviewed by: all NMFS social scientists who conduct SIAs, staff from all eight Fishery Management Councils, NMFS regional and national National Environmental Policy Act (NEPA) specialists, NMFS national and regional staff from the Office of Sustainable Fisheries, and NOAA General Counsel.

Nonetheless, periodic updates to the referenced laws and policies can occur, so it is important to keep in contact with regional NEPA Coordinators. For instance, on September 14, 2020, a new rule from the Council on Environmental Quality (CEQ) became effective, which updated CEQ's regulations for implementing NEPA (85 Fed. Reg. 43304, July 16, 2020). As a result of this rule, NOAA and NMFS will update their NEPA procedures to reflect the changes in the NEPA regulations. The NOAA NEPA Coordinator issued the first NOAA interim guidance on September 14, 2020. The NOAA NEPA Coordinator will update that guidance and issue additional interim guidance, as necessary. In addition, NMFS intends to issue NMFS-specific interim guidance, including guidance relevant to the NEPA process for actions under the MSA. Please reach out to your regional NEPA coordinator and regional General Counsel for updates and with any questions.

II. What is the purpose of this Practitioner's Handbook?

This Practitioner's Handbook for Fisheries Social Impact Assessment (hereafter, the Handbook) focuses on Social Impact Assessment for U.S. marine fisheries, though much of the basics would apply to any SIA. As United States fishery managers develop and modify FMPs and fishery ecosystem plans (FEPs) that implement management

¹ Magnuson-Stevens Fishery Conservation and Management Act (see more on this below) and National Environmental Policy Act (see more on this below).

actions to protect the Nation's fish stocks, part of the process, required by law, includes weighing and describing the social impacts of these regulatory actions². The recognition that fisheries resource management affects not only the resource, but also the resource users and their communities, highlights the fact that fisheries are (among other things) social in nature. An SIA “provides information to agencies and communities about social and cultural factors³ that need to be considered in any decision; provides a mechanism for incorporating local knowledge and values into the decision (including local ecological knowledge [LEK] and traditional ecological knowledge [TEK]); and can help a decision maker identify the most socially beneficial course of action for local, regional, and national interests” (ICPGSIA 2003). SIA and other analyses will be written as part of a broader Environmental Impact Statement (EIS). As with all EIS analyses, for the SIA you will be asking: What are the likely impacts if the proposed regulatory action occurs versus if the status quo regulations continue?

By providing a more standardized procedure for producing an SIA, this Handbook will further the following objectives: 1) to assure that fisheries SIA writers understand the available types of data and how to access them, so SIAs are based on “the best scientific information available”⁴ (per National Standard 2 of the Magnuson-Stevens Fishery Conservation and Management Act [MSA]);⁵ 2) to help social scientists who have never conducted an SIA or need a brush-up; and 3) to suggest common core components of SIAs. Anyone planning to conduct an SIA should first have carefully reviewed the [NOAA/NMFS Guidelines for Assessment of the Social Impact of Fishery Management Actions](#) (NMFS 2007) before reading this Handbook.

This Practitioner’s Handbook for Fisheries Social Impact Assessment is solely a set of professional recommendations on how to implement the NMFS (2007) Policy Directive on SIAs (PD 01-111-02, linked above). Further, neither of these two guidance documents creates enforceable rights or a cause of action under law. However, an SIA provides important components of the record, satisfying legal requirements of the MSA and NEPA, and supporting NMFS decisions under the MSA. If the information in the SIA is lacking or incorrect, then the record supporting the action is flawed and the action itself is vulnerable to legal challenge.

In the end, you are aiming to describe, to the extent they are relevant to the regulation at hand and to the extent data are available or can be reasonably acquired in the timeframe of the Council action, any of the following that will be measurably impacted: 1. *Demographic characteristics*, 2. *Cultural issues of attitudes, beliefs and values* (e.g., maintaining a traditional “way of life” or traditional ecological knowledge), 3. *Effects of proposed actions on social support and services, and health and safety issues*, 4. *Impacts to non-consumptive and recreational uses of living marine resources and their habitats* (e.g., recreational fishing and diving), and 5. *Historical dependence on and participation in the fishery by fishermen and*

² N.B. This document does not address NOAA obligations under the Marine Mammal Protection Act or the Endangered Species Act, though many aspects will be applicable to SIAs generally.

³ In general, cultural practices will be discussed here under the broad mantle of “social factors”.

⁴ This does not necessarily require collecting new information, but must include sufficient information to make an informed assessment.

⁵ For more context on the connection to National Standard 2, see NMFS (2007:6).

communities, including the special social and cultural importance of fishing in tribal and other indigenous communities (NMFS 2007, Sec. 2.2, p.1, re. NMFS/NOS 2019). You are not required to specifically reference each of these five areas. However, you should think about these general categories when planning your SIA and looking at likely impacts, based on your review of the proposed regulatory actions, the fisheries/fleets involved, and the fishing communities that depend on those fisheries.

In addition, you need to consider your available time and resources. In other words, what is the timeline for preparation of the SIA? With limited time you may have to rely exclusively on a literature review, secondary data, and transcripts from scoping hearings. With more time you may be able to conduct phone interviews. Even more might allow for focus groups. If you have at least a full year of advance warning that a specific type of amendment will be considered, you might be able to plan and implement a survey – and perhaps even design a before/after survey that will allow you to assess the accuracy of your predicted impacts and potentially learn of impacts you had not anticipated. *Generally speaking, however, data gathering projects that require long lead times (e.g., focus groups or surveys) should be implemented as long-term projects and not attempted in relation to specific Council actions.* More information on data gathering can be found in section V.b. and Appendix C.

Two key points to remember: (1) Surveys will require following the process laid out in the Paperwork Reduction Act (PRA). And the PRA applies to any NOAA-funded contracts for external companies or institutions to conduct surveys on NOAA's behalf as well as to Council members and staff, who are considered to be federal employees for purposes of collecting information from the public, per the Office of NOAA General Counsel (See Appendix C, section 1 for more detail on the PRA); and (2) Not all Council actions require the same level of analysis. It will depend on the scope of the action. An EIS for a major amendment implementing a wholesale change of the management structure, e.g., to a catch share system, will require more time and research than, say, an amendment changing the required mesh size for a particular species or species complex. Further, the level of analysis for an EIS differs from that for an Environmental Assessment (EA). More on EIS vs. EA can be found below under section IV.

a. Why a Step-by-Step Handbook to SIAs?

The objective of this Handbook is to provide technical advice for NMFS and Council staff that streamlines the SIA process while fully capturing relevant social impacts. Conducting an SIA is a skill. Those entering a job with NOAA Fisheries or one of the Councils may or may not yet have acquired that skill, even if they have a background in social science. This Handbook is organized to provide some basic background and then to lead the reader step-by-step through the planning, data collection, and write-up stages of an SIA.

There is also need for a description of existing data streams and potential methods for collecting new data in ways that are applicable to a wide range of fisheries management decisions. This Handbook provides step-by-step information on making choices about methods and data in order to develop a more standardized SIA procedure across federally managed

fisheries, while also allowing for regional and fisheries-specific data structures, innovation, and needs.

b. What is the relationship of this Handbook to the NMFS Guidelines for Assessment of the Social Impact of Fishery Management Actions?

This Handbook is not meant to replace the NMFS Policy Directive⁶ Guidelines for Assessment of the Social Impact of Fishery Management Actions (NMFS 2007). Instead, this Handbook responds to the statement in the Guidelines noting: “Individual fisheries and issues will call for a range of social factor⁷ analysis methods and techniques, and selection of these tools will require case-by-case judgment. Social factor analysis is an evolving field in applied social science and creative applications may be found to fit different fisheries and their participants.” This Handbook provides support for making those case-by-case judgments.

III. Why do we do SIAs? Legal and policy framework

SIA is a tool for gauging the social and cultural consequences of alternative management or policy measures. The SIA is used in conjunction with economic and environmental impact assessments to facilitate the decisionmaking process. It does so by identifying, among the management alternatives that will meet the stated goals, those with the greatest positive or least negative impacts (Vanclay 2002). For NOAA Fisheries (NOAA Fisheries and NMFS will be used interchangeably throughout this document), these goals include meeting stock rebuilding requirements and creating positive net national benefits.

Legal requirements for conducting SIAs are found in laws passed by Congress and Executive Orders created by the President. Failure to fully comply with statutory requirements could render the agency’s action vulnerable to legal challenge. An executive order is an instrument used by the President to carry out functions of the executive office, and, when based on a constitutional or statutory grant of power, it essentially has the force of law, except in instances where it is contradicted by other federal law, and except that it does not generally create any right or benefit enforceable against the United States (Duncan 2010). Policy Directives are “statements of and instructions for implementing important, high-level internal direction and positions that guide organization decisions and actions.”⁸ These are internal agency requirements and do not have the force of law. However, significant deviation from stated agency policy

⁶ See <https://www.fisheries.noaa.gov/national/laws-and-policies/policy-directive-system>

⁷ NMFS (2007:5) defines social factor analysis as “description of the social characteristics of a fishery and/or community.”

⁸ <https://www.fisheries.noaa.gov/national/laws-and-policies/policy-directive-system>

could also render an agency action vulnerable to a legal challenge or render a Council-recommended action subject to disapproval. Below, key laws, Executive Orders (E.O.s), and policies are discussed, as they form the basis for certain specific topics that an SIA must address when prepared in a federal, and especially a federal fisheries, context. Following this will be a step-by-step guide through the SIA process itself.

a. What laws require SIA?

There are two primary laws that require assessment of social impacts in connection with fisheries management actions: the NEPA and MSA. Other laws or sections of laws (including the MSA) require targeted social assessments when *specific populations are impacted*, e.g., fishing communities, or *under specific circumstances*, e.g., the implementation of limited access.

1. National Environmental Policy Act

NEPA requires that Federal agencies prepare an EIS for every major federal action “significantly” affecting the quality of the “human environment” (NEPA sec. 102(2)(C)). If a proposed action is not expected to have significant environmental impacts, CEQ’s regulations provide for preparation of an EA to determine the action’s significance. Both the EIS and EA must address certain factors related to social impacts, and NMFS uses the SIA to accomplish this.

CEQ’s regulations define “human environment” as follows:

“Human Environment” means “the natural and physical environment and the relationship of present and future generations of Americans with that environment” (40 CFR 1508(m)).

CEQ’s regulations require that EISs discuss the “environmental consequences” of a proposed action and its alternatives (40 CFR 1502.16). This includes the following types of “effects:” “*ecological* (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), *aesthetic, historic, cultural, , social, or health effects* [emphases added]. Effects may also include those resulting from actions that may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial” (40 CFR 1508(g)). In addition, when the agency determines that economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement shall discuss and give appropriate consideration to these effects on the human environment (40 CFR 1502.16(b)).

2. Magnuson-Stevens Fishery Conservation and Management Act (MSA)

The MSA requires consideration of multiple social impact considerations in the development of fishery management actions. The record for any fishery management action must include documentation that it is consistent with 10 national standards, several of which pertain to social factors. In addition, fishery management plans must include 15 mandatory components, and may include an additional 13 discretionary components, several of which require consideration of social impacts. The MSA also includes special programs that may additionally call for consideration of social impacts. The information in the SIA can be used to satisfy these requirements. Key provisions are discussed in more detail below.

National Standards.

National Standard 1. Fundamentally, all fishery management actions taken under the MSA must provide for achieving “optimum yield” (MSA sec. 301(a)(1)). The MSA defines optimum yield (OY) as:

the amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities and taking into account the protection of marine ecosystems; that is prescribed on the basis of the MSY [maximum sustainable yield] from the fishery, as reduced by any relevant economic, social, or ecological factor; and, in the case of an overfished fishery, that provides for rebuilding to a level consistent with producing the MSY in such fishery (MSA sec. 3(33)).

Thus it is critical that each fishery management action is supported by documentation of these considerations. NMFS’s National Standard 1 Guidelines provide additional direction as to the recreational and social factors to be assessed:

The benefits of recreational opportunities reflect the quality of both the recreational fishing experience and non-consumptive fishery uses such as ecotourism, fish watching, and recreational diving. Benefits also include the contribution of recreational fishing to the national, regional, and local economies and food supplies (50 CFR 600.310(e)(3)(iii)(A)(2)).

Social factors. Examples are enjoyment gained from recreational fishing, avoidance of gear conflicts and resulting disputes, preservation of a way of life for fishermen and their families, and dependence of local communities on a fishery (e.g., involvement in fisheries and ability to adapt to change). Consideration may be given to fishery-related indicators (e.g., number of fishery permits, number of commercial fishing vessels, number of party and charter trips, landings, ex-vessel revenues) and non-fishery related indicators (e.g., unemployment rates, percent of population below the poverty level, population density), and preference for a particular type of fishery (e.g., size of the fishing fleet, type of vessels in the fleet, permissible gear types). Other factors that may be considered include the effects that past harvest levels

have had on fishing communities, the cultural place of subsistence fishing, obligations under tribal treaties, proportions of affected minority and low-income groups, and worldwide nutritional needs (50 CFR 600.310(e)(3)(iii)(B)(1)).

National Standard 3 (MSA sec. 301(a)(3)). National Standard 3 provides for managing stocks as a unit. The National Standard 3 Guidelines indicate that management units may be organized around a variety of perspectives including biological, ecological, social, or other bases (50 CFR 600.320(d)(1)).

National Standard 4 (MSA sec. 301(a)(4)). National Standard 4 prohibits discrimination between residents of different states and requires that allocations be, among other things, fair and equitable. The National Standard 4 Guidelines set forth factors to consider in developing fair and equitable allocations, including:

Economic and social consequences of the scheme, food production, consumer interest, dependence on the fishery by present participants and coastal communities, efficiency of various types of gear used in the fishery, transferability of effort to and impact on other fisheries, opportunity for new participants to enter the fishery, and enhancement of opportunities for recreational fishing (50 CFR 600.325(c)(3)(iv)).

National Standard 8 (MSA sec. 301(a)(8)). National Standard 8 requires taking into account “the importance of fishery resources to fishing communities by utilizing economic and social data that are based upon the best scientific information available...” (MSA sec. 301(a)(8)). The MSA defines “fishing community” as (MSA sec. 3(17)) “a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community.”

NMFS’s National Standard 8 Guidelines further clarify that a “fishing community” must be tied to a specific location (as opposed to a community of interest such as one based on gear or target species). The guidelines also provide extensive guidance on what needs to be analyzed to support findings under NS 8, including the following excerpt:

“FMPs must examine the social and economic importance of fisheries to communities potentially affected by management measures. For example, severe reductions of harvests for conservation purposes may decrease employment opportunities for fishermen and processing plant workers, thereby adversely affecting their families and communities. Similarly, a management measure that results in the allocation of fishery resources among competing sectors of a fishery may benefit some communities at the expense of others...”

... The analysis should assess the likely positive and negative social and economic impacts of the alternative management measures, over both the short and the long term, on fishing communities. Any particular management measure may economically benefit some

communities while adversely affecting others. Economic impacts should be considered both for individual communities and for the group of all affected communities identified in the FMP. Impacts of both consumptive and non-consumptive uses of fishery resources should be considered” (50 CFR 600.345(c)(1)-(5)).

Further, both qualitative and quantitative data use are specified as important, including, for commercial fisheries, “information provided by fishermen, dealers, processors, and fisheries organizations and associations.” Similarly, relevant fishing and fishing-related industries and groups should be assessed for recreational and subsistence fisheries. Elsewhere, boatyards, ice suppliers, and tackle shops are given as examples of directly related fisheries-dependent services and industries that may be part of a fishing community.

FMP Mandatory Components

Pursuant to the MSA, FMPs must include a Description of the Fishery that includes components that pertain to social concerns:

Description of the Fishery. FMPs must contain a description of the fishery, including, but not limited to, the number of vessels involved, the type and quantity of fishing gear used, the species of fish involved and their location, the cost likely to be incurred in management, actual and potential revenues from the fishery, any recreational interest in the fishery, and the nature and extent of foreign fishing and Indian treaty fishing rights, if any (16 U.S.C. § 1853(a)(2)).

b. What are other laws and executive orders relevant to SIA?

A variety of other laws and Executive Orders relate to particular groups or activities within the fisheries and may require specific social analyses that would be included in the SIA. Here we provide a summary. More detail is provided in Appendix A. E.O. 12898 on Environmental Justice requires that federal agencies conduct their programs, policies, and activities in a manner to ensure individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination under, those programs, policies, and activities because of their minority or low income status. E.O. 12866 on Regulatory Planning and Review requires that federal agencies assess the costs and benefits to the Nation of implementing a regulation. Regions with tribes will need to follow E.O. 12875 on Enhancing the Intergovernmental Partnership and E.O. 13175 on Consultation and Coordination with Indian Tribal Governments.

c. What are relevant NOAA Fisheries policy directives?

All NMFS policy directives related to social and economic analysis of regulatory actions can be found [here](#).

1. NMFS Guidelines for Assessment of the Social Impact of Fishery Management Actions

In 2007, the National Marine Fisheries Service updated its Guidelines for Assessment of the Social Impact of Fishery Management Actions. This guidance was re-affirmed in 2014 (NMFS 2007). This document provides an overall introduction to SIAs. In particular, it states, “In the context of marine fisheries conservation and management, SIAs focus on the human environment of the fisheries. That is, SIAs consider the effects of changes in resource availability or fishing practices on fishermen, communities, fishing-related businesses and employment, families and other social institutions, regulations and social norms of behavior, and cultural values” (NMFS 2007:5). In addition, NMFS (2007) reviews NOAA Fisheries policy on SIAs, and discusses how to undertake a social factor analysis, the concept of fishing communities, and various special considerations for undertaking an SIA. It provides significant assistance for organizing and conceptualizing how an SIA should be developed. As noted above, anyone planning to conduct an SIA should first have carefully reviewed the Guidance before reading this Handbook. Similar to this, though narrower in focus, is the NMFS Guidance for Conducting a Review of Catch Share Programs. Where such a review has been conducted, it will also be a good source of information about that fishery. More detail on this guidance is provided in Appendix B.

2. Other relevant NOAA, NOAA Fisheries, and Executive Branch policy directives

There are two key policies on environmental justice: guidance from the White House Council on Environmental Quality and the Dept. of Commerce Environmental Justice Strategy. For those in regions with tribes, associated policy directives are also critical, such as Department of Commerce Consultation and Coordination Policy (2013), which implements Departmental Administrative Order 218-8. Also relevant is the Office of Management and Budget guidance for E.O. 12866 and Small Business Administration guidance for the Regulatory Flexibility Act. The NOAA Policy and Procedures for Compliance with the National Environmental Policy Act and Related Authorities provides important information on all aspects of NEPA.⁹ And the policy directive on Ecosystem-based Management will be useful, as many regions are moving to Fishery Ecosystem Plans rather than Fishery Management Plans. See Appendix B for more detail on these and other relevant policy directives. Finally, the NOAA

⁹ On July 16, 2020, the Council on Environmental Quality (CEQ) promulgated regulations changing the procedures for complying with NEPA. All actions in progress prior to the rule's effective date of September 14, 2020, may proceed under the old guidance. Federal agencies have 1 year in which to revise their procedures and bring them into the compliance with the new rules. NOAA and NMFS will be developing new guidance. Consult with your region's NEPA Coordinator to stay informed about new developments.

Fisheries and National Ocean Service Guidance and Best Practices for Engaging and Incorporating Traditional Ecological Knowledge in Decision-Making (NMFS/NOS 2019) is important in any area with tribal or indigenous fisheries. Note: This guidance and best practices document deals solely with “TEK associated with indigenous peoples, as distinguished from ‘local ecological knowledge’ held by long-time residents in an area, or long-term participants in an activity or industry.”

IV. Where within an Environmental Impact Statement are social impacts discussed?

The Environmental Impact Statement is mandated by NEPA for applicable major federal actions that are anticipated to result in significant impacts to the human environment.¹⁰ The MSA similarly mandates a Fishery Impact Statement for an FMP or amendment, to assess the likely effects of any FMP or amendment on participants in applicable fisheries and fishing communities.¹¹ In practice, the information and analyses in the EIS generally cover both requirements. There are two primary sections in an EIS where data on social factors is found: the Affected Human Environment (AHE) section and the Impact Assessment sections. There may be separate social and economic impacts sections, or all impacts (social, economic, biological, ecological) may be discussed together in sub-sections based around each measure in the regulatory action. In addition, economic impacts are important to social assessments because of concomitant social impacts or because of social factors that influence, e.g., the conduct of commerce. Below we further describe the differences between the AHE and the SIA and their connections to the Economic Impacts section of the EIS.

We also note that actions that are not anticipated to result in significant impacts to the human environment and for which the agency does not have an applicable categorical exclusion (CE), require only an EA, not an EIS. To clarify, the CEQ regulations for implementing NEPA, at 40 CFR 1508.9, state that an EA is a concise public document prepared by a Federal agency to aid an agency’s compliance with [NEPA] and support its determination of whether to prepare an [EIS] or a [FONSI] ... (40 CFR 1508.1(h)). The requirements for an EA, as stipulated by CEQ regulations at 40 CFR 1500-1508, are less prescriptive than those for an EIS. It need only “briefly” discuss the purpose and need, alternatives, and the environmental impacts (40 CFR 1501.5(c)). However, all types of required analysis under NEPA, and resource categories potentially affected by the proposed action, must still be addressed -- including SIA and environmental justice.

¹⁰ For certain actions, a federal agency can satisfy NEPA by applying a Categorical Exclusion or preparing an Environmental Assessment and Finding of No Significant Impact (FONSI), as applicable. Speak to your NEPA Coordinator for more details.

¹¹ For additional details about the requirements for Fishery Impact Statements, see MSA § 303(a)(9) (16 U.S.C. § 1853(a)(9)) and section II(a)(2) above.

a. SIA versus Affected Human Environment (AHE) section

The AHE describes the baseline status of the fishery (whether commercial, recreational, subsistence, or some combination) before implementation of any new regulations included in the action, including both social and economic information, as well as basic descriptive data such as landings, value, and number of permits by permit category, and indicators such as local and regional quotients (LQ and RQ) and/or NOAA Fisheries Community Social Vulnerability Indicators (CSVIs). The SIA, on the other hand, analyzes and describes the likely changes, due to the alternatives under consideration, to the social fabric of the fishery. This includes activity and place-based community-level impacts, and takes into account relevant cultural aspects.

These changes will vary based on existing capacities and vulnerabilities within the fishery and the fishing communities (as understood from the CSVIs and other indicators listed above), as well as the management alternatives.

In the SIA you are comparing the conditions in the fishery at the time when the regulatory action in question is proposed to: (a) the expected status of the fishery if the regulatory action is put in place versus (b) the expected status of the fishery if no action is taken (the status quo alternative). In making this assessment, the SIA will reference or summarize some stage-setting or background information from the AHE. The SIA analyst may write sections of the AHE or the AHE may be prepared by Council staff with some consultation by the social and economic impacts analysts. Further, for social impact assessments under NEPA, the analysis should be based on the entire affected region and society, not the fishery in isolation. This is one reason (in addition to National Standard 8, discussed below) why we also assess impacts to the broader fishing communities.

b. Social versus Economic Impact Assessments

Because both the social and the economic impact assessments use some of the same data, it is important to understand how the two assessments are different.¹² At the most basic level, social impacts are anything linked to a public or private action (though here we are concerned only with federal actions) that affects or concerns a specific group of individuals. Those impacts, for fisheries SIA, may include alterations to fishing or processor or dealer routines, cultural norms, community or fishing vessel social relationships, local political organization, fishermen or fishing community health and well-being, and personal and property rights (or privileges, as U.S. quasi-property rights to fish are legally defined) (re. Vanclay 2003,

¹² There are three primary types of economic impact assessments: 1) A general assessment that parallels the SIA, the Economic Impacts section of the EIS, 2) the Regulatory Flexibility Act analysis which may include elements from the Economic Impacts section, and 3) the Benefit-Cost Analysis required under E.O. 12866 which is both provided separately from the EIS and also included in the EIS, often within the Regulatory Impact Review (RIR) or Regulatory Impact Assessment (RIA). Here we are comparing the SIA to the Economic Impacts section.

Vanclay et al. 2015, NMFS 2007).¹³ Specific data items may or may not be relevant to a given regulatory action, already available, or feasible to obtain for various of these factors. More on this in section V.c.3.

The SIA will frequently employ or reference some economic data. Predicting changes to occupational opportunities and community infrastructure, for instance, is in part dependent on the analysis of economic impacts. However, “[w]hile SIAs focus on social and cultural values and systems [related to the economy], economic impact assessments focus on market and non-market values and systems” (NMFS 2007:5), including impacts to firms, fleets, and industries. Further, impacts to market and non-market values, in turn, have social impacts for individuals, households, communities, and other social groups.

V. You are beginning work on an SIA: What do you do?

First your regional Council will have identified a problem that it thinks could be ameliorated via regulatory action and possibly also some ideas on types of regulatory actions that would solve the identified problem. “The typical FMC [Fishery Management Council] process for development of a management recommendation usually involves an iterative process with the public in which one or more early versions of a draft fishery management measure and environmental analysis (i.e., draft EIS or draft EA) are shared, commented on, and modified over the course of several FMC meetings prior to a final FMC vote” (NOAA 2017b:C9). For these iterative versions the Council will have requested analyses of the issue(s) to identify or clarify the underlying causes for the identified problem.

Analysts, including you, will respond to these requests. Here you begin initial identification of likely outcomes and impacts of the different options. In the early stages you will provide input on possible social impacts or likely responses of different categories of fishermen and other stakeholders to these possible regulatory actions, based on your knowledge of the region or your knowledge of social science and the fisheries social science literature. If you have read this Handbook beforehand, that will help, though at the beginning you may spend a lot of time just listening and absorbing. As you become familiar with the fishery and the issues, you will flesh out the SIA in more detail, discussing the alternatives and their differing types and/or levels of impact (and usually contributing some tables and discussion to the AHE).

An SIA is context-specific and addresses all issues relevant to the people involved and the ways their livelihoods and ways of life will be impacted (NMFS 2007). This means you need to figure out what the issues are and who will be impacted. You begin with the type(s) of regulatory actions being considered. This section is a useful reference to help identify the types of impacts that you should consider and inform the relevant data you will want to seek for your fishery. On its own, it will not tell you the type or level of impact for any given action, but it can be used as a prompt to make sure that the breadth of potential social impacts is comprehensively examined.

Remember that for social impact assessments under NEPA, the analysis should be based on the entire affected region and society, not the fishery in isolation. In a fisheries context, this

¹³ The ICGSIA (2003), to which NMFS contributed, similarly states that agencies need to address the aesthetic, historic, cultural, economic, social, or health effects which may be direct, indirect, or cumulative.

could potentially include the accumulated impacts of the regulation in question, previous and concurrent regulations in the fishery in question, impacts in other fisheries that participants in this fishery also participate in, and the impacts of other non-fisheries regulations or societal forces such as a downturn in the economy. The appropriate boundaries for the analysis should be carefully considered, however, because if the boundaries are defined too broadly, the analysis could become unwieldy, and if they are defined too narrowly, significant issues may be missed.

a. What is the regulatory action?

Social impacts should be analyzed based on the types of management actions that are being proposed. Such changes may be administrative changes (like changing rules about paperwork) or regulatory (like changing rules about how and when fishing occurs). Below, potential impacts are reviewed for the following common regulatory actions for fishing activity: allocations; closed areas and/or seasons; gear changes; days-at-sea; catch limits; limited access/entry; and catch shares (including Limited Access Privilege Programs, or LAPPs). A list of types of management included under the term “catch shares” can be found in the [NOAA Catch Share Policy](#) (NOAA 2017a). See Table 1 below for a summary of common impacts for each listed regulatory action category. Not all impacts marked as related to a particular regulatory action will occur, but these are typical categories to begin with when looking for potential impacts. Section V.b., below, discusses how to know who in the fishery in question might be affected and where and how to find relevant information on those groups (including fishing communities). On its own, this section will not tell you the level of impact for any given action, but it can be used as a prompt to make sure that the breadth of potential social impacts is comprehensively examined. Keep in mind, as well, that the particular context of the fishery you are assessing may create unique impacts or variations on the impacts described here.

1. Allocations

To allocate is to distribute between groups. In fisheries one common allocation by a Council is the division of the Total Allowable Catch (TAC) or Annual Catch Limit (ACL) between commercial and recreational fisheries. Allocations to many types of subsistence or customary use groups are handled at a higher level by treaties, though some indigenous group access may be through Councils, e.g., Fishery Ecosystem Plans in the Western Pacific Region (see more under V.b.3.v, below). The balance of allocations between commercial and recreational fisheries is often contentious, and may be complicated by sub-allocations across geographic areas. Because allocations ultimately affect income for both commercial and recreational vessels (private and for-hire),¹⁴ there is a cascade of possible social impacts, including to job

¹⁴ For hire vessels include both charter and party/head bosts. Charter boats generally charge a flat fee for a trip (regardless of the number of passengers), but they are only licensed to carry a maximum of 6 passengers per trip (so are often called "six packs"). Head boats (party boats) mostly charge per person

satisfaction (Pollnac and Poggie 1988, Gatewood and McCay 1990, Pollnac and Poggie 2006, Pollnac et al. 2012), time with family, and other impacts. For recreational anglers the loss is generally connected more to angler satisfaction (Holland and Ditton 1992, Beardmore et al. 2014). However, also see Wilde et al. (1998) on motivations for sportfishermen, and Norris-Raynbird (2004) and Colburn et al. (2015) on motivations of for-hire captains. All of these can have follow-on effects to shoreside commercial businesses (e.g., dealers, processors, boatwrights, gear manufacturers) and recreational industries (e.g., marinas, bait-and-tackle shops, hotels, and restaurants). See Jacob et al. (2013a) for more on the social impacts of allocations. For more information on allocation processes, see the [NOAA Fisheries Catch Share Policy](#), and the related [Fisheries Allocation Review Policy](#).

2. Closed areas/seasons

Closed areas and other forms of management that are designed to reduce fishing effort in a particular area (including Marine Protected Areas, Habitat Areas of Particular Concern, Marine Monuments) can take many forms and have many purposes (Liu et al. 2018). Closures that are temporal as well as spatial, such as seasonal closures, identify and protect discrete areas during periods of high species density or during a vulnerable life history stage. Closed areas are also employed as a way of reducing the catch of non-target species by closing areas according to temporary or seasonal shifts in non-target species location. Other closures, including Marine Protected Areas (MPAs), may be long-term in response to target-species declines. There is also a wide variation in the acceptance of area closures among stakeholders based on the intended goals (e.g., reduce bycatch, protect spawning aggregations, protect essential fish habitat) and duration (temporary, seasonally recurring, or permanent) (Pita et al. 2010), as well as whether LEK was used in creating the spatial and temporal parameters. The difficulty in defining the social impacts of closed areas is inextricably tied to their variability and differences in how they are perceived by stakeholders (Pomeroy et al. 2007). MPAs may help provide long-term food security, especially with regard to sedentary species that remain within the borders of the designated area, though local fishermen may experience a relative decrease in catch per unit effort and an increase in the cost associated with fishing due to avoiding that area (Mascia et al. 2010). Fishermen may, however, find area closures to align better than other management measures with their cognitive mapping of the ocean (Clay 1996, Olson 2006, St. Martin and

and can legally carry people up to the maximum capacity approved for the vessel - which is usually much more than 6 people. The lines can be blurry, however, as charter boats may charge per person and head boats may charge a flat fee. Thus, the clear distinction is vessel capacity - vessels licensed to carry 6 or fewer (charters) and those licensed to carry more than 6 (head boats). More broadly, a charter boat is frequently hired by a group of anglers for a fishing trip. If no one hires the boat for a specific trip on a given day, the boat may not leave dock. Often there are very specific species that the anglers want to target. A party boat or headboat is more likely to go out on a regular schedule, with individual anglers hiring a place on the boat. There may be some minimum number of anglers required for the trip to take place, but it is still a regular trip that anyone can join by paying the per-head fee. There is also often a broader acceptable range of target fish, many times for food.

Table 1. Examples of social impacts that fisheries management changes may produce

Social impact	Closed areas	Gear changes	Days at Sea	Size Limits	Catch limits	Trip Limits	Limited Access	Catch shares
Relocation of fishing grounds/ displacement of fishing effort	X	X	X		X			X
Increase/decrease crowding	X	X	X		X		X	X
Increase/decrease gear conflicts	X	X	X		X			X
Increase/decrease in CPUE	X	X			X		X	X
Increase/decrease in food security	X			X		X		X
Increased cost to participate in fishery	X	X			X			X
Change to family and community life	X	X	X				X	X
Increased/decreased safety at sea	X	X				X		X
Relocation of fishermen and processing facilities	X							X
Change economic and social structure of community						X	X	X
Change in job/angler satisfaction	X	X	X	X	X	X	X	X
Change in composition and character of fleet							X	X

Change in composition of fishing support services	X	X						X
Opportunity to expand fishing efforts		X					X	X
Pressure to keep up with competition		X						
Ability to preserve way of life		X		X	X		X	X
Increased criticism of government or perception of overbearing government	X	X	X	X	X	X	X	X
Changes in occupational opportunities/consolidation			X				X	X
Changes in discarding of marketable fish		X		X	X	X		X
Increased/decreased fishing season					X			X
Change in relationship between fishermen and the supply chain					X	X		X

Olson 2017). MPAs can also impact nearby fishing communities, in both positive and negative ways (Mascia et al. 2010).

Closures can affect both commercial and recreational fishermen. One of the direct consequences of an area closure is the change in fishing behavior as fishermen (commercial and recreational) attempt to adjust to the lack of access to a closed area. For commercial fishermen, Murawski et al. (2005) show that the shift in otter trawl fishing effort associated with seasonal and year-round groundfish closures off the Northeast United States was highly concentrated to the borders of those closed areas. This shift in effort is an attempt to “fish the line,” which has been shown to be part of an optimal fishing strategy capitalizing on the biological “spillover” from a closed area (Kellner et al. 2007). Because closed areas displace some fishing effort rather than simply reducing it (Halpern et al. 2004), they can lead to concentration of effort localized at the boundaries of closures that in turn can cause crowding and gear conflicts among fishermen (Suuronen et al. 2010). Less mobile fishermen may bear a heavier burden as they are less able to easily switch out of closed areas, or into reopened areas. This would reduce effort, unless small boat effort is replaced by large boat effort -- which would have distributional impacts. A change in fishing behavior that attempts to employ a more mobile fishing strategy will have additional social costs such as likely disruptions to family and community life, as well as a potential decrease in safety at sea. Recreational and commercial fishermen may incur social costs such as loss of a traditional fishing site. During seasonal closures, fishermen will target other species, which may involve gear changes or changes in timing or duration of trips. Changing gear and duration may have economic impacts, especially for commercial fishermen whose gear costs may be quite high. They may also have economic impacts on restaurants that feature local species, leading to additional economic and social impacts to fishing communities. Seasonal closures may also have cultural impacts if they affect the supply of species that are important staples of the local cuisine, a preferred food source, or have cultural or spiritual importance to local tribes or other indigenous peoples (Donkersloot et al. 2020b, Carothers et al. 2021). Recreational fishermen may be more likely to switch species than gear. Changes in time spent at sea can have impacts on family time and other social activities for both commercial and recreational fishermen. All this can lead to economic and related social impacts for shoreside businesses. These impacts affect both the business owners and the employees. Other negative social impacts of a closure can include starting a derby fishery that results in landings that are too high and occur over too short a time period, leading to lower prices and/or unharvested quota.

However, positive outcomes from selectively opening closed areas may include increased revenue, number of fishing trips, and number of usable days-at-sea or fishing days.¹⁵ Closed areas can also be implemented and adjusted specifically for reasons that have positive impacts on fishermen, such as to alleviate gear conflicts, as was the case with Framework 22 to the Northeast Multispecies Fishery Management Plan in New England. The Framework required certain areas be closed to either mobile or stationary gear during certain time periods. As noted in the Final Rule (Federal Register Vol. 62, No. 46 / Monday, March 10, 1997 / p.10747): “The framework measures build upon the emergency action and provisions of the Council’s voluntary industry agreement. The measures in this rulemaking were selected from among other options

¹⁵ Days-at-sea is a specific management tool. Fishing days are simply days that a vessel is able to be on the water.

because they are relatively less controversial, as evidenced by the near unanimous support of the Council.”

3. Gear restrictions

Switching between different fisheries by changing gear types is one of the most common adaptive strategies that commercial fishermen employ (Acheson 1981). However, limited access and catch shares (discussed below) have often led to greater specialization in species and therefore gear. There are two types of gear restrictions considered here: requirements for gear configuration (e.g., mesh size, hook type, trawl or dredge width) or type (e.g., nets, hooks, dredges, traps) and restrictions on the amount of gear deployed (e.g., limits of numbers of traps or nets, or total bans on the use of a particular gear). Both types of gear restrictions aim to alter the selectivity of a particular sector (e.g., fishery, vessel size) and to control the effort in a fishery.

Restrictions on gear configuration can be used to prevent overfishing of stocks. In a trawl or set net fishery, incorporating a minimum mesh size as a gear restriction is an attempt to increase the selectivity of the gear and increase the escapement of smaller species. Additional bycatch reduction technologies incorporated into a fishing gear can also alter selectivity, avoid capture of non-target species (including protected resources such as sea turtles), or facilitate their non-lethal release (Campbell and Cornwell 2008). Some bycatch technologies can impact target catch levels (Ward 1994, Pascoe and Revill 2004, Brewer et al. 2006, Larsen et al. 2018), though this is not universal (Avery et al. 2017, Chavez and Willard 2017, Vasapollo et al. 2019). Restrictions on types of gear can also be deployed to protect habitat; these are generally aimed at bottom-tending gears such as trawls and dredges (Collie et al. 2017, Pitcher et al. 2017, Barnette 2001, Kaiser et al. 2000, Auster et al. 1996). Requirements to modify or change gear have economic impacts that can be especially burdensome for small and/or owner-operated vessels, creating concomitant social and cultural impacts for fishing communities that may already be socially vulnerable or highly engaged in fisheries affected by the restrictions.

Restrictions on amount of gear deployed also aim to limit catch, though discussions of such measures can backfire. Fishermen may rush to add more gear or move from part-time to full-time, to maximize fishing history in hopes of being “grandfathered” in should limits be imposed. In addition, some fishermen who did not originally follow this path may eventually feel obliged to increase their total amount of gear as a reaction to the pressure of competition with other fishermen that did increase their gear. Commercial fishermen believe in the importance of equity (Acheson 1981, Davis 1991, Durrenberger 1997, Pooley et al. 1998, Olson 2006, Pinkerton 2013, Bennett et al. 2020). But they also have a tradition of “highliners,” who are the most successful fishermen and therefore earn more than the average, thus acquiring social status as successful fishermen (Sinclair 1983, Acheson 1988, Brown 2010, Jenkins 2010: endnote 10). Acheson (1988:52) notes, however: “The prestige enjoyed by highline fishermen is especially great if they adhere to other valued community norms and goals.” Keeping up with the competition can also help maintain the community’s social structure by maintaining relative income and associated relative social status.

Gear restrictions can also be used in commercial fisheries with specific social consequences in mind. When implemented as a means of preserving a “way of life,”¹⁶ gear restrictions can protect specific socially or culturally-valued sectors of a fishery (e.g., smaller owner-operated vessels) who would not be able to successfully compete in a race to add gear. However, gear restrictions can also cause conflict within a fishery, as the restriction may be seen as hindering the technological innovation of some while providing preferential protection to others. Fishermen who are above the “ceiling” of a restriction may feel that their competitive advantage is hindered and that the restriction unfairly benefits those beneath it. Restrictions like these can also force different segments of a fishery to “meet in the middle,” creating a more uniform fishery and impacting social structure and social status. Again, this involves the conflicting goals of equity and highlining.

Like many management regulations, gear restrictions that specify how fish are caught may be perceived as overly restrictive and a sign of too much government involvement. The perception of an overbearing government is matched by a sense of frustration caused by increasing regulatory limits on effort. In general, fishermen want to maintain their own catch per unit effort even if limits are placed on overall effort; however, this is frequently not feasible from a management perspective, leading to increasing frustration on the part of fishermen (Smith 1980). But no impacts are universal; the specifics of the regulation are important. Such restrictions can increase labor and time to fill out an economically viable trip, or provide greater trip revenue where there is a combination of a vessel fish limit (e.g. 50 fish) and a size limit. At the same time, these restrictions can create greater harvest opportunity over time (greater total harvests) resulting in more community benefits, food production, and income. Thus there may be an issue of immediate pain for later gain, with larger and more capitalized vessels frequently best positioned to last until the later gains kick in.

Reduced discards due to gear modifications are often considered a positive impact, as commercial fishermen find it very frustrating to be required to discard fish due to bycatch or total catch limits. This is especially true if the fish are unlikely to survive release. A gear change to a more selective form of gear can also make other fishing regulations, such as species size limits, redundant. Avoiding the need to discard as many fish in the first place is a positive impact. Time previously spent in discarding prohibited fish can also be redirected toward catching more of the target species, improving efficiency and the bottom line (Villasante et al. 2016). A gear specifically designed to limit bycatch (including of protected species) is called a bycatch reduction device (Ward 1994, Robins-Troeger 1994, Brewer et al. 2006). It may lower the volume (Bisack¹⁷), but potentially improve the quality (Brewer et al. 2006) of directed species catch. There may also be increased bycatch discard of co-occurring species that do not have economic value, but do take space in the hold from target species.

For recreational fishermen, gear limits include required use of rod and reel or hook and line, different hook types, and minimum/maximum hook sizes. Depending on the species sought

¹⁶ See Mederer (1999), Van Ginkel (2001), Brookfield et al. (2005), Kelty and Kelty (2011), Sowman and Sunde (2018) on the phrase “way of life” as used in fisheries social science. Also see Pollnac and Poggie (2008) for a related discussion.

¹⁷ Bisack, Kathryn. Personal comm. Protected Species Economist, Social Sciences Branch of the Northeast Fisheries Science Center. Woods Hole, MA 02143.

and the source of angler satisfaction for that species (e.g., size of fish vs. number of fish), hook size limits may or may not have a substantial impact on angler or for-hire captain satisfaction (see references under V.a.1., Allocations).

4. Fish size limits

Size limits on fish for commercial fishermen may be imposed through gear regulations, discussed above, or direct limits (e.g., commercial size limits in the West Coast salmon troll fishery). Commercial fishermen often fish for a particular size that fits the market they serve, e.g., plate-sized fish or a large fillet. Especially for deepwater fish, anything brought up that is too large is almost always dead by the time it's brought on board and fishermen feel wasteful throwing it back. For recreational fishermen, hook type or size (see V.a.3., above) may be employed, but fish of the wrong size may simply be caught and released, or discarded if dead (depending on individual fishery regulations). In recreational fishing, the impacts would be to satisfaction for anglers who want to catch a larger fish for bragging rights (even if it is then released), sport fisherman who are looking to win tournaments with the largest fish by weight or length, for-hire captains who are seeking to make their customers happy (see references under V.a.1., Allocations) -- and to anglers who count on bringing fish home to eat, especially to those that may be better categorized as subsistence fishermen (Steinback et al. 2009) or non-commercial fishermen (Leong et al. 2020).

5. Trip, time-period, and possession limits

Certain size categories of vessels or categories of permit holder may be restricted to specific maximum pounds or numbers of fish per trip or week, or month -- or specific frequencies of trips. Total weight limits are generally associated with commercial fisheries, while limits on numbers of fish (often known as "bag limits") or length of individual fish are generally associated with recreational fisheries.

In commercial fishing, this may incentivize more fishing trips per day, week, or month for that species, in order to land a desired or required amount of fish. Resulting impacts may include less onshore time for family or other activities, including community activities, or fishing in more dangerous weather with impacts to health and safety. When trip limits are landing limits (rather than catch limits), in multispecies fisheries they may result in increasing discards, with the attendant socio-economic effects discussed above. Alternately, fishermen may fish more of another species, potentially requiring gear changes and/or different patterns of fishing. These can also impact onshore time and may require additional expenditures, with concomitant impacts. Trip limits may also impact processors, who may require a specific amount of a particular species at a time to make processing that species profitable. Processors will sometimes switch to other similar local species, but they may also switch to imported fish. This may affect fishermen's ability to sell their catch in the short-term, or even their long-term marketing relationships with processors for that species. This would have economic and social impacts for fishermen and processors, including combined impacts for communities that are both ports of landing and sites of processing plants.

In recreational fishing, angler impacts would be to angler satisfaction (see references under V.a.1., Allocations) and to anglers who count on bringing fish home to eat, especially to those that may be better categorized as subsistence fishermen (Steinback et al. 2009). Charter boats may lose income if anglers are less likely to take trips for certain species of fish. However, while bag limits may decrease the quality of the experience for a particular angler trip, by extending the season they may allow more total angler participation (both on private and charter vessels), thus increasing angler satisfaction. Extension of the season and greater total angler participation is also likely to provide benefits to local communities and help sustain the broader industry.

6. Days-at-Sea

Days-at-Sea (DAS) management attempts to control the overall effort in a commercial fishery by limiting the amount of time a commercial fisherman/vessel may fish. When coupled with an overall catch limit, however, DAS can lead to overcapitalization as fishermen buy larger vessels to catch more fish within the restricted time period (Hilborn 2007), unless companion regulations limit upgrades (re. Rossiter and Stead [2003:284]). They can also lead to safety issues from fishing in bad weather to take advantage of all available fishing days. DAS may also be implemented for limiting overall catch or discards. Sometimes DAS may be leased or stacked (where a single owner with two or more vessels combines the DAS from all the vessels onto one). There are usually restrictions on when this can happen and/or who is allowed to do so. Determination of the number of DAS for a vessel may be based either on its annual average of days fished during a specific set of years or by categories such as vessel size or gear type. Issues can arise (in the design phase or during appeals processes that may be available) over complaints of miscounting of historical days fished, especially for small vessels and/or small ports, with appeals potentially resulting in increases in DAS for some vessels. On the other hand, assignment of DAS by category can favor vessels that historically fished fewer than the allocated DAS for their assigned category, while negatively impacting any vessels in any category that historically fished more days. These are similar to issues that can arise in catch share systems over quota share amounts, which are often based on historical catch records. While DAS involve an allocation, they are not considered a catch share because they do not allocate a portion of the catch.

7. Overall catch limits

Catch limits may be simply an overall limit for the fishery, or a subset of the fishery, with individual fishermen limited either by input methods (e.g., restrictions on gear or trip length) or by output methods (e.g., the amount of fish removed or landed). See Morison (2004) on issues in defining input and output controls. Such overall catch limits may be referred to as a TAC/ACL. When a fishery exceeds the catch limit, a management response may be triggered. For example, fishing may be halted until the end of the fishing year. Or, fishing may continue in the current year, with either (1) the final amount overage taken out of the following year's TAC or (2) with a new and more restrictive TAC set for that following year, or (3) the imposition of any other

appropriate measures such as gear restrictions and area closures. Typically, the TAC is set according to scientific recommendations and based on some interpretation of the basic management objective (e.g., to exert a specific fishing mortality, or to maintain the stock at (or return it to) maximum sustainable yield), together with the biological information on the current stock abundance (Gulland 1984). In the U.S., there is now a statutory requirement to set an ACL, which may not exceed the level recommended by the Council's Scientific and Statistical Committee (SSC), must prevent overfishing, and must be accompanied by Accountability Measures (AMs). The NS1 guidelines describe AMs as management controls that prevent the ACL from being exceeded, or correct or mitigate overages of the ACL if they occur.¹⁸ If a fishery approaches the ACL, specific in-season AMs may be implemented to prevent the ACL from being exceeded. If an ACL is exceeded in a given year, AMs must be implemented as soon as possible to correct the operational issue that caused the ACL overage, as well as any biological consequences to the stock as a result of the overage. Without complementary management tools for commercial fishermen (e.g., gear restrictions, catch limits instead of landing limits, or species size limits) and for recreational fishermen (e.g., bag and/or size limits), fisheries management that is based on a TAC or ACL can cause an increase in regulatory discarding once the catch limit for a given species has been reached. Fishermen interviewed by Rossiter and Stead (2003) complained that their current management based on catch limits forced them to discard marketable fish. Fishermen felt that an alternative management system based on effort (see V.a.6., DAS) would allow them to retain those fish and reduce their discards. In some cases, a very restrictive quota on a common bycatch species can limit fishermen's ability to fish their target species. That bycatch species is then often referred to as a "choke" species (Baudron and Fernandes 2015, Mortensen et al. 2018).

Within the context of a catch share program, fishermen may try to work around this by buying additional quota, though if too many individuals are seeking to buy, the price increases. This means less capitalized enterprises, including many owner-operated vessels, may be priced out of the market. This, in turn, can lead to targeting other species, if feasible, or simply to not fishing for certain periods of time or in certain areas. All of these have economic and social impacts. Alternatively, fishermen may establish "risk pools" that can mitigate financial (and therefore some social) risk (Holland and Jannot 2012).

8. Limited access and limited entry

Limited access can cover a range of management rules for commercial fisheries, "from simple restricted permit programs and limited entry schemes to more detailed transferable quota and effort programs" (Pooley et al. 1998:1), some of which we would now define as catch shares (see below). Limited access contrasts with open access, and "derives from the earlier

¹⁸ Under the MSA, in order to set an annual catch limit, first an acceptable biological catch (ABC) is determined; this is a level within which a catch limit may be set and is based on a control rule that accounts for scientific uncertainty. The ABC should support maximum sustainable yield (MSY) within the fishery. MSY is connected to the MSA term optimum yield (OY) as follows: OY is defined as MSY "as reduced by any relevant economic, social, or ecological factor" (16 U.S.C. §1802(33)). And in practice, OY is often assumed to be equal to MSY.

term *limited entry* which referred to license limitation programs. Limited entry meant controlling the total number of fishing vessels, fishermen, or equipment in a fishery” (Rettig and Ginter 1978). Because many fishermen, especially those who operate at small to medium scales, engage in traditional “annual rounds,”¹⁹ they may be less likely to qualify for limited entry/access than vessels exclusively targeting the species in question, when entry is based (as is frequent) on historical landings. This can, in turn, disrupt annual rounds and push such fishermen into a smaller number of fisheries, leading to less ecosystem-based patterns of fishing (Stoll et al. 2016). The heavier dependence on fewer species also means greater economic risk in the event that one of those species undergoes a poor recruitment year. Farr et al. (2018) find that this increased specialization can also degrade the quality of LEK possessed by fishermen, just as LEK becomes more relevant as we move toward managing ecosystems, not simply fish.

9. Catch shares

A catch share in the U.S. is a form of rights-based management, though legally it is not a full property right but a revocable privilege. Per the NOAA Catch Share Policy (2017:8):

“Catch share” is a general term for several fishery management strategies that allocate a specific portion of the total allowable fishery catch to individuals, cooperatives, communities, or other entities. Each recipient of a catch share is directly accountable to stop fishing when its exclusive allocation is reached. The term includes specific programs defined in law such as “limited access privilege” (LAP) [established in 2007] and “individual fishing quota” (IFQ) programs, and other exclusive allocative measures such as Territorial Use Rights Fisheries (TURFs) that grant an exclusive privilege to fish in a geographically designated fishing ground.

These types of management programs are set apart from other, more traditional, forms of management because they confer a greater level of “ownership.” There are three principal types of allocations under LAPPs, as described in MSA § 303A: allocations to an individual person or entity; allocations to a community; and the grouping of individual and/or community allocations under the umbrella of a regional fishing association (see Stoll and Holliday [2014] for more details, and Wingard [2000] on community allocations).

In the United States, catch share programs use both individual allocations and allocations to groups and entities. These include IFQs and Individual Transferable Quotas (ITQs),²⁰ each of which can be granted to both individuals and entities. (Hereafter, we will refer simply to IQs rather than differentiate between IFQ and ITQ.) Allocations can also be made to entities such as processors (Pautzke and Oliver 1997, Matulich 2009, van Putten et al. 2011, Fina 2011), fishermen organized as corporations and LLCs, fishing cooperatives, and fishing communities.

¹⁹ Because smaller vessels have a more limited geographic range, a common strategy involves fishing multiple species across the course of a year as seasonal ecosystem changes bring different fish into the traditional grounds of these fishermen, as well as targeting the species that seem healthy while taking a break on species that have a low recruitment year.

²⁰ Though initially these were differentiated in that ITQs were transferrable while IFQs were not, this distinction has largely become null because many IFQs are now transferable.

In the Northeast, “sectors” in the groundfish fishery receive allocations annually based on the individual catch histories (Potential Sector Contributions) of that year’s members.²¹

In general, catch shares have (1) resulted in consolidation, (2) changed the dynamic between fishermen and the supply chain, (3) changed the employment structure of crews, and (4) may have improved safety (Pfeiffer and Gratz 2016, Knapp 1999, though cf. Windle et al. 2008). Following initial allocations, there is considerable consolidation as those who receive small allocations and/or have less capital find themselves to be no longer profitable and lease or sell their quota to those seeking more, leaving only the most efficient (or most heavily capitalized) vessel owners. This leads frequently to the creation of owners and renters, “sea lords” per McCay (2012), who in relation to their crew are much like shareholders and sharecroppers on land (Hersoug et al. 2000, Olson 2011, Griffith 2018). In some cases, these vessel owners no longer fish themselves (or may never have fished), increasing the probability that wealth associated with the catch share privilege may leave the communities where fishermen live (Olson 2011) -- which may be ports, but also include nearby towns.^{22,23} Quota privileges may also tend to redistribute ACL out of the control of certain social groups, such as Alaska Natives (Carothers et al. 2010, Donkersloot et al. 2020a). While some catch share programs do restrict use, transfer, and ownership in an attempt to maintain the character of the fleet, these are not always successful (Szymkowiak and Himes-Cornell 2015). Catch shares also often lead to increased costs of entry, making it difficult for young people to enter the fishery (Volz 2005, Christensen et al. 2009, Pinkerton and Edwards 2009, van Putten and Gardner 2010, Lynham 2013). The ability of fishermen to choose when they fish under IQs may change the dynamic between fishermen and processors. Fishermen can wait to harvest their quota when the price is best and they may have more choice of where they sell their fish. For example, they are no longer limited by which processors have the capacity to process the glut of fish associated with a derby. Longstanding social relations between processors and fishermen (Wilson 1980), the number of processors within a reasonable distance of the fishing grounds, or additional regulatory actions may, however, mitigate this freedom to choose. Safety may improve as fishermen shift from the competitive “race to fish” to longer seasons and as less economically profitable vessels (often older, less safe vessels) are retired. Windle et al. (2008:707), however, found that where there are leasing or certain other agreements between fishermen and processors or other companies, safety may instead be compromised. Lastly, fishery employment patterns generally change: the number of active vessels and crew positions drop dramatically, crew may be transitioned from being paid in shares to salaries, and crew time off to engage in other jobs or activities is often reduced due to longer seasons (Olson 2011). For more detail on the range of potential social impacts from catch shares, see Olson (2011), Lord (2011), Colburn et al. (2017), and Griffith (2018).

²¹ Those in the Northeast Region should be aware that the Multispecies Sectors Program, while a catch share, is not a LAPP (for more on this see Clay et al. 2014 and Colburn et al. 2017) and therefore is not governed under section 303A of the MSA.

²² Movement of fishermen away from the coast can also be associated with gentrification (Colburn and Jepson 2012).

²³ Of course, the wealth associated with the fishery is more extensive than just that associated just with quota shareholders, and the connection of these other accumulations of wealth to the community might not be altered by the quota share program.

Finally, it is also important to remember that all of the impacts discussed here in section V.a. are relative to an existing situation and practitioners will need to consider the status quo regulations to determine the direction of effects. In other words, would the negative or positive impacts be greater with the proposed changes than if no new regulations were introduced?

b. Whom does the regulation affect?

Assessment of impacts begins by (1) looking at the specifics of the regulation, (2) assessing likely social and cultural impacts, and then (3) connecting to the results of the economic impact analysis. The type of regulation will give you a sense of the kinds of social impacts that might occur (see above). The economic analysis may help you to discern those impacted more severely economically, and those economic impacts will have their own associated social impacts that must be considered in addition to direct social impacts. So it is important from the beginning to coordinate with the economist working on your EIS. Both long-term and short-term impacts of any particular management measure may be negative or positive (and large or small).

Social impacts of fisheries management actions vary depending on which social groups one analyzes. However, the key groups to study for social impacts of fisheries can be divided into those experiencing what economists would call direct versus indirect versus induced impacts of the regulations. Those directly impacted may include commercial, recreational, and subsistence fishermen, and minority and low-income fishing populations. Those indirectly impacted may include commercial and/or recreational fishing-related shoreside business owners. Induced impacts affect even the non-fishing residents of a fishing community and local businesses that are not involved in fishing. The following describes common potential social impacts on each of these groups, though it is organized by fisheries/fleets, fishermen, and fishing communities. Also see Pollnac et al. (2006) for helpful information.

1. Fisheries/Fleets

Changes to current regulations may primarily impact, for example, those in certain permit categories, with certain size categories of vessels, fishing with certain gear, or fishing in certain areas. Analyzing fishery/fleet groups requires landings databases and sometimes observer or other regional databases (e.g., in the Northeast, when a regulation is related to mesh sizes or dredge lengths this information is found in the observer databases). Specific permit categories may be added, eliminated, or have their status changed in some way, e.g., increasing the trip limit, decreasing the allowed days-at-sea, switching to a limited access or catch share status. Smaller vessels, as noted above, may be more impacted by the introduction of closed areas, limited access, and catch shares. Regulatory actions may specifically target vessels using nets by increasing the required mesh size, or pots/traps by limiting total numbers an individual may have in the water at any one time, or trawls/dredges by declaring certain areas of sensitive bottom habitat off limits. Implementation of limited access or catch shares may exclude or severely limit fishing by vessels that do not meet the identified qualifying criteria. To begin, determine which of the three main types of fishermen will be impacted: commercial,

recreational, and/or subsistence.²⁴ Any or all of these may also overlap with tribal or indigenous groups, of which the federally recognized tribes are a special category that requires working with NMFS Regional Offices. If you are working on a measure that impacts federally recognized tribes, talk with your supervisor before proceeding.

2. Fishermen

There are three primary categories of fishermen: In some regions the subsistence fishing is on purely non-federal fisheries and does not fall under NOAA Fisheries' purview. In others, subsistence fishing may be associated primarily with tribes or other indigenous groups, and may be referred to as customary use fishing. Fishing by tribes and indigenous populations will require familiarizing yourself in detail with the laws, guidance, and procedures related to these groups. Seek out regional experts and the NOAA Tribal Liaison at NOAA Fisheries headquarters. See also Appendix A and Appendix B. Yet a third category of wholly or partly subsistence can be found among recreational fishermen who depend on eating all or part of their catch (Steinback et al. 2009) and those engaged in "non-commercial" fishing (Leong et al. 2020). Be aware that some fishermen may be involved in two, or even all three, categories.

Moreover, any one proposed management action by itself may have long- or short-term impacts on either the recreational or commercial sector, or both. In some locations there may also be impacts to subsistence fishing, either directly or through impacts to those in the recreational sector who may rely on the fish they catch for subsistence purposes. It is also important to remember cumulative impacts: social impacts may be more severe or threatening to the sustainability of fishing communities when considering the entire suite of proposed management actions and other state and regional fishery regulations and community changes. The totality of these management actions could be severe enough to dislocate a substantial number of fishermen, dealers, and related industries and cause changes to the economic and social structures of communities. If this occurs, when the stocks are rebuilt there may not be a fishing industry in place that is structured or has the expertise to take advantage of improved fishing conditions for each species for which reductions in catch were originally implemented. However, such phenomena might also occur should adequate corrective action not be taken immediately and a continued drop in a fish population occur, resulting in more stringent management measures in the future.

i. Commercial

The social impacts of fisheries management measures will depend on multiple factors, including the species being managed, the geographic area where the fishery takes place, the relevant fleet-based group characteristics, the levels of social vulnerability and fishing dependence for the place-based fishing communities where the fishery is commonly landed (as

²⁴ NMFS does not have an overarching definition of subsistence fishing. However, under the Alaska Subsistence Halibut program it is defined thusly: "Subsistence halibut is halibut caught by a rural resident or a member of an Alaska Native tribe for direct personal or family consumption as food, sharing for personal or family consumption as food, or customary trade."

measured by indicators and other methods described below in section V.c.), and any relevant cultural characteristics of the fishermen and communities associated with the fishery. And remember that not all impacts are negative. There could be significant, long-term social benefits from management measures that end overfishing. When overfishing on these species is stopped and biomass is rebuilt, models predict that the fish stocks will be of such an amount that fishermen will be able to expend less effort to land the same or similar poundage of fish as they land currently. Similarly, short-term impacts of regulations designed to end overfishing may be positive or negative (and large or small).

Furthermore, impacts will be different on captains versus crew, and hired captains versus owner-operators. On most commercial fishing vessels worldwide (Acheson 1981), once the catch is sold, the profits are allocated in shares to the owner and crew. Often “the boat” (owner) is paid first and then shares go to each crew member. Crew with special skills (e.g., mechanic, or captain – if the captain is not owner) often receive a slightly larger share than other crew. But everyone earns more when more fish is caught. Cutler et al. (2017) found that most crew in the Northeast U.S. receive shares. Guillen et al. (2017) note that while most crew worldwide still receive shares, crew remuneration systems may also vary according to the state of exploitation of the resource. The crew payment method can change, however, under certain management systems. Under catch shares, for instance, there has often been a shift from shares to wages for crew (Olson 2011). Further, under many (but not all) catch share systems only the vessel owner can receive quota, as quota is often allocated on the basis of pounds or dollars of fish brought in by a vessel, with the resulting allocation going to the vessel owner. For more on crew and catch shares see section V.a.9. On catcher-processor vessels there are both fishing crew and processing workers. Even when crew are paid shares, processing workers usually receive wages. More generally, any regulation that requires cost cutting can affect crew jobs directly through fewer positions on boats or indirectly through postponed maintenance that can impact the safety of both captains and crew.

Another difference is between vessels where crew are primarily kin (and the whole vessel may operate as an extended family enterprise) versus vessels where crew and captain are unrelated (Norr and Norr 1978, McCay 1978, Acheson 1981). The prevalence of crew being kin varies to some extent by cultural groups. In the U.S. it has been found, for example, among Alaska Natives (Mishler and Mason 1996, Donkersloot et al. 2020b), Portuguese crews in New Bedford, MA and Italian crews in Gloucester, MA (Doeringer et al. 1986), “Slav” fishing crews in California and Washington (Pomeroy and FitzSimmons 2001), and Vietnamese crews based along the Gulf of Mexico (in Texas, Louisiana, Mississippi, Alabama, and Florida; Mayfield-Johnson et al. 2019) and in California (Orbach and Beckwith 1982). These are examples, not an exhaustive inventory.

ii. Recreational

As with the commercial sector, the long-term benefits of ending overfishing and rebuilding overfished stocks to the broad group of recreational fishermen (anglers) in a region is hard to predict. As less is generally known about the social structure and aspects of the recreational sector, it is even more difficult to predict what future conditions may be and how recreational fishermen will benefit from more healthy stocks. It is expected that with increasingly healthy

stocks, recreational anglers will catch more fish per trip, and thus reap the benefit of increased angler satisfaction. However, similar to the situation with the commercial fishery, the composition of the recreational sector and associated industries may adjust during the recovery period such that the same individuals and entities that bear the short-term adverse impacts may not receive the future benefits. As with commercial fishermen, impacts to the recreational sector will vary across sub-sectors, in this case: private anglers vs. for-hire vessels (charter boats and party/head boats), private boats, and shoreside anglers. There are also distinctions between traditional anglers vs. sport fishermen (see Norris-Raynbird 2004) vs. subsistence fishermen who may be tribal or indigenous people, but may also be classed as recreational -- though they also depend on catching fish for food (see Steinback et al. 2009). Another way to analyze impacts to recreational fishermen may be women vs. men (Gaynor et al. 2016). Within the for-hire sector there are also differences between charter vessels (that carry 6 or fewer anglers) and party vessels (that may carry more than 6 anglers). Steinback and Brinson (2013:Table 6) report for the Northeast that 97% of charter boats and 64% of head boats were owner-operator vessels. Interestingly, despite the high level of captain-owners in charter fishing, most charter owners in the Northeast have other jobs, earning about 17% of their total annual gross income from charter fishing (Steinback and Brinson 2013:Table 7). Party/head boat owners, on the other hand, earn about 70% of their total annual gross income from head boat fishing, as these boats generally require a much higher level of investment (*ibid*). About half of the charter boats employ one crew-member for the spring/summer/fall season (about 6 months). The other half are generally smaller charter boats that employ no crew members. Owner-operated head boats generally employ 2+ crew members. Those that employ a captain would also hire approximately 2+ crew members during the season (about 6 months). Typically, hired captains receive a set paycheck per trip. Non-captain crew members (i.e., mates) typically make most of their money from tips for assisting clients and filleting fish, in addition to a low base wage.

Interestingly, an analysis of New York and New Jersey commercial and for-hire fishermen in the wake of Hurricane Sandy found commercial fishermen in the sample were, on average, more experienced and more likely to have fishing as a primary occupation than for-hire fishermen (Seara et al. 2016), though they had similar ages. This may suggest for-hire fishermen enter the profession later in life. "Also, for the majority of fishermen in the for-hire sector, fishing was not a primary source of income, while for most commercial fishermen the opposite was true" (*ibid.*, p12; though cf. Steinback and Brinson 2013 above). Further, perception of adaptive capacity to disasters was, for commercial fishermen, associated with their ability to stay in fishing, while for-hire fishermen overall were much more willing to look for non-fishing work. Interestingly, within the for-hire category the group that resembles Norris-Raynbird's (2004) category of "traditional" for-hire captains was closer in response to commercial fishermen than to other for-hire fishermen. This category comprises those with longer term involvement in fishing and whose livelihoods depend on the activity mostly or entirely, and thus matches more closely the characteristics described by Steinback and Brinson (2013) for party/head boats than for charter boats.

iii. Subsistence

NMFS has no general definition of subsistence. However, the federal halibut fishery has a subsistence category: "Subsistence halibut is halibut caught by a rural resident or a member of an Alaska Native tribe for direct personal or family consumption as food, sharing for personal or family consumption as food, or customary trade." More generically, Macinko and Schumann (2007:593) have described four different, at times conflicting, definitions in usage within different bodies of academic literature (see also Steinback et al. 2009 and Leong et al. 2020 for some of the complications in defining subsistence):

fishing for livelihood rather than profit (definition 1); fishing where catch is distributed through non-market mechanisms, regardless of the economic level of the fishermen (definition 2); fishing undertaken to support traditional exchange structures, whether or not it is done in the context of a market economy (definition 3); or fishing characterized by its cultural significance, whether it is a community or an individual activity (definition 4).

Subsistence fisheries often support community well-being through food security and cultural importance. In fact, especially in cases of cultural importance, subsistence fishing is so important fishermen may subsidize their fishing with income from a paying job (Veltre and Veltre 1983:185-193; cf. Natcher 2009:88 on subsistence hunting; also see Kruse 1991:324-325 on why subsistence activity persists in the face of available wage income). There are also often interactions between subsistence fisheries and commercial fisheries. For example, in the Bering Sea where subsistence salmon fisheries are crucial for the health and well-being of Alaska Native communities in Western Alaska, there are conflicts with the commercial pollock fishery that has historically caught salmon as bycatch. Conflicts between subsistence and other fishing sectors can cause cascading effects throughout subsistence fishing communities that affect every part of their way of life (Donkersloot et al. 2020a).

3. Fishing Communities

All regions should analyze at the level of place-based communities and assess their relative economic and social dependence on fishing and related industries. Analyses at the place-based community level are important because since place-based coastal "fishing communities," as defined under the MSA, require specific examination under MSA National Standard 8 (also known as the "communities standard") (see III.a.2., above; see also Clay and Olson 2008 and Rowan 2009). Currently, only the Western Pacific Region has officially defined its MSA "fishing communities." However, fishing communities have long been acknowledged in the academic literature as a key element of fishing culture (McCay 1978; Clay and Olson 2007, 2008; Bodin and Crona 2008; Donkersloot et al. 2020b), In addition NMFS, through the NMFS Guidelines for Assessment of the Social Impact of Fishery Management Actions, "has provided operational guidance relative to social and community impacts to Regional Fishery Management Councils since 1991" (NMFS 2007:4), long prior to the creation of an MSA definition of fishing community in 1996 (via the Sustainable Fisheries Act). For simplicity, the remainder of this

document will use the term “fishing community,” unless otherwise specified, to mean both an MSA fishing community and in its generic definition as a community involved in fishing.

Sometimes the AHE will define primary and secondary communities that are expected overall to be most impacted by a regulation. These can be defined based on various techniques described under section V.c., Organizing your analyses by these sub-groupings can be helpful, in addition to reporting simple overall landed pounds or value by community.

As noted above, within fishing communities there are certain sub-groups of importance beyond the fishermen, including (1) fishery-dependent shoreside businesses, (2) the broader community that is not directly connected to the fishery but nonetheless may be impacted, and (3) for analyses of environmental justice, minority and low-income residents. Once you know, based on the proposed regulations and the economic analyses, the distribution of impacts across fleet-based groups, you can begin to figure out in which communities these sub-groups are found in the highest concentrations. Also see Pollnac et al. (2006) for helpful information. Within the academic literature, Clay and Olson (2007) suggest:

A number of important themes nonetheless emerge from the literature that appear relevant for artisanal and industrial fisheries, and widespread geographic locations: (1) a certain level of visible connection to the industry (boats, gear, fishing-related businesses) and other infrastructure elements; (2) connections among on-land and at-sea networks²⁵; (3) the frequent role of kinship in the labor process; (4) multiple household- and family-level ties to fishing (with many fishermen, different generations, and gendered fishing-related tasks); and (5) the frequent persistence of a sense of a cultural connection to fishing through changes from small-boat to large-boat, family to industrial, commercial to recreational fishing and even to fishing-related tourism that involves little actual fishing activity. The infrastructure variable appears especially important, as seen from the perspectives of both fishermen (Jacob et al. 2005; Olson and Clay 2001; Robinson et al. 2003, 2005) and researchers (Hall-Arber et al. 2001:3, Hall-Arber 2007, Ingles and McIlvaine-Newsad 2007).

While place-based fishing communities must be examined, for some analyses it may make sense to also sort data by, e.g., port of landing by trip, most common port of landing for each vessel in a given year, the port where the vessel docks when not fishing, or the town where the owner lives. One or more of these options will be available in all regions, from either landings databases or permit databases. Be aware that the port where the vessel docks when not fishing and town where the owner lives may or may not be the same community. Where they are different, this may be due to gentrification (see Colburn and Jepson 2012) that forces fishermen to move away from the waterfront or individuals who maintain their permits as an income source after retirement and leave the community. Or it may be related to the permit owner being the quota holder, but not the vessel’s owner. The likelihood of one or another of these combinations

²⁵ On this point, also see St. Martin (2001, 2006) and St. Martin and Olson (2017).

will vary by fishery and by region. The range of options that are available to you varies by region.

Through literature reviews, conversations with fishermen, or other sources, you may also already be aware of certain fisheries or fishing-related occupations being associated now or in the past with specific social or cultural groups, as noted under Commercial Fishermen in section V.b.2.i.

i. Fishery-Dependent Shoreside Businesses

There are three sets of infrastructures in this category: those related to commercial fishing, those related to recreational fishing, and those related to subsistence fishing (which may overlap with either commercial or recreational fishing, or both (re. Steinback et al. 2009, Leong et al. 2020)). In each case, fishing operations/fishermen and shore-based support infrastructure are interdependent (re. Clay and Olson 2007, 2008; for subsistence fishing see also Donkersloot et al. 2020a, 2020b and Carothers et al. 2021). All fishermen depend on the existence and condition of a variety of support businesses to maintain their fishing activities. Likewise, the owners of fisheries support businesses rely on the health of fish stocks and success of the fishermen for their own well-being. As such, the impacts of fisheries management measures on fisheries support businesses are also important to consider in SIAs (per National Standard 8 and the National Standard 8 Guidelines). Businesses related to commercial fishing that fall under this category include: dealers, processors, canneries, chandleries, boatyards, net makers, commercial docks, compressed air filling stations (where scuba fishing is common), and ice vendors. Businesses related to recreational fishing that fall under this category include bait-and-tackle shops and marinas. For indigenous subsistence fisheries key infrastructure may include fish camps and traditional sites for setting nets (re. Carothers et al., 2021). Any reduction in landed product or location of landing can affect shoreside business infrastructure, business owners, and employees of these businesses. Regarding infrastructure, Brewer et al. (2004:16) note the importance of both quantity and location of infrastructure in the northeast U.S., and of the critical ties infrastructure placement may create between communities:

The Gloucester Community Panel identified infrastructure essentials for an active fishing port (Robinson et al. 2003, 2005). The Panels Project has found, however, that some fishing communities do not have all of the requisite elements in their own community and must go to a larger fishing port (hub port) to obtain the required services. This may make the dependent ports more vulnerable, having less direct influence on the community upon which they rely but do not live. Moreover, federal regulations require fisheries managers to analyze socio-economic impacts on place-based fishing-dependent communities (National Standard 8 of the Sustainable Fisheries Act), but do not necessarily take into account the networks of dependency between the hub ports and their satellites.

The Panels project, as described in Hall-Arber (2007:148), involved establishing community panels “in six fishing ports in Maine, Massachusetts, and Rhode Island. Each panel was comprised of 10 to 12 individuals, a cross section of harvesters, processors, shoreside business

owners, and other members of the fishing communities. The panels identified issues of concern to their ports, and with the help of coordinators and the principal investigators, gathered data through interviews and focus group meetings, then drafted and reviewed reports. The project was successful in addressing topics of immediate concern in the region such as the impacts of changes in fishery management plans, particularly on fishing industry infrastructure.”

ii. The Broader Community

Non-fishing or non-fishing-related businesses are still impacted because they benefit from the social and economic contribution of fisheries to the local economy, services, and infrastructure, as well as the social, economic, and cultural benefits of, e.g., working waterfronts and fishing-related museums, and tours. For example, the presence of fishing activity in a community may provide the population or economic base that makes operating a grocery store or maintaining a school in the community possible. Or if large numbers of fishermen in the community have a reduced/increased income, that could affect the local tax base. Local/state/federal employees/contractors may be affected (e.g., electronic monitoring may displace observers). Consumers that desire regionally/locally sourced seafood could also be impacted, as could local seafood restaurants. Buyers at local farmers markets could also be affected (e.g., the impact of electronic fish ticket requirements and West Coast trawl catch share requirements for first receiver licenses). Not all of these will need to be addressed in any single regulation, and maybe none of them will, but it's best to start by thinking broadly and then narrow in.

iii. Minority and Low-income Populations

There are specific federal requirements under Executive Order 12898 for consideration of impacts on minority and low-income populations in federal decisionmaking. (See Appendix A for more on the law and Appendix B for two key policy directives.) These populations must be identified and fully considered in any SIA (NMFS 2007:6). The White House Council on Environmental Quality (CEQ) Guidance on Environmental Justice under NEPA defines the key terms from E.O. 12898 (pp. 25-27) as follows:

Low-income population: Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty. In identifying low-income populations, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect.

Minority: Individual(s) who are members of the following population groups: American Indian or Alaska Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.

Minority population: Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population

percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

As noted earlier, some fisheries are focused around cultural groups. This can include groups defined as minorities, who should be particularly noted in terms of any environmental justice concerns, e.g., the Black Gullah Geechee fishermen in the Carolinas (Hoskins-Brown 2020) and other Black fishermen in the Mid-Atlantic menhaden fishery (Garrity-Blake 2005), Alaska Natives (Donkersloot 2020a, Carothers et al. 2021), Vietnamese (Asians) along the Gulf of Mexico (Mayfield-Johnson et al. 2019) and in California (Orbach and Beckwith 1982), and indigenous Hawaiians (Pacific Islanders) (Leong et al. 2020). Processing plants may largely employ members of the listed minority groups or low-income populations (e.g. Moberg and Thomas 1993, Selby et al. 2001, Garcia and DeCastro 2017). Certain fishing communities may also include the population categories listed above, even if the categories are not exclusive to or in fact do not include fishermen. The E.O. applies to the fishing community as a whole, not just those living there who are involved in the fishery. And as noted above, the broader community is also impacted by changes in fishing regulations, even if only at a tertiary level – what economists call induced effects. See more on measuring environmental justice in section V.c.3.

iv. Tribes

The United States is home to a significant number of federally recognized Native American tribes.²⁶ As sovereign nations, they are privy to a unique and distinctive relationship with the federal government compared to states and other entities. There are a number of legal requirements that federal fisheries managers must take into account, including respecting the rights of the tribes to set their own priorities and make decisions that affect their resources and distinctive way of life. In order to successfully meet these requirements, effective and open working relationships and regular consultations between fisheries managers and tribal representatives are imperative. Tribes are, in fact, equal partners in managing some fisheries and are entitled to a portion of the allowable catch in their traditional and customary areas.

v. Other Indigenous Groups

The Western Pacific Regional Fisheries Management Council has codified the inclusion of social considerations in Fishery Ecosystem Plans (FEPs). It is the only region that officially designated MSA fishing communities through the rulemaking process – as amendments to the region’s FMPs, now FEPs ([64 FR 19067](#), [68 FR 46112](#)). Fishing communities in Hawaii are defined at the archipelago island scale, with the recognition that individuals who are substantially dependent on or substantially engaged in the harvest or processing of fishery resources are not set apart from island populations as a whole ([Environmental Assessment](#) for establishing American Samoa, Guam and Commonwealth of the Northern Marianas Islands fishing communities and [Environmental Assessment](#) for establishing Hawaii’s communities). An omnibus amendment for all FEPs in the region also created a mechanism for including social,

²⁶ Currently, there are 573 federally recognized Native American tribes. See 84 FR 1200 (Feb. 1, 2019).

ecological, and management considerations in setting Annual Catch Limits (Environmental Assessment, 50 CFR Part 665.4). In addition, the FEPs include social and cultural objectives that must be considered when developing new rules (e.g., see Objectives 4 and 7 in the FEP for the American Samoa Archipelago). All these must be taken into account in the SIA.

For tribal and indigenous people, fishing has millenia-long ties to all areas of life: subsistence, culture, spirituality, community, conceptions of self, as well as economy (Donkersloot et al. 2020a, 2020b; Carothers et al. 2021).

c. Organizing your analyses

Multiple factors can be considered in choosing the specific communities to focus on for the SIA. Ideally, multiple criteria are used. But the ability to use multiple criteria is based on the availability of data, which will vary by region. Minimum types of data to consider are landings, value, unique dealers, and number of permits in the fishery of concern. There are also indicators that include some or all of these: Fishing Engagement, Fishing Reliance (both from the NOAA Community Social Vulnerability Indicators, aka social indicators), RQ, and LQ. Counts of processors and other shoreside fishing-related businesses can also be helpful. The Office of Science and Technology's (OST) Fisheries Statistics Division conducts a voluntary Processed Products Survey annually.²⁷ OST in 2013 conducted a Recreational Bait and Tackle Economic Survey (Hutt et al. 2015).²⁸ Looking to the academic literature and to NMFS, Council, U.S. Fish & Wildlife Service, and state reports (sometimes called "gray literature") can be helpful. There may also be relevant studies in your Region. In the Northeast, for example, infrastructure such as processing, boatyards, and chandleries²⁹ was identified as increasingly concentrated in a few "hub ports," (Robinson et al. 2003, 2005³⁰; Brewer et al. 2004; Hall-Arber et al. 2001; Hall-Arber 2007; Mt. Auburn Associates 2009; Brown et al. 2017). And the Southeast Region, which includes the U.S. Caribbean, conducted a fishery census for Puerto Rico (Matos-Caraballo and Agar 2011) and for the U.S. Virgin Islands (Kojis and Quinn 2004). In addition, all NMFS regions have community profiles and/or community snapshots that provide information on fishing communities³¹. And the NMFS social indicators website is an invaluable source for information on social vulnerability and gentrification pressure vulnerability.

²⁷ It is voluntary it does not necessarily provide a 100% count, but is nonetheless informative. Certain confidentiality rules apply to use of the data. Access the database via: <https://foss.nmfs.noaa.gov/apexfoss/f?p=215:200:4517174670249:::> The query can be limited in terms of breaking down data by area, but a custom request can be placed via the comments page: <https://foss.nmfs.noaa.gov/apexfoss/f?p=215:207:9729124093857::NO::>

²⁸ <https://www.st.nmfs.noaa.gov/Assets/economics/Bait-and-Tackle/documents/RBTES%20Final%20Results%20Flyer%20v8.pdf>

²⁹ A ship chandler (or ship's chandler) is a retail dealer who specializes in supplies or equipment for ships, known as ship's stores. They supply the crew's food, ship's maintenance supplies, cleaning compounds, rope, etc. The advantage of using a chandler is that the captain/crew do not have to find or visit multiple stores in each port where they land, but can use the chandlery as a one-stop shop.

³⁰ Additional port-based reports for the Northeast Region are available for download at http://seagrant.mit.edu/cmss/comm_mtgs/commmtgs.html.

³¹ <https://www.fisheries.noaa.gov/national/socioeconomics/fishing-community-profiles>

In some cases, data relevant to your SIA may already exist, e.g., in fisheries databases or the CSVIs, but in other cases some new data collection may be needed. These new data may be acquired by a variety of methods, including literature reviews, semi-structured interviews, oral histories, focus groups, and surveys. However, as discussed above, many of these will require more time than you have available for the SIA work. (For more detail on data collection methods, see Appendix C). Many or all of these data, depending on the regulatory action in question, should be described in detail in the AHE and then referenced in the SIA as summary data. Note: Before gathering data from any Alaska Native, tribal, or indigenous group, be sure to consult the best practices described in NMFS/NOS (2019) and talk to your Regional Office and the NOAA Tribal Liaison. Individual regions may also have resources on this topic. For instance, the North Pacific Fishery Management Council has a Community Engagement Committee (CEC) with the express purpose of recommending strategies to provide effective engagement with rural and Alaska Native communities. Information on the CEC and its proceedings is available at <http://www.npfmc.org/committees/cec>.

To understand the views of fishermen, it can be helpful to attend the Scoping Meetings/Public Hearings held when a Council is planning a significant regulatory action. Travel funds or other impediments may limit your physical attendance, but the meetings will also be recorded and audio files or transcripts will be available upon request from the Council. These meetings are held in selected fishing communities throughout the region associated with the species or species groups for which a regulatory action has been determined to be necessary. These are fora where members of the public (including fishermen, processors, town officials, environmental groups, and others) can express their views of likely impacts of the proposed action and offer alternatives they would like to see considered.³² If at all possible, attend all these meetings.

In some cases, scoping is carried out within the context of a single or several Council meetings, often in conjunction with a broader solicitation of written public comment. There will also be letters and emails submitted for the public record. These can be read through for themes or analyzed using qualitative data analysis software such as Nvivo, MaxQDA, Atlas-ti, and others. It is important to remember, however, that not all fishermen can afford to take the time off and travel to the nearest meeting or feel comfortable writing a letter to the Council. So, opinions and data offered in these ways may not represent either a random sample or complete coverage of the views of expected impacts that may occur. Thus themes should clearly be labeled as from Public Comments and caveated as not a random sample.

Stakeholder interviews are also useful, but only if you have enough time. Some pertinent interviews may be also available on the NMFS oral history site, Voices. The Voices staff can help you to find any likely relevant transcripts or recordings. Ideally, it is most effective to combine data gathered through more than one method, as each method may measure slightly different aspects of a given issue or topic. If you do have time, even to spend a week trying to conduct a set of phone interviews, see the discussion of semi-structured interviews and oral histories in detail in Appendix C, section 5. If your region has existing regular surveys of fishermen, in general or in the fishery you are dealing with, those data can also be examined to see what might be relevant.

³² For more on scoping meetings and other procedures related to NEPA, talk to your Regional NEPA specialist, as current documentation is in the process of being updated during 2021.

The fisheries/fleets involved can be analyzed using your region's fisheries databases. To assess fishing community dependence on the fishery being regulated, there are two primary options: (1) using the NMFS fishing engagement and fishing reliance indicators and (2) calculating regional and local quotients. It is often preferable to do both, as each provides a slightly different take on the fishery and its associated communities.

1. Fishing Engagement and Fishing Reliance

These two measures are available for commercial and recreational fisheries (see Appendix C, section 4.a for details). Fishing Engagement measures the importance of fisheries to a given community relative to other coastal communities in a region. Fishing Reliance is a per capita measure of engagement. Fishing Reliance allows smaller communities with small fishing fleets to still be represented as having a strong community involvement in fishing if a large fraction of their population is involved in fishing -- even if they do not appear heavily involved in the absolute terms measured by Fishing Engagement (Jepson and Colburn 2013, Colburn et al. 2017). These indicators can be developed based on the aggregate of all species landed in a community or as individual species/species group Fishing Engagement and Reliance. Engagement and reliance are two of the indicators that form the NMFS CSVIs. See Appendix C, section 4 for technical details.

2. Regional Quotient and Local Quotient

The RQ is a measure of a community's contribution to regional landings or value for a particular species or species group. It is expressed as a percentage (community landings or value of a species or species group divided by total regional landings or value of a species or species group). The LQ is a measure of the importance of a particular species or species group relative to all species landed in a community. It is expressed as a percentage (community landings (value) of the catch share species or species group divided by total community landings (value) of all species (Colburn et al. 2017).

3. How do I assess environmental justice?

The basic environmental justice overview should be provided in the AHE. In the SIA the results are used to identify communities already expected to be impacted by a measure or measures within the regulatory action that could have additional burdens based on environmental justice criteria. In many cases, a particular management action is unlikely to change the overall vulnerability of a community. However, even in these cases, for someone whose living is impacted negatively by a management measure, living in an already highly socially vulnerable community can mean there are fewer resources available for support or alternative jobs to supplement any income loss.

Since there is often some question about how to analyze environmental justice, an overview is provided here of a suggested way to structure this analysis. Environmental justice is measured at the community level, where a community is "either a group of individuals living in

geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect.”³³ Here we recommend using the fishing communities defined in the AHE as primary and secondary communities.

Indicators of vulnerability for purposes of environmental justice can include but are not limited to income, race/ethnicity, household structure, education levels, and age. The main focus of E.O. 12898 is to consider “the disproportionately high and adverse human health or environmental effects of [an agency’s] programs, policies, and activities on minority populations and low-income populations in the United States and its territories...” Some of the indices within the NMFS CSVIs can provide useful insights for understanding communities where environmental justice may be a concern.

The low-income element of environmental justice can be measured by using the Poverty, Population Composition Vulnerability, and Personal Disruption indices of the CSVIs. The Poverty index includes Percent receiving assistance, Percent of families below poverty level, Percent over 65 in poverty, and Percent under 18 in poverty. The Population Composition Vulnerability index includes Percent white alone, Percent female single headed households, Percent population age 0-5, Percent that speak English less than well. The Personal Disruption index includes Percent unemployed, Percent with no diploma, Percent in poverty, and Percent females separated. See Table C2 in Appendix C. It is also possible to use simply the Poverty index alone or the Percent of families below poverty level, though this covers fewer aspects of poverty.

The minority status element can be assessed through the Population Composition Index described above. It is also possible to use the percent of individuals who are members of the following population groups: American Indian or Alaska Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic – per the Decennial Census. Further, some fisheries and fishing-related industries may be known to include individuals of the defined minority or low-income populations and these should be mentioned at least qualitatively.

More generally, in any case where the use of quantitative or statistical data is problematic, another option would be to follow the suggestion of the IWGEJ (Interagency Working Group on Environmental Justice) and NEPA Committee (2016:14) to hold scoping meetings to discuss levels of minority and low-income populations.

4. How do I assess the social factors relevant to my SIA?

Some of these can be described using simple counts of landings and permits (including broken out by relevant permit categories) by community. Other potentially useful datasets include U.S. Census data, the voluntary NMFS Processed Products Survey, and counts of bait and tackle shops created by recreational fishing industry groups. Ask your colleagues for the extent to which these are available for your region, and be aware that there are strict rules on the use of Processed Products data due to confidentiality issues.

³³ Per the White House Council on Environmental Quality (CEQ) Guidance on Environmental Justice under NEPA.

One of the most useful tools, however, is the set of NMFS CSVIs. In addition to the Fishing Engagement and Fishing Reliance indicators described earlier, there are indicators of Social Vulnerability and Gentrification Pressure Vulnerability (Colburn and Jepson 2012, Jepson and Colburn 2013, Colburn et al. 2017). Social Vulnerability and Gentrification Pressure Vulnerability represent social factors (Table C2 in Appendix C) that can shape a community's ability to adapt to change (Jacob et al. 2010, 2013b). For instance, if individuals with category A permits will be affected, which communities have the most category A permits, and which of those communities are most involved in fishing (per LQ, RQ, Engagement, Reliance), and are socially vulnerable, or are experiencing gentrification pressure? Which communities have the most processors located there, dealers buying there, unique vessels landing there?

While the CSVIs assess at the full community level, rather than the level of the fishing population within the community, it is notable that fishing communities from Maine to Texas tended overall to have higher levels of poverty and more social vulnerabilities than other coastal communities in that same region of the U.S. coast (Colburn et al. 2016), even though within the set of fishing communities there is still a broad range of poverty and vulnerability levels. Additional detail on all these community vulnerability indicators can be found in Appendix C, section 4.

Many of the social and cultural issues can be found in the literature for your region, if not always for individual communities. Literature from other regions may also offer ideas to follow up on. Changes in social structure, for example, have been found for catch shares and limited access in a number of different fisheries and cultures (see section V.a.9. on catch shares, above), and these examples from the literature can be applied as potential outcomes of an SIA that includes these management measures. There is a literature on safety in fisheries (e.g., Knapp 1999, Windle 2008, Jin and Thunberg 2005, Pfeiffer and Gratz 2016) that can point to possible outcomes of specific types of regulations (some from the catch shares literature and some more general, see also V.a.6., Days-at-Sea). There are a number of studies of recreational fishing, including the for-hire vessels (charter boats and party/head boats) that discuss what impacts are most likely within the recreational sector (see especially V.a.4,5). Historical dependence can be assessed through time series of permits and landings, through the literature, and by looking at the initial FMP documents for the fishery in question. Semi-structured interviews and oral histories, when there is time for these, can also provide social and/or cultural data. See Appendix C for more details on acquiring and analyzing data.

5. What about the impacts of climate on management?

Further, another factor that may interact with any of the above are the various impacts of climate change as described and measured in, for example, Colburn et al. (2016), Pörtner et al. (2014), Griffis and Howard (2012), and Clay et al. 2020. Common impacts include (1) rising sea levels and increased hurricane-related storm surge that can impact coastal infrastructure and coastal communities, (2) species range changes related to rising sea surface temperature that can change how far from home fishermen need to travel to fish, as well as move species beyond the range of the Council they are currently governed by, and (3) increasing levels of ocean acidification that make it difficult for crustaceans (lobster, shrimp, crab) and especially shellfish

(scallops, clams, quahogs, oysters) to form their shells, impacting their ability to survive. See Appendix C, section 4.c. for more detail.

d. Writing it up: What is the format of an SIA?

Depending on the Council under which the fishery is governed, the SIA section of the EIS may appear as a single section, be distributed in pieces across the EIS by management measure, appear in conjunction with the economic analysis under a header such as “Impacts to Human Communities,” or some combination. See Mengerink et al. (2014) for an overview of the variety of SIA presentations to be found in EIS documents. Talk with the lead for your EIS planning team about what the structure of your EIS or EA will be.³⁴ The structure below will allow you to mix and match as needed.

1. Brief discussion of why SIA is required

Begin with 1-2 short paragraphs providing background on laws that require SIA. The major laws to mention are NEPA and the MSA. Also make note of National Standard 8 and E.O. 12898 on Environmental Justice and any relevant policy directives.

2. Brief description of how key fishing communities were chosen

Describe which individual method or multiple methods (discussed in V.c.) that you used to make your choices. Include a table of the chosen communities. It may be helpful to divide the communities into Primary and Secondary communities based on data used in the selection process, e.g., one versus two standard deviations from the mean for numerical indicators and/or perceptions data from interviews.

3. Short overview of relevant background data on those communities

Provide a brief overview of important information about the selected communities. Tables and graphics of the selection criteria and the Social Vulnerability and Gentrification Pressure Vulnerability indicators should be included along with short text descriptions of the key points to note, e.g., overall similarities, trends over time, individual ports or vulnerabilities that stand out for some reason. Include climate vulnerability indicators where available and relevant. Radar graphs (see Jepson and Colburn 2013:15-16) and bar graphs with three dimensions (see Colburn et al. 2016:295) can help to portray multiple vulnerabilities at a time. But simpler charts and tables downloadable from the CSVI website are sufficient.

All or most of this information is usually found in the AHE and simply referenced or summarized in the SIA. However, some data tables or graphs may be specific to the SIA and

³⁴ Also, discuss the extent to which you are responsible for the AHE.

found there or in the proposed-action by proposed-action discussions. Again, coordinate with the leader of your planning team.

4. Discussion of the communities and fishery/fleet groups impacted under each proposed action

Use data gathered above and relate it to social and economic analyses of fleet-based groups to discuss impacted place-based communities and social groups. Connect the social analyses to the economic and biological analyses for the managers, especially where there are both qualitative and quantitative data used (Sharp and Lach 2003, Pollnac et al. 2006).

For each action, describe which communities are most impacted by each proposed regulatory change due to the impacted permit categories, gear types, areas fished, etc., across social groups and communities -- and considering the different communities' social, economic, and climate vulnerabilities and cultural impacts. Which communities have the largest numbers of impacted fishermen or fishing and fishing-related businesses? Which of these have specific types of vulnerabilities, which have multiple types of vulnerabilities, which have greater versus lesser levels of each of the vulnerabilities? And which communities, because of these combinations, are most impacted by each specific regulatory action? For an example of a very basic SIA, see NEFMC/MAFMC Monkfish Framework 9³⁵ (section 7.5). (Also note the AHE in section 6.4, especially 6.4.2 on Ports and Communities.) In addition, note any communities or social groups clearly impacted under E.O. 12898 on environmental justice (see doughnut graph in Colburn et al. 2016:293 as a quick way to provide overview, though a simple table can be sufficient), and/or that include treaty tribes or other indigenous peoples.

5. Summary of key points

Examples of questions to address in a summary include:

- Are impacts of the specific alternative³⁶ chosen more positive or negative overall relative to the status quo and all the other alternatives, or are they too variable by individual measure to characterize in an overall way?
- Are impacts (either positive or negative) large or small and short- or long-term?
- Are impacts evenly distributed across communities, or are some communities impacted negatively or positively by multiple measures while others are impacted by only one or two measures, or none of the measures?
- Where communities are overall more heavily impacted, negatively or positively, is it due to the presence of large fleet/fishery sub-groups or large fishing community sub-groups, or to higher than average levels of social or climate vulnerabilities, or

³⁵ Available at: <https://www.nefmc.org/library/framework-9-2>. Click on "Download File" for the EIS document.

³⁶ Under NEPA, there is the additional requirement to address cumulative impacts. See Appendix B, section 1 for more detail.

higher engagement or reliance on the species in question – or some combination?
Hint: It will usually be a combination.

Remember to use plain language. You are writing for the public, not for scientists. And finally, keep in mind as Rowan (2009:188) notes: “Magnitude criteria look at duration, spatial extent or size, likelihood and reversibility of impacts, and take into account legal standards and professional judgement about wellbeing. *Focusing on wellbeing shows that the core of SIA is about how people are affected by projects*” [and, for this Handbook, regulatory actions] (emphasis added).

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Appendix A: Other Relevant Laws and Executive Orders

1. Executive Order 12898 – Environmental Justice

NMFS (2007) states that an SIA must address environmental justice issues, where they exist. E.O. 12898 requires that federal agencies conduct their programs, policies, and activities in a manner to ensure individuals or populations are not excluded from participation in, or denied the benefits of, or subjected to discrimination under, those programs, policies, and activities because of their race, color, or national origin. To evaluate these impacts, information about the vulnerability of certain stakeholders must be better understood. Indicators of vulnerability can include but are not limited to income, race/ethnicity, household structure, education levels, and age. Although some general information related to this issue is available through the U.S. Census and other quantitative data, these sources do not disaggregate those individuals or groups that are affected by changes in marine resource management or the quality of the resource itself. Therefore, other types of data collection tools must be utilized to gather information related to this executive order. In addition, and specifically with respect to subsistence consumption of fish and wildlife, federal agencies are required to collect, maintain, and analyze information on the consumption patterns of populations who principally rely on fish and/or wildlife for subsistence.³⁷ The main focus of E.O. 12898 is to consider “the disproportionately high and adverse human health or environmental effects of [an agency’s] programs, policies, and activities on minority populations and low-income populations in the United States and its territories...”

In order to implement the E.O., a Memorandum of Understanding (MOU) was signed by seventeen Cabinet members and White House offices in 2011 to facilitate coordination. One item in that MOU is the creation of the Interagency Working Group on Environmental Justice (IWGEJ). The Dept. of Commerce Environmental Justice Strategy (see Appendix B) is also a product of that MOU. For more on the IWGEJ, see Appendix B.

2. Executive Order 13707 – Using Behavioral Science Insights to Better Serve the American People

E.O. 13707 enforces the idea that “behavioral science insights can support a range of national priorities, including helping workers to find better jobs; enabling Americans to lead longer, healthier lives; improving access to educational opportunities and support for success in school; and accelerating the transition to a low-carbon economy.” The E.O. encourages federal agencies to incorporate behavioral science insights into their activities and policies through: (1) determining access to programs, (2) presenting information to the public, (3) structuring choices within programs, and (4) designing incentives.

While not specifying particular analyses, This E.O. supports the importance of social and economic analyses.

³⁷ For examples, see NOAA (2019), U.S. EPA (2000, 2019), U.S. DOI (2019).

3. Executive Orders related to Treaty Tribes

Across the federal government, agencies are required to follow the requirements for regular and meaningful consultation and collaboration with state, local, and tribal governments on federal matters that significantly or uniquely affect their communities laid out in E.O. 12875 – Enhancing the Intergovernmental Partnership and E.O. 13175 – Consultation and Coordination with Indian Tribal Governments.

4. Executive Order 12866 – Regulatory Planning and Review

E.O. 12866 requires that federal agencies assess the costs and benefits to the nation of implementing a regulation, in order to assure for the American people “a regulatory system that protects and improves their health, safety, environment, and well-being and improves the performance of the economy without imposing unacceptable or unreasonable costs on society; regulatory policies that recognize that the private sector and private markets are the best engine for economic growth; regulatory approaches that respect the role of State, local, and tribal governments; and regulations that are effective, consistent, sensible, and understandable.” In other words, to assure that “a regulatory action not be undertaken unless the potential benefits to society for the regulation outweigh the potential costs to society” (NMFS 2007:1).

5. Regulatory Flexibility Act (RFA)

The RFA (sometimes also referred to as RegFlex) requires that, for applicable rules, federal agencies prepare an initial and final regulatory flexibility analysis which “...shall describe the impact of the proposed rule on small entities...” The initial regulatory flexibility analysis “...shall also contain a description of any significant alternatives to the proposed rule which accomplish the stated objectives of applicable statutes and which minimize any significant economic impact of the proposed rule on small entities” (RFA Section 603(b)(5)(c)). In addition, each final regulatory flexibility analysis shall contain, among other things, “...a description of the steps the agency has taken to minimize the significant economic impact on small entities...” (RFA Section 604(a)(6)).

6. Small Business Regulatory Enforcement Fairness Act (SBREFA)

SBREFA (often pronounced [sub ree fuh]) “provides new avenues for small businesses to participate in and have access to the federal regulatory arena. The SBREFA gives small businesses: more influence over the development of regulations; additional compliance assistance for Federal rules; and new mechanisms for addressing enforcement actions by agencies.”³⁸ Notably, it permits judicial review of agencies' compliance with the RFA to ensure that RFA procedures are accurately followed.

³⁸ <https://www.sba.gov/advocacy/summary-sbrefa>

Appendix B: Other Relevant Policy Directives

1. White House Council on Environmental Quality (CEQ) Guidance on Cumulative Effects under the National Environmental Policy Act (NEPA)

On September 14, 2020, a new rule from the Council on Environmental Quality (CEQ) became effective, which updated CEQ's regulations for implementing NEPA (85 Fed. Reg. 43304, July 16, 2020). As a result of this rule, NOAA and NMFS will update their NEPA procedures to reflect the changes in the NEPA regulations. NOAA's procedures for implementing NEPA are set forth in NAO 216-6A and its accompanying Companion Manual. NMFS's procedures for complying with NEPA for MSA fishery management actions are set forth in Appendix C to the Companion Manual. While NOAA and NMFS are in the process of revising their NEPA procedures, they will issue interim guidance on specific issues to assist in implementing the new regulations in the short-term, until NOAA and NMFS finalize their revised NEPA procedures. The NOAA NEPA Coordinator issued the first NOAA interim guidance on September 14, 2020. The NOAA NEPA Coordinator will update that guidance and issue additional interim guidance, as necessary. In addition, NMFS intends to issue NMFS-specific interim guidance, including guidance relevant to the NEPA process for actions under the MSA.

The revised NEPA regulations remove the definition of "cumulative impacts" from the regulations. However, CEQ has not eliminated all requirements to consider the effects of other past, present, and reasonably foreseeable future actions that may inform the effects that will be expected from a proposed action and its alternatives. The underlying concepts of cumulative effects remain relevant to portions of the NEPA analysis. For example, the revised NEPA regulations continue to require a description of the affected environment. In order to do this, the condition of environmental resources likely to be affected must be described, and this should include an analysis of past and present activities that have influenced the condition of each resource likely to be affected by the proposed action. In addition, the affected environment must describe "reasonably foreseeable environmental trends and planned actions in the area(s)." Consistent with current agency practice, this should include both Federal and non-Federal planned activities that are reasonably foreseeable. Additional guidance on cumulative effects may be issued in the future. Please reach out to your regional NEPA coordinator and regional General Counsel for updates and with any questions on cumulative effects.

For social impact assessments under NEPA, the analysis should be based on the entire affected region and society, not the fishery in isolation. In a fisheries context, this could potentially include the accumulated impacts of the regulation in question, previous and concurrent regulations in the fishery in question, impacts in other fisheries that participants in this fishery also participate in, and the impacts of other non-fisheries regulations or societal forces such as a downturn in the economy. The appropriate boundaries for the analysis should be carefully considered, however, because if the boundaries are defined too broadly, the analysis could become unwieldy, and if they are defined too narrowly, significant issues may be missed. CEQ guidance for cumulative effects under NEPA notes these considerations as well.

2. Policy and Procedures for Compliance with the National Environmental Policy Act and Related Authorities

On September 14, 2020, a new rule from the Council on Environmental Quality (CEQ) became effective, which updated CEQ's regulations for implementing NEPA (85 Fed. Reg. 43304, July 16, 2020). As a result of this rule, NOAA and NMFS will update their NEPA procedures to reflect the changes in the NEPA regulations. NOAA's procedures for implementing NEPA are set forth in NAO 216-6A and its accompanying Companion Manual. NMFS's procedures for complying with NEPA for MSA fishery management actions are set forth in Appendix C to the Companion Manual. While NOAA and NMFS are in the process of revising their NEPA procedures, they will issue interim guidance on specific issues to assist in implementing the new regulations in the short-term, until NOAA and NMFS finalize their revised NEPA procedures. The NOAA NEPA Coordinator issued the first NOAA interim guidance on September 14, 2020. The NOAA NEPA Coordinator will update that guidance and issue additional interim guidance, as necessary. In addition, NMFS intends to issue NMFS-specific interim guidance, including guidance relevant to the NEPA process for actions under the MSA. Please reach out to your regional NEPA coordinator and regional General Counsel for updates and with any questions.

3. White House Council on Environmental Quality (CEQ) Guidance on Environmental Justice under NEPA

On September 14, 2020, a new rule from the Council on Environmental Quality (CEQ) became effective, which updated CEQ's regulations for implementing NEPA (85 Fed. Reg. 43304, July 16, 2020). However, the revised NEPA regulations do not specifically address environmental justice, and at this time, CEQ has not made any changes to its environmental justice guidance.

The first page of the current guidance from 1997 notes that: "In the memorandum to heads of departments and agencies that accompanied E. O. 12898, the President specifically recognized the importance of procedures under the National Environmental Policy Act (NEPA) (42 U.S.C. §4321 et seq.) for identifying and addressing environmental justice concerns." It further defines the key terms from E.O. 12898 (pp. 25-27) as follows:

Low-income population: Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty. In identifying low-income populations, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect.

Minority: Individual(s) who are members of the following population groups: American Indian or Alaska Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.

Minority population: Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. In identifying minority communities, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a geographically dispersed/transient set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect. The selection of the appropriate unit of geographic analysis may be a governing body's jurisdiction, a neighborhood, census tract, or other similar unit that is to be chosen so as to not artificially dilute or inflate the affected minority population. A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds.

Disproportionately high and adverse environmental effects: When determining whether environmental effects are disproportionately high and adverse, agencies are to consider the following three factors to the extent practicable:

(a) Whether there is or will be an impact on the natural or physical environment that significantly (as employed by NEPA) and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment; and

(b) Whether environmental effects are significant (as employed by NEPA) and are or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group; and

(c) Whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

Additional definitions that may be of use are found immediately following, and in subsequent sections.

4. Interagency Working Group on Environmental Justice

The Interagency Working Group on Environmental Justice (IWGEJ) has published a helpful report for analyzing these populations (IWGEJ and NEPA Committee 2016). Note that this report is not official guidance or a legal requirement.³⁹ The U.S. Environmental Protection Agency's Policy on Environmental Justice for Working with Federally Recognized Tribes and Indigenous Peoples and the Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity are also useful documents to consult. For guidance on determinations of what is a “low income population,” see the definition in Appendix B under CEQ guidance on Environmental Justice under NEPA.

Suggested data sources for making this determination include the Decennial Census, American Community Survey (ACS) and “interviews with [knowledgeable] representatives from local schools, health and human services, places of worship, local businesses, and community representatives and leaders.” Number of fishing permits relative to overall population may provide approximate percent fishermen in the community. These are, however, very rough methods and care should be taken not to overstate them. Ethnographic data on the specific fishery of interest and its distribution across communities may be compared in a general manner to the overall race/ethnicity distributions within communities.

The Poverty, Population Composition Vulnerability, and Personal Disruption indices of the CSVIs are also good sources of these data. See section V.c.3 above.

5. Dept. of Commerce Environmental Justice Strategy

The Dept. of Commerce issued guidance in 1993 that affirms: “During National Environmental Policy Act reviews of major agency actions, any potential disproportionate and adverse environmental or health effects on low-income or minority populations are considered.”

6. Policies and processes regarding tribes

Under current practice, NOAA Fisheries is responsible for formal government-to-government consultation requirements with federally recognized tribes, as described in E.O. 13175 (cited above). The Department of Commerce Consultation and Coordination Policy (2013), provides information on complying with relevant laws regarding treaty tribes. An important staff resource is the NOAA Tribal Liaison, based at NOAA headquarters. The Liaison is available to assist regions with tribal engagement in the fisheries management process. Key information regarding the tribal consultation process and for informal consultations over a controversial issue can be found in the NOAA Consultation Handbook (formally titled NOAA Procedures for Government-to-Government Consultation with Federally Recognized Indian Tribes and Alaska Natives).

In addition, the North Pacific Fishery Management Council has established a policy priority to reach out to Alaska Native Villages and Corporations. This includes more than 220 federally

³⁹ See report for full disclaimer.

recognized tribes and over 100 Alaska Native Corporations (which are included in tribal consultations per the Consolidated Appropriations Act that extended the obligations for NMFS under E.O. 13175). In particular, Alaska Native Villages were allocated specific fishing rights through the Community Development Quota Program (MSA Sec. 305(i)), discussed above in section II.a.2.

The west coast of the United States has over 30 tribes with federally recognized treaty/tribal fishing rights (Puget Sound, Washington Coast, Columbia River, Oregon, and Idaho). There are also many other federally recognized tribes in the region who have lost access to salmonids. All of the region's FMPs take into account tribal fishing rights. In particular, the Pacific Fishery Management Council manages the region's tribal fisheries as part of larger group of fisheries and has a Council membership provision for a treaty tribal member and alternate member (MSA Sec. 302(b)(5)(D)).

7. Office of Management and Budget Guidance on Implementing E.O. 12866

This guidance clarifies that "significant" regulatory actions are "those likely to lead to a rule (1) having an annual effect on the economy of \$100 million or more or adversely and materially affecting a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities; (2) creating a serious inconsistency or otherwise interfering with an action taken or planned by another agency; (3) materially altering the budgetary impact of entitlements, grants, user fees, loan programs; or (4) raising novel legal or policy issues (Sec. 3(f))."

8. The Small Business Administration's Guide for "How to comply with the Regulatory Flexibility Act"

This guidance for RFA clarifies that: "The RFA does not seek preferential treatment for small entities, nor does it require agencies to adopt regulations that impose the least burden on them, or mandate exemptions for them. Rather, it requires agencies to examine public policy issues using an analytical process that identifies barriers to small business competitiveness and seeks a level playing field for small entities, not an unfair advantage."

9. NOAA Ecosystem-Based Fisheries Management (EBFM) Policy

Here, EBFM is defined "as a systematic approach to fisheries management in a geographically specified area that contributes to the resilience and sustainability of the ecosystem; recognizes the physical, biological, economic, and social interactions among the affected fishery-related components of the ecosystem, including humans; and seeks to optimize benefits among a diverse set of societal goals." Furthermore, it recognizes that tradeoffs must

be made among these societal goals, based on the expected physical, biological, economic, and social impacts of each.

10. NMFS Guidance for Conducting a Review of Catch Share Programs

This guidance is designed to “ensure the reviews of catch share programs (CSPs) are comprehensive and targeted at meeting statutory requirements; coordinated with stakeholders; carried out in a transparent, efficient, and effective manner; and are conducted by applying consistent standards across the country while allowing necessary regional flexibility.” In order to conduct an effective review, appropriate data collection plans should be put into place at or before implementation. Similar to an EIS, Catch Share Program Reviews must include the following elements relevant to an SIA:

- 1) a description of biological, ecological/environmental, economic, social, and administrative environments before and since the program’s implementation,
- 2) an analysis of the program’s biological, ecological/environmental, economic, social, and administrative effects,
- 3) an evaluation of those effects with respect to meeting the goals and objectives (i.e., program performance), including a summary of the conclusions arising from the evaluation,
- 4) a summary of any unexpected effects (positive or negative) which do not fall under the program’s goals and objectives.

Appendix C: Tools and Methods

The tools and methods presented here should be carried out by trained social scientists or under their direct supervision. If you are not a social scientist, talk to the social scientist(s) in your region before implementing any of these tools and methods. Also, remember that you need to consider your available time and resources. In other words, what is the timeline for preparation of the SIA? What methods are feasible to use within that timeframe? How large is the change being implemented? How many people and communities will likely be affected? And will any of the methods you are considering require a filing under the Paperwork Reduction Act (described below)?

1. The Paperwork Reduction Act (PRA) process

Before beginning any primary data collection, familiarize yourself with the Paperwork Reduction Act, or PRA (U.S. OPM 2011, Executive Summary), a federal law designed to:

- Minimize the paperwork burden on the public and other entities.
- Ensure the greatest possible public benefit from and maximize the utility of information created, collected, maintained, used, shared, and disseminated by or for the federal government.
- Improve the quality and use of federal information to strengthen decisionmaking, accountability, and openness in government and society.
- Minimize the cost to the federal government of creating, collecting, maintaining, using, disseminating, and disposing of information.

The PRA applies when a federal agency seeks to collect information using identical questions posed to 10 or more persons (or fewer if applicable to the entirety of an industry sector). Large-scale surveys, thus, always require PRA compliance. Focus groups for the purpose of beta testing a survey will require PRA compliance, but be included in the PRA package for the survey rather than require a separate PRA package. External companies or institutions with NOAA-funded contracts to conduct surveys on NOAA's behalf must also comply with the PRA, as must Council members and staff, who are considered to be federal employees for purposes of collecting information from the public, per the Headquarters Office of NOAA General Counsel.

Oral histories and semi-structured interviews do not utilize an identical set of questions, but instead a general set of topics, not all of which may be covered with any particular interviewee. Focus groups that are essentially group interviews focusing on general topics, as described for oral histories and semi-structured interviews, will not be subject to the PRA.

It is important to keep in mind that preparing a PRA package generally requires time and, once submitted to OMB, the clearance process will generally take from four months to up to a year for processing. The package may then be sent back with questions and need to be revised and resubmitted. All this must be taken into account in survey planning to ensure that the survey can be developed, approved, implemented, and analyzed in time for use in the SIA. This is why

surveys are recommended for implementation *outside* of the Fishery Management Council process. Find out who the PRA specialist for your region is -- they are invaluable sources of information and assistance when preparing a PRA request.

2. Literature review

Literature reviews can be one of the most useful sources of information for an SIA. The purpose of a literature review is to identify existing research and information about the chosen topic. In the case of an SIA, this refers to the fishery of interest, the regional fishing communities, and the proposed management alternatives. The literature can include articles in academic journals, NOAA Technical Memoranda and other reports, reports from the U.S. Fish & Wildlife Service or states in your region, and other “gray literature” such as previous EIS documents for the fishery in question. These can then be summarized and used in the SIA to complement and explain findings based on current fishery-specific and community-specific data. There are free literature search sources, such as Google Scholar, Researchgate.net and Academia.edu. NOAA also has access to certain databases, such as Wiley, JSTOR, and ScienceDirect, through an agency-wide agreement. Council staff and contractors may have access when using their @noaa.gov email. Contact your local NOAA Fisheries librarian for details. Other databases, such as AnthroSource, are dependent on membership in a professional society (here, the American Anthropological Association). You may also have access to other specific journals through a professional society membership, such as *Fish and Fisheries* through the American Fisheries Society or *Human Organization* through the Society for Applied Anthropology. Also see Bernard (2006, chapter 4).

For historical perspective on fisheries participation, look at available Community Profiles in your region, as well as the original and some more recent FMP documents in your region. Other gray literature may also be available in libraries, including the NOAA Fisheries Science Center libraries, or on your region’s NOAA Fisheries Science Center or Regional Office website. Reports will likely be available, for instance, on any social or economic surveys conducted in your region. Results may be published as journal articles, technical memoranda, and/or reference documents. Talk to your social scientist and economist colleagues.

3. General Secondary Data

Secondary data can include simple counts of landings and permits (including broken out by relevant permit categories) by community. Other potentially useful data includes census data, information on processors, and counts of bait and tackle shops (also see section V.b. of the main document). There are also various indicators and sets of indicators. These include the RQ and LQ, as well as the Fishing Engagement and Fishing Reliance, and Social Vulnerability and Gentrification Pressure Vulnerability indicators from the NOAA CSVIs (also see section V.c. of the main document and section 4 of this appendix).

To use most secondary data (except for the pre-calculated CSVIs), you will need to understand your region’s databases. For example, which variables are in landings, permit, dealer, or other quantitative databases? How do you find the look-up tables that list the possible

variables, e.g., what are the possible species codes for the variable that pulls species caught, and what species name is associated with each code? What are proper methods for linking these databases correctly? Learn your available databases well and you will be well poised to conduct or request whatever analyses are necessary. Seek help from your fellow social scientists.

Getting data may be your responsibility or your data may be pulled by a central group that works for the lab/office as a whole. This varies by region. If it is your responsibility, it will be important to learn the programming language(s) most commonly used to access the data. Some of the most common are SQL, SAS or SAS Access (which embeds SQL code within SAS) and, increasingly, R. If you are not already familiar with the language(s) in common use in your region, ask for training. And do not hesitate to ask your colleagues specific questions about how to pull a certain subset of data; they will be happy to share code with you. If it is pulled by a central group, you should still learn the data structure as described in the previous paragraph, in order to know what data to ask for. Again, turn to your social and economic colleagues for assistance.

Depending on your region, you may also want to begin collecting the year-by-year permit application forms from your regional office. These will list all the federal fisheries governed by FMPs and define the various categories under each. Since these can change over time, it's a handy way to keep a record of long-term changes in categories or category definitions. But be aware that changes may occur within a fishing year that are not reflected until the following permit year. Only the most recent management action for a given fishery will have the most up-to-date information. Each year the current year's application form will be available on the regional office website or from the appropriate regional office. Further, if you call that office, they may be able to supply you with at least a subset of previous years' forms. You will find that it is easy to sort by categories that existed within a given year, but more difficult to know what those categories meant. Having annual permit applications, with their concise descriptions of FMP-by-FMP categories, can be helpful. Contact the NMFS Regional Office and speak with the Permits office to learn how such data are handled in your region.

4. Community Social Vulnerability Indicators

NOAA Fisheries' social scientists developed the CSVIs in order to analyze objective well-being, including Social Vulnerability and Gentrification Pressure Vulnerability. They have been calculated for nearly 4,600 communities in coastal counties from 19 states in the U.S. East and Gulf Coast, and West Coast, as well as Alaska and Hawaii (Colburn and Jepson 2012, Himes-Cornell and Kasperski 2016, Jepson and Colburn 2013). They are also being adapted for U.S. Caribbean territories (pers. com. Michael Jepson) and draft FMPs including the CSVIs are available on the Caribbean Council website.⁴⁰ These indices were developed based on the work of Jacob et al. (2010, 2013a), who operationalized the concepts of social vulnerability and resilience in fishing dependent communities, and Cutter et al. (2009) who did the same for natural hazards. The CSVIs are the first such measures developed and operationalized at the community level for application to U.S. fisheries policy on a national scale. Given the MSA

⁴⁰ <https://www.fisheries.noaa.gov/action/caribbean-island-based-fishery-management-plans>

requirement to take into account place-based fishing communities, 12 indices were developed at the place level (Census Designated Place (CDP) and Minor Civil Division (MCD)), using 77 variables from seven secondary data sources including NMFS landings data, NMFS recreational effort data, and the U.S. Census' American Community Survey 5-year estimates.

A complete description of the CSVIs, the methodology used to create them, supporting information, and an exploratory map can be reviewed here:

<https://www.fisheries.noaa.gov/national/socioeconomics/social-indicators-fishing-communities-0>.

See also Jepson and Colburn (2013) and Colburn et al. (2017).

a. Fishing Engagement and Reliance

Commercial Fishing Engagement and Reliance indices can be calculated at the regional level using a common national procedure, and may be created based on the total aggregate of fish landed in each community or broken out by species/species groups. They are available on the [NOAA Fisheries social indicators website](#). Due to differences in the availability of data, recreational Fisheries Engagement and Reliance indices are calculated on a regional basis. To date, there are recreational fishing indices calculated for the Northeast, Southeast, and Gulf of Mexico communities, based on NOAA Fisheries' Marine Recreational Information Program (MRIP) site survey data (Jepson and Colburn 2013). The Alaska Region, the West Coast Region and the Pacific Islands Region rely upon data unique to each region to construct their recreational indices. Talk to your regional colleagues.

i. Fishing Engagement

The Fishing Engagement indices demonstrate the importance of fisheries to a given community relative to other coastal communities in a region. They include both commercial Fishing Engagement and recreational Fishing Engagement. (See Table C1 for commercial Fishing Engagement variables; recreational Fishing Engagement variables will vary by region. Speak to your social science colleagues for details for your region.)

ii. Fishing reliance

Fishing Reliance represents the per capita values of the variables included in the engagement indices. Including the per capita commercial and recreational Fishing Reliance indices allows smaller communities with small fishing fleets to still be represented as having a strong involvement in fishing if a large fraction of their population is involved in fishing. (See Table C1 for commercial Fishing Reliance variables; recreational Fishing Reliance variables will vary by region. Speak to your social science colleagues for details for your region.)

Table C1. Variables selected to construct the Commercial Fisheries Indices

Index	Variable
Commercial Fishing Engagement	Landed pounds and value Number of dealers with landings Number of commercial fishing permits
Commercial Fishing Reliance	Landed pounds and value per capita Number of dealers with landings per capita Number of commercial fishing permits per capita

b. Social Vulnerability and Gentrification Pressure Vulnerability

The current CSVI social indicators target Social Vulnerability (Jepson and Colburn 2013), including Gentrification Pressure Vulnerability (Colburn and Jepson 2012, Jepson and Colburn 2013). Additional social indicators are planned. While not a full measure of community well-being, they are focused on community-level characteristics theorized to influence, though not predict,⁴¹ objective well-being and are considered social-community attributes. Social Vulnerability and Gentrification Pressure Vulnerability represent social factors (see Table C2) that can shape either an individual's or a community's ability to adapt to change (Jacob et al. 2010, 2013b).

Be aware, however, that these may not be appropriate in areas with large numbers of very small and/or subsistence-based communities, e.g., in the Alaska and Western Pacific Regions. For example, most theorists agree that poverty is an indicator of social vulnerability and can be associated with decreased well-being (e.g., Morrow 1999, Cutter et al. 2003, Lee 2014). Poverty is commonly measured based on whether household income is below a specific threshold (set in the U.S. by the Census Bureau). However, individuals engaged in a subsistence way of life may not require cash to meet their basic needs in the same way as individuals fully integrated into a market economy, and income statistics may not prove as reliable an indicator of their material well-being (Robards and Alessa 2004). Nonetheless, subsequent groundtruthing by Lavoie et al. (2018) found that qualitative rankings of vulnerability completely or moderately agreed with quantitative indicator rankings 73.8% of the time “and the results indicate that most of the indices are representative of community vulnerability.”

In Alaska, a subsistence indicator is also calculated based on surveys conducted by the Alaska Department of Fish and Game (Himes-Cornell and Kasperski 2016, Lavoie et al. 2018). There are specific limitations to the Alaska subsistence indicator due to very infrequent collection

⁴¹ Indicators of objective well-being (OWB) are a promising tool to aid in planning processes as well as SIA and other forms of regulatory review. However, many studies have demonstrated that OWB measures do not necessarily accurately predict individual-level subjective well-being (Diener and Suh 2000, Inglehart and Klingemann 2000, Marshall and Marshall 2007). Because the CSVIs do not incorporate measures of individual-level subjective well-being, or the relational context in which notions of the “good life” are given meaning, we must emphasize that they do not stand alone as a comprehensive measure of well-being. See Smith and Clay (2010) for more on objective vs. subjective well-being.

of subsistence data by the state, along with not all communities being surveyed in any given year (see Donkersloot et al. (2020a) and endnote 1 of Himes-Cornell and Kasperski (2016) for details).

i. Social Vulnerability

Social Vulnerability Indicators (Table C2) characterize factors that over time may indicate a threat to community resilience. It includes indices of Personal Disruption, Population Composition, Poverty, Labor Force, and Housing Characteristics.

ii. Gentrification pressure vulnerability

The Gentrification Pressure Vulnerability Indicators (Table C2) characterize factors that over time may indicate a threat to the viability of a vibrant commercial working waterfront, as non-fishing related businesses compete with the fishing industry for waterfront locations and fishing community populations grow with the influx of new residents often from outside the area. It is comprised of indices of Retiree Migration, Urban Sprawl, and Housing Disruption. The Retiree Migration Index and Urban Sprawl Index were not calculated for Alaska communities due to the lack of regional relevance.

Table C2. Variables selected to construct the social vulnerability and gentrification pressure indices

Index	Variable
Social Vulnerability	
Personal Disruption	Percent unemployed Percent with no diploma Percent in poverty Percent females separated
Population Composition	Percent white alone Percent female single headed households Percent population age 0-5 Percent that speak English less than well
Poverty	Percent receiving assistance Percent of families below poverty level Percent over 65 in poverty Percent under 18 in poverty

Labor Force Structure	Percent females employed Percent population in the labor force Percent of class of worker self employed Percent population receiving social security
Housing Characteristics	Median rent in dollars Median mortgage in dollars Median number of rooms Percent mobile homes
Gentrification Pressure Vulnerability	
Housing Disruption	Percent change in mortgage Percent change in home values Percent of owners monthly costs 35% of income
Urban Sprawl	Population Density Nearest city w/50k population in miles Cost of living index Median home value
Retiree Migration	Households with one or more over 65 Percent population receiving social security Percent receiving retirement income Percent in labor force

c. Climate vulnerability

The CSVI climate vulnerability indicators characterize environmental conditions that may affect the sustainability of essential commercial and recreational fishing businesses and infrastructure. The Sea Level Rise Risk Index is available for all states except Alaska and was computed using the NOAA Office of Coastal Management coastal land area data at elevations from one to six feet above the mean higher high water mark (Colburn et al. 2016). A Storm Surge Risk Index is available for the Eastern and Gulf Coasts and was calculated using the Sea Lake and Overland Surges from Hurricanes (SLOSH) display program data from the National Hurricane Center and digital elevation data from the United States Geological Survey. Both indicators were developed using the same methodology as Jepson and Colburn (2013) and Jacob et al. (2010, 2013b) and are available on the CSVI website⁴². Additional climate vulnerability indicators may be available at the regional level. For example, there are Alaska-specific indicators for Sea Ice Coverage,

⁴² <https://www.fisheries.noaa.gov/national/socioeconomics/social-indicators-fishing-communities-0>

Erosion Risk, Permafrost Coverage, and Proximity to Transition Zones (Himes-Cornell and Kasperski 2015).

5. Semi-structured interviews and Oral Histories

In conducting research for an SIA, the semi-structured interview⁴³ is usually the most immediately useful for information on day-to-day fishing practices, views, and understanding of management measures, and likely responses to different management measures (see Colburn and Clay 2011⁴⁴). For an SIA, it is a meeting in which the interviewer can target issues around the fishery and management measure, but does not strictly follow a formalized list of questions. Instead, they will ask more open-ended questions, allowing for a discussion with the interviewee rather than a straightforward question and answer format. For an SIA, oral histories are especially helpful for information on cultural values, social structure, TEK, LEK,⁴⁵ and changes over time. They similarly use open-ended questions, but would be focused more broadly on the interviewee's long-term involvement with fishing, their experiences, the knowledge that was passed down to them from relatives or captains they worked with when they were young, and the knowledge they have acquired from experience. Oral histories can fill in gaps in the historical record, especially for marginalized groups.

In either case, you should prepare an interview guide in advance by choosing a set of general topics that you are looking for information on. Remember that if you will be speaking with 10 or more people you cannot ask the same set of identical questions of all of them (per PRA rules, in section 1 of this Appendix, above). This is why general themes or topics are usually best, e.g., addressed through open-ended questions that allow the interviewee to respond with what they consider to be important on the topic, e.g., "Tell me about fishing for x species", or "Talk to me about your history in fishing" or "thoughts on regulations" or "challenges in fishing today," rather than closed ended questions that provide the interviewee with a limited set of explicit options for answers (e.g., yes/no, multiple choice or drop down, checkboxes, and ranking questions).

For a semi-structured interview focused on a specific regulation or set of regulations, the number of individuals you will want to interview depends on the complexity and importance of the regulation in question. This will relate to the scale of the potential impact and how many stakeholders might be impacted, though Creswell and Poth (2016) suggest a range of 20-30 people to be adequate. Patton (1990) suggests stopping when the interviewer and the note taker/person handling the recording equipment agree that thematic saturation, the point at which no new concepts emerge from subsequent interviews, has been reached. For Patton this occurred at 20 interviews. The approach for semi-structured interviews is to talk to people with different points of view on a specific topic. Depending on the regulatory action, you may want to talk to commercial fishermen/industry representatives, recreational fishermen, shore support

⁴³ What we describe here as a semi-structured interview actually falls somewhere between Bernard's (2006:210-212) definitions of unstructured versus semi-structured interviews. However, conducted as we describe, these interviews are not subject to the PRA.

⁴⁴ This uses the term oral histories for what were actually semi-structured interviews.

⁴⁵ Note that TEK is associated with indigenous peoples, as distinguished from LEK held by long-time residents in an area, or long-term participants in an activity or industry (NMFS/NOS 2019).

businesses, etc. For each stakeholder type you want to talk to people within that sector who might have different points of view. This is a time to draw upon key informants and snowball sampling to help you identify people to interview.

A semi-structured interview, because you are simply probing for information on likely impacts of a regulation, may well be shorter than an oral history to conduct and analyze. For an oral history, you will be looking for more in-depth information and planning for the possibility of new and unexpected insights or LEK; this may take an hour or more. You will therefore want to allow the interview to flow more naturally, with you gently guiding but not constantly forcing back to the topics you want to cover. Interesting and useful information that you hadn't thought to look for may emerge in such a less directed conversation. If you are not experienced with interviewing, see Bernard (2006, Chapter 9) and ask your experienced colleagues for coaching. Or, they may be able to do the first few interviews with you to help you learn by example. [Voices](#) offers workshops, support and guidance. The site also has an excellent downloadable [guide](#) to doing oral history. Remember this for oral histories: "The rule is: Get people onto a topic of interest and get out of the way. Let the informant provide information that he or she thinks is important" (Bernard 2006:216).

For an oral history or a semi-structured interview, you should plan, if at all possible, for in-person interviews. In-person interviews are objectively preferable because you have the added information available through facial expressions and body language. In addition, you develop trust and rapport when you can make eye contact with the narrator and respond physically (but silently) to their statements - smiles, silent laughter, nodding your head, eye contact, etc. Also, the audio is a better-quality recording. When in-person is not feasible, try to arrange a video call. There are multiple platforms that can be used. There are tools for recording remote interviews if that is your only option (e.g., Zencaster™, Report I™).

But in-person is not always possible or the best use of your time. Short interviews to quickly gather specific factual information or a brief take on a specific topic may be better conducted by phone or video call, especially if the respondents you are looking to interview are located over a broad geographic area. These interviews may or may not be recorded. But if they are not recorded you need to take extensive and detailed notes, including flagging key phrases in the interviewee's own words. Your initial notes, taken during the interview, can then be fleshed out immediately afterward while the interview is fresh in your mind. As with all things, your ability to remember details from shorthand notes will improve over time. General themes will emerge simply from reading through these compiled interview notes. That is often enough for the SIA.

a. Choosing the interviewees

To find the appropriate interviewees, first list out the key types of people you need to interview based on likely impacted groups, given the regulation and any draft economic analyses available early in the process. The sample size should be based on both the range of stakeholder types, number of participants within each group, and similarities and differences within and across these groups. You want to capture convergent and divergent perspectives on a central theme. For example, you determine that the potentially impacted stakeholders are commercial and recreational fishermen, and shore support businesses (e.g., net makers, ice

houses, bait and tackle stores). For each stakeholder type you want to talk to people that represent a range of perspectives until you achieve thematic saturation, i.e, when no new concepts emerge from further interviews. See Vasileiou et al. (2018) and Hagaman and Wutich (2017) for examples of how to determine sample size.

Next, ask NMFS port agents (Regional Office staff), other social scientists and economists in your group, social scientists at your regional Fisheries Management Council, or at your regional Sea Grant office for suggestions – and contact information. You may also find initial contacts through Council members and by attending Council meetings. Another source may be fishing associations in your region whose members would be affected by the regulation in question. Then, when speaking with those contacts, ask at the end of the interview for suggestions of other groups and/or individuals that you should talk to; this is snowball (Bernard 2006:193) or purposive (Bernard 2006:194) sampling, and is useful for hard-to-find populations, including those for whom there is no good sample frame.

b. Conducting the interviews

Short semi-structured interviews for basic background information do not necessarily require recording. Simple handwritten or typed notes may be sufficient. This is true whether or not you include their name. Your initial notes, taken during the interview, can then be fleshed out immediately afterward. General themes will emerge simply from reading through these compiled interview notes. That is often enough for the SIA. If you (either during the conversation or later) decide you would like to use a quote from an interviewee, you must have their permission in writing. An email will suffice.

Oral history interviews (whether in-person or by phone) must be recorded. A standard release form should be handed out or emailed in advance.⁴⁶ This will give the interviewee the option to approve: 1) recording the interview as audio and/or video and/or 2) uploading the interview to Voices, the NMFS oral history site as an audio/video file, and/or a written transcript. It will also specify that these formats can be downloaded and used by researchers. Before you sit down for an interview, the interviewee should understand the purpose, scope, and possible outlets for the recording. At the interview, before you record, you can introduce the release. Then sign it after the interview as a good-faith measure. It should offer multiple use options, such as that transcript and recording may be uploaded to Voices, only transcript may be uploaded, and/or NMFS researchers may keep a non-public file and use the data contained in it for summary statistics only. For assistance in choosing an appropriate release form that will grant permission for public uses of the interview, contact the person listed on the Voices “About Us” page. If permission to record is not given, let them know the interview will not be uploaded to Voices and then take as detailed notes as possible. It is also critical to quickly state, at the beginning of the interview: “This is an interview with [interviewee]. The interview is taking place on [date] in [location]. The interviewer is [interviewer name].” These metadata are essential for the interview to be of use to you and other researchers. You may want to add one or two additional top level questions, such as “what is your primary fishery?” or “how old are you, if I may ask?”

⁴⁶ One option for a standard form can be found here: <https://voices.nmfs.noaa.gov/how-to-contribute>.

In terms of the heart of the interview, you will likely be planning to ask thematic questions aimed at soliciting facts: who, where, what, when, and how. You can list the regulatory changes and ask what they expect would be the impact of these measures, and then ask a few key follow-up questions regarding specifics of the proposed regulatory changes, as needed. But also think about asking “why” as a follow-up question, as it may uncover social or cultural values that impact behavior in ways that might not seem obvious (see Rossiter and Stead 2003, Hall-Arber et al. 2009, Urquhart et al. 2013).

Finally, it can be useful to interview in pairs. This allows one person to concentrate on the interview, while the other is in charge of setting up and dealing with the recording machinery or taking backup notes.

c. Transcribing and analyzing the interviews

If you have recordings, you will need to transcribe your interviews – either yourself or by hiring someone with appropriate expertise (e.g., a professional transcription service). The transcription should not include verbal tic - ums, ers, mm-hmm, etc. It makes the transcript harder to read and understand for researchers and, in any case, interviewees often request they be removed. Non-standard pronunciations should also be corrected, e.g. “fishin” for “fishing,” as these make searching the transcript more difficult. If these linguistic aspects are important for a researcher, they can listen to the recording; but, for the transcript to be easily read and searched, it should be standardized. Additionally, interviewees must be allowed to review their transcript before granting final approval. They may find they said something that, in retrospect, they do not wish to be made public.

You should also include periodic time codes (“minutes:seconds” elapsed since the start of the recording) at natural breaks to help readers/listeners. If you are transcribing yourself, you may want to use transcription software such as Trint, Temi, or others. Research the current available software packages, and also consult your colleagues to see if they are using something that your group already has a license for. You will also want to prepare a preliminary list of topics you want to code for. Once you have all the transcriptions, read through them to get a general feel for the common and important content or themes to see if there are additional codes you want to include. If your transcriptions were done by someone else, this step can also allow you to correct for things like spelling errors of fish names or other common misspellings that would have been introduced by the transcriber. If the transcriber is not familiar with common fisheries acronyms, fish names, etc., such errors can be minimized by providing them a reference list. If you are planning to upload these oral histories or semi-structured interviews to the Voices website, consult the website for materials related to formatting.

Depending on how many interviews you are dealing with, it may be enough to mark up these Word documents and create a matrix in Excel for tracking themes by characteristics such as age, sex or gender, town, and fishery. If you have more than 10-12 interviews, or a large number of codes per interview, you will probably want to analyze the transcripts using a text analysis software package. These programs have procedures for assigning characteristics such as those described above, and lists of these characteristics are generally downloadable. There are many different such software packages available, including MaxQDA™, NVivo™, and Atlas-ti™. Ask your colleagues what they are using, as it will be simpler to work with a package that

others already know and can guide you on. If you already have a particular package you are familiar with and your office is amenable to buying a license for that, it may be simplest to continue working with what you already know. If neither of these is the case, do some research to find out what is currently the most recommended software package that fits your needs. Many software packages allow for various types of analysis to help understand connections between codes or categories of interviewees. Explore these to help you understand the interview data.

6. Focus Groups

As described above in section 1 of this appendix on the PRA, focus groups for the purposes of beta testing a survey fall under the PRA and will need to be part of the PRA package for the survey. Beta testing is a method used in the preliminary stages of survey development to refine answer categories for multiple-choice questions and to narrow questions to those most effective in soliciting the information you are looking for (Bernard 2006). Focus groups are one way to conduct beta-testing (more on beta testing in section 7, below).

Other focus groups that involve a facilitated discussion (facilitated by you, a colleague, or a professional) around a set of topics or themes do not fall under the PRA (See section 1 of this Appendix, above). These groups are typically between 6 and 12 people. Usually, a set of 3-5 focus groups is held on different dates and in different locations, to allow attendance by geographically dispersed members of the target interview group. Focus groups as a stand-alone method provide valuable insight into understanding the impacts of fisheries management measures through the collection of qualitative data from fishery stakeholders (Lew and Himes-Cornell 2011).

In terms of practicalities, you may take care of all focus group arrangements yourself or you may choose to hire a professional focus group business. There are companies that specialize in setting up focus groups and can handle many of the pre-focus group activities, as well as provide recordings and/or transcripts that facilitate your analysis. If you decide to use a focus group company, ask your colleagues for recommendations. The Division of Economic and Social Analysis within the NMFS Headquarters Office of Science and Technology may also have suggestions.

a. Choosing focus group locations and dates

In order maximize attendance by the full range of the target population, you should choose a set of key ports based on your initial analysis of place-based communities, fleet-based groups, and social groups. You will also want to identify a range of dates that both fit your research schedule and are easiest for fishermen. Many elements play into both these factors. Your ability to travel during certain periods may be constrained by budget deadlines or other administrative issues; most commonly, lack of a clear agency budget may mean funds for travel – even local travel (within 50 miles of your home office), are not available until the end of the fiscal year, leaving your travel period heavily constrained. Work- and weather-related issues are the most common constraints for fishermen and other industry members. For instance, some fisheries in the Northeast are slow in the winter, so fishermen may have more time or flexibility of schedule

to attend a meeting then. Yet on the West coast there is an active winter crab fishery that may make this a bad time for meetings. Further, if snowstorms or hurricanes are common in your region during certain periods, those may not be ideal for those who may have to travel an hour or more to reach the closest focus group. There will be judgement calls involved. Speak with colleagues or local fishermen about best times for meetings in your region. Council staff may be especially knowledgeable, as they need to schedule a lot of meetings. You, or your focus group company, will then need to secure locations for holding the focus groups and make all necessary arrangements. Some useful resources for planning, conducting, and analyzing focus groups can be found in Bernard (2006:232-239), Morgan and Scannell (1998), and Chapter 5 of Fowler (1995).

b. Choosing your sample population

Begin with the communities you have chosen to focus on in the SIA. Then locate contact information for a matrix of individuals covering the key fleet-based groups and social groups. Home address of the permit holder is usually associated with permits, as is permit number (which should allow connection of permit data to landings data). You may or may not have phone numbers. You or your focus group company will then need to begin mailing invitations (which you need to create) that include the list of focus groups, their dates, and locations. Fishermen should be asked to identify first and second choices for which focus group to attend. That allows some flexibility in case of too few people choosing one location or too many another.

c. Setting up the focus groups

For focus groups that do not fall under the PRA, remember that the most common size for a focus group (except for those using the Q-methodology described below) is 6-12 individuals. You will want to invite more than your preferred number, as there will inevitably be some fishermen who need to cancel at the last minute. There is a significant amount of planning that goes into inviting the participants and finding and setting up facilities and materials for the focus group. Be aware that per Department of Commerce General Counsel guidance: "As a general rule, an agency may not expend appropriated funds to provide food to Government employees or other individuals as it is considered an expense personal to the individual." If you wish to provide food or drink during the focus groups, talk with your colleagues about the best way to handle this. If using a focus group company: 1) you send them a list of ports where you want to conduct the focus groups and the matrix that constitutes the sample frame and 2) they arrange details of specific sites, including recording equipment, and send invitations and track RSVPs.

d. Conducting the focus groups

A focus group is essentially a group discussion around a set of topics or themes, where you encourage the participants to discuss topics with each other, not just you, while you occasionally interject to keep the discussion flowing without stalling on one topic for too long

(see Bernard 2006:232-239, Morgan and Scannell 1998, and Chapter 5 of Fowler 1995). You do not need professional facilitator training to run a focus group, but you should at least have experience in semi-structured interviews or oral histories. Ask leading questions, for example: How do you decide where to fish? What are current issues affecting your ability to earn a living in fishing, whether related to regulations or other areas? When do you think gear regulations/closures/etc. work well/don't work well?

Apart from the basic focus group described above, there are two specific research techniques that can be used in a focus group setting that may be useful in the exploration and comparison of the impacts of fisheries management measures (or other topics): the Delphi technique and Q-methodology. Both methods generally require specialized training in interview facilitation techniques. It is unlikely you will have time to use these for an SIA, but if your position allows for longer term data gathering, these could be used in addition to or instead of surveys.

The Delphi technique is used to systematically develop a consensus of expert opinion. The Delphi Method (when used in face-to-face settings technically called a mini-Delphi or Estimate-Talk-Estimate) involves experts on a topic either (1) conducting multiple rounds of pile sorts, (2) answering multiple rounds of short questionnaires⁴⁷, or (3) participating in multiple rounds of semi-structured interviews. In all cases, the focus group leader summarizes the overall results for the group in-between rounds. This allows each expert to revise their responses based on the feedback about the group responses. In this way, the group usually moves toward a consensus that can be used by the researchers in making assessments about the topic (e.g., proposed regulations or LEK) that was the focus of the process. You need a representative set of experts; the size and complexity of the fishery will determine how many individuals this is. Examples of using the Delphi technique in fisheries can be found in Lin et al. (2014), Moutopoulos et al. (2017), Leite and Gasalla (2013), and de Groot et al. (2014). Training in the Delphi technique is desirable before implementing it.

Q-methodology combines the benefits of both qualitative and quantitative research for the trained researcher. Group interviews or focus groups can use this methodology to investigate the in-depth perspectives of stakeholders. Interview participants are requested to systematically rank amenity values to be explored (e.g., characteristics of management measures or of fish species) and indicate the outcomes or states that they most prefer. This method assesses patterns of attitudes and shared perceptions and produces 'typical' sets of views by averaging out different individuals' views. It begins with researchers searching out strong and differing views on the topic of interest. For a fisheries regulatory action, the hearings held for the scoping process are a rich source of data on perceptions and beliefs, or what in Q-methodology are called "subjectivities." The range of opinions is represented by a set of statements that cover the range of common views on the subject. Individual participants (selected for their strong and differing views on the topic of interest) are asked to pile sort these onto a basically parabola-shaped grid, with statements they strongly agree with to one side, those they strongly disagree with to the other side, and those they are indifferent to or ambivalent about in the center. You need a representative set of the full range of opinions on the topic; the size of the fishery and complexity of views on your topic (here, likely a regulation) will determine how many individuals

⁴⁷ To avoid PRA requirements, we recommend that you do not use the questionnaires option.

this is. However, 30-40 participants is a common number. After the pile sorts, researchers conduct a semi-structured interview with each participant to better understand why they have sorted as they have. Then the results of the sorts (as clarified through the semi-structured interviews) are run through a factor analysis to find similarities and differences and allow researchers to group the various views into a smaller number of meaningful bins. For a short description of the Q-methodology and how to use it, see DEFRA (2007:61) and Ozdemiroglu et al. (2006:27-28). See also a short video at: <https://qmethod.org/resources/how2q/>. Examples of the use of Q-methodology in fisheries include MacDonald et al. (2015), Albizua and Zografos (2014), and Wainger et al. (2017).

e. Analyzing the focus group data

For general discussion, focus group transcripts can be analyzed in the same way as semi-structured interview transcripts (described above), either simply as Word documents or with qualitative data analysis software. For Delphi and Q Methodology, see discussion and references above, under 4.d., Conducting the focus groups.

7. Surveys

In general, there are five main stages to a survey research project: (1) initial planning and project set-up, (2) survey development and testing, (3) testing survey protocols and making final approvals, (4) full survey implementation, and (5) post-implementation activities. With specific application to surveys conducted for U.S. fisheries, Lew and Himes-Cornell (2011) provide general protocols and best practices for each of these stages. This Handbook describes some of the key considerations.

We especially note the issue of final approvals (part of stage (3) in the previous paragraph). This refers to required actions under the PRA. A package of information specific to the PRA (the PRA package) must be submitted to the federal Office of Management and Budget (OMB) for approval prior to conducting the survey. Sometimes your PRA package may be sent back for revisions before approval is granted. See section 1 of this Appendix for more detail.

a. Creating the survey

In order to develop a survey of fisheries stakeholders, there are a number of things to keep in mind. First of all, an important consideration in survey research is the length of time it takes to develop and test a survey instrument and obtain any necessary approvals. Further, a survey aimed at fisheries stakeholders should be developed with the buy-in of key members of the target population and fisheries management agencies (NMFS, the Council, tribes and other indigenous groups, perhaps state fisheries management agencies or regional Marine Fisheries Commissions) to minimize both duplication and implementation challenges (Lew and Himes-Cornell 2011). Depending on your relationship with the fishery participants and their views on the management measure of interest, it may be quick to get their buy in or it may take a lot of time to gain their trust and convince them that it is worthwhile to participate in the survey.

Surveys should generally have modules that are cohesive and attempt to gather specific data to answer particular research questions. A key problem here to be aware of is that surveys often become too long when there are too many research questions being addressed and too many modules included as a result. It is best to keep the survey as focused as possible on a few key research questions and tailor the modules to those. Of course, include all the usual suspects (demographics, etc.). Finally, there are a number of different types of surveys one might consider depending upon what research question is being asked. Replicating a cross-sectional or intercept survey over time is one way to gather data using new modules, while keeping a few core modules.

b. Beta testing

Before finalizing the survey, it must be beta tested. This process can help to refine answer categories for multiple-choice questions and to narrow questions to those most effective in soliciting the information you are looking for. One way to do this is by surveying 9 or fewer people with one survey instrument or dividing the questions into more than one instrument and testing each of these with 9 or fewer people. Each version can include a small number of identifying or sorting questions, in addition to the actual survey questions themselves. Another is by holding a focus group of no more than 9 people or two focus groups of fewer than 9 people total (e.g., one of 4 people and one of 5).

c. Choosing a sampling strategy

Two basic sampling strategies are appropriate for large-scale surveys: random sampling, and intercept sampling. Random sampling is the gold standard, but requires a known sample frame: a list of permit holders, for example. However, for some populations such as fishing vessel crew in most U.S. regions, there is no sample frame. Even in Alaska, where there are state crew licenses to create a frame, NMFS does not have access to contact information for those crew. In addition, for some tribal and other indigenous groups, fishing permits are not required. In these cases, intercept sampling may be the only option. An intercept survey can be conducted at docks, marinas and other locations where fishermen tend to congregate. All available fishermen found in places where fishermen congregate can be approached, at random times and locations within ports systematically selected using multivariate criteria, e.g., taking the total number of vessel owners in a fishery that landed fish in each port in the previous year and multiplying that by an average number of crew per vessel (as estimated by NMFS or other experts). From this an estimated sample frame can be created and a target sample size assigned. Pollnac and Poggie (1978:365) found this an effective method for achieving a high respondent participation rate, and a sample obtained in this manner can be conceptualized as a sample from the universe of all hypothetically possible data sets collected under the same conditions (see also Chein 1976, Thomas 1976, Freund 1960). Vessel owners and permit holders can also be asked for lists of employees and/or permission to contact their employees. In general, when approaching crew at their vessel, it is customary to seek approval from

captains, if they are available, to speak to their crew. When appropriate, appointments can be made at a time and location of the interviewee's choosing.

d. Choosing a survey method

There are many options when choosing a survey method. Some of the primary methods are: in-person, phone, mail, internet, or some combination of these. Bernard (2006, Chapter 10) provides an extensive description of various survey methods and the advantages and disadvantages of each. Dillman et al. (2009, 2011, 2014) provide excellent advice as well, especially on how to conduct multi-method surveys.

e. Analysis of survey data

Analysis of survey data will require familiarity with more than simple descriptive statistics. For those not familiar with statistical analysis, it will be important to connect with colleagues, including statisticians and/or economists, to make a plan for analysis. It is necessary to report the overall survey response rate and describe the potential for any bias in the results from non-response. And regardless of how the data are analyzed, it will be necessary to assess the accuracy and validity of the responses. To do this, one key procedure is to analyze the pool of respondents. Some things to consider are (1) the evenness of coverage of the target population; (2) the suitability of the sampling strategy in the light of field experience and findings, sophistication, and uniformity of response elicitation and accuracy of recording survey responses; (3) the efficacy of measures to prevent, compensate for, and understand non-response to the survey overall or individual questions; and (4) the quality of data entry, cleaning, and metadata recording. In some cases, it may be necessary to weight the survey responses in order to correct for potential biases in the sample population that filled out the survey as compared with the whole population. See Colburn et al. (2015:9-13) for an example of a Research Methods section for a survey report.

At the most basic level, survey question responses should be presented with summary statistics and variance (e.g., standard error and confidence intervals). Additional analysis will have to be tailored to the type of questions the survey asks. Three common types of questions are multiple choice, open-ended, and Likert scale. With multiple choice questions, data can be explored and reported in one-way tables (simple tables providing frequency counts of responses) and cross tabulations (one table per question with the first column as respondent categories and the column headers as the possible answers). For purely qualitative survey responses, such as those collected in open-ended questions, it is possible to convert the answers into quantitative data by grouping responses into nominal, mutually exclusive codes and then analyzing the frequency of use of those codes. The frequency of these codes in the responses can be reported in the same types of tables described above for multiple choice questions. For the more statistically inclined, the responses can be used to create more complex statistical models. For Likert scale data, responses can be reported in percentage terms of which responses were chosen most frequently.

There are many resources available that present general best practices for (1) analyzing survey responses, (2) maximizing item and unit response, (3) minimizing biases, and (4) generally producing surveys that will yield high quality information. For more details on conducting surveys and analyzing data from them, the following resources may be useful: Lew and Himes-Cornell (2011), Dillman et al. (2009, 2014), Rea and Parker (2005), Groves et al. (2011), URSSC (2001), and Lew et al. (2015).