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September 2, 2015

Ms. Dorothy M. Lowman, Chair  
Pacific Fishery Management Council  
7700 NE Ambassador Place, #101  
Portland, OR 97220

**RE: Agenda Item H.8: Amendment to Modify Groundfish Essential Fish Habitat and to Adjust Rockfish Conservation Areas**

Dear Chair Lowman and Council Members:

Ocean Conservancy<sup>1</sup> appreciates the Pacific Fishery Management Council's (Council's) continuing work on modifications to Pacific Coast Groundfish Essential Fish Habitat (EFH) conservation and management measures to aid the recovery and sustainability of the west coast groundfish fishery. The Council in April 2015 determined a scope of action and management measures to implement via FMP and/or regulatory amendments. These options offer the opportunity both to improve groundfish habitat protections and to enhance fishing opportunities. We now urge the Council to identify sub-alternatives for further analysis and consideration consistent with our recommendations below. In summary, we recommend the Council:

- Include, for further analysis and consideration, an alternative consistent with the proposal submitted by Ocean Conservancy (OC), Oceana and Natural Resources Defense Council (NRDC) in July 2013 focused on EFH Conservation areas that are closed to non-tribal bottom trawling along with deepwater habitat protections, with exceptions that are described below.
- Include, for further analysis and consideration, an alternative representing the work of the Collaborative EFH Working Group as appropriate based on this group's progress.
- Provide guidance supporting Groundfish EFH measures that result in no net loss of functional habitat protections across substrate and habitat types, including biogenic benthic habitats, in the context of EFH and Trawl Rockfish Conservation Area (RCA) reconfigurations shoreward of the 700 fathom curve.

Detailed recommendations can be found below.

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<sup>1</sup> Ocean Conservancy is a non-profit organization that educates and empowers citizens to take action on behalf of the ocean. From the Arctic to the Gulf of Mexico to the halls of Congress, Ocean Conservancy brings people together to find solutions for our water planet. Informed by science, our work guides policy and engages people in protecting the ocean and its wildlife for future generations.

**I. Include in the alternatives the non-tribal bottom trawling and deepwater habitat protections proposal submitted by Oceana/OC/NRDC , with certain modifications described below**

The [Coastwide Conservation Proposal](#) offered by Ocean Conservancy, Oceana, and Natural Resources Defense Council was developed with intensive outreach and important input by stakeholder bodies such as the Council’s EFH Review Committee. The proposal received high scores in the EFH Review Committee’s ranking process and the recent NMFS preliminary analysis<sup>2</sup> in both habitat protection value and in minimizing trawl effort displacement. We believe the proposal falls clearly within the range of reasonable alternatives that foster informed decision-making and informed public participation.

Based on agency and stakeholder input received since the July 2013, we ask for Council consideration of each area and boundary in the proposal with the following minor exceptions: Remove proposed closure areas 4, 21 and 59 based on stakeholder input; remove re-opening areas 43, 44 and 76 due to jurisdiction and/or agency issues. Also, as the Council may know, the proposal’s midwater trawl regulation will be considered outside the scope of the EFH action and thus would not be part of the Council’s range of alternatives.

Ocean Conservancy appreciates the Council’s inclusion of the proposal’s bottom trawl closure for waters beyond 3,500 meters in depth in the EFH action’s scope, and we request that an explicit alternative for this closure be described and included within the range of alternatives. This alternative should benefit from the productive recent conversations relative to the legal authorities available to the Council for this type of closure including implementation through non-EFH MSA discretionary authority.<sup>3</sup> Protection of the vast and poorly-studied deepwater seafloor provides great value to conservation and management of ocean ecosystems.

**II. Include area recommendations for EFH and RCA reconfigurations submitted by the Collaborative EFH Working Group**

Ocean Conservancy supports the effort to contribute to the Council’s alternatives consideration process by the industry/non-governmental organization EFH collaborative group. The framework for alternatives assessment provided by the project team appears to provide space for a proposal emerging from this stakeholder-driven effort.

**III. Provide guidance supporting a goal of no net loss in effective habitat protection shoreward of 700 fathoms in reconfiguring EFH and RCA areas, and prioritizing**

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<sup>2</sup> NMFS Response to Council’s Questions concerning the Effectiveness, Accuracy, and Completeness of Pacific Coast Groundfish EFH. Supplemental Informational Report 7. PFMC September 2014 Meeting. [http://www.pcouncil.org/wp-content/uploads/IR7\\_Sup\\_NMFS\\_EFH\\_EvalRpt\\_Sept2014BB.pdf](http://www.pcouncil.org/wp-content/uploads/IR7_Sup_NMFS_EFH_EvalRpt_Sept2014BB.pdf)

<sup>3</sup> 16 U.S.C. § 1853(b)(2).

**alternatives that include the full range of habitats across the biogeographic, depth and substrate type range**

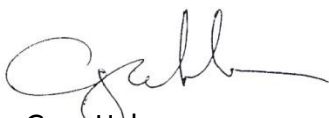
Within the existing footprint of groundfish trawl effort, a great variety of proposals and configurations are available for Council consideration. The EFH project team has provided a framework for the September meeting which brings necessary coherence to the process of crafting a range of alternatives. However, we recommend the Council provide guidance to the project team regarding how to handle two closely linked sets of measures with important ramifications for habitat under consideration in the Groundfish EFH action. Ocean Conservancy recommends that such guidance support an overall outcome that does not roll back levels of effective habitat protection within the current trawl footprint based on the balance of new habitat protection areas against re-openings of RCA areas.

We also urge Council guidance that prioritizes alternatives for habitat protection that include EFH conservation areas protecting habitats across the full range of substrate types, biogeographic and depth zones. Alternatives that include this range will best protect the diversity of groundfish and other habitat, including those with as-yet unknown value to natural and fishing communities. Further, representation of the full range of geographic and depth zones may play an even greater role in enhancing resiliency in the face of changing climate and oceanographic conditions.

Finally, we recommend the Council provide guidance prioritizing alternatives in two additional areas: (1) currently unfished and thus less impacted habitats within the current groundfish trawl footprint (shoreward of 700 fm), and (2) structure-forming invertebrates such as corals and sponges. Areas within the footprint which have not received recent trawl effort—such as in wide areas offshore southern California—can provide the EFH process with exceptional “bang for the buck” protections as well as contribute to ecosystem resiliency. Coral and sponge communities play important roles in marine biodiversity and productivity that are only beginning to be discovered. Setting aside significant areas known or suspected of supporting these habitat forming marine animals is a critical part of a precautionary Groundfish Essential Fish Habitat conservation program.

We appreciate the work of the Council, project team and advisory bodies in developing the Groundfish EFH update and look forward to a program that expands science-based habitat conservation and enhances opportunities for sustainable groundfish fisheries. Thank you for your work on this important effort.

Sincerely,



Greg Helms  
Manager, Pacific Fish Conservation Program



Ivy Fredrickson  
Staff Attorney, Conservation Programs



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September 2, 2015

Dorothy Lowman, Chair  
Pacific Fishery Management Council  
7700 N.E. Ambassador Place, Suite 101  
Portland, OR 97220-1384

**RE: Agenda Item H.8 (Amendment to Modify Groundfish Essential Fish Habitat and to Adjust Rockfish Conservation Areas)**

Dear Chair Lowman and Members of the Council:

The Pew Charitable Trusts has collected 11,832 comments urging the Council to move habitat protection forward and seek a broad set of solutions for fishing communities and a healthy ocean.

Please include the attached petition as an electronic submission on the web site for the Council's supplemental briefing book. The petition itself is included here, along with the names, cities and states of individual signers that were gathered as of September 1, 2015. The Council may continue to receive additional comments in the days ahead.

Thank you very much.

Sincerely,

Tom Rudolph  
Officer, U.S. Oceans, Pacific  
The Pew Charitable Trusts  
[trudolph@pewtrusts.org](mailto:trudolph@pewtrusts.org)

Dear Chair Lowman and Council Members,

Thank you for your past work to protect ocean habitat. As you consider revisions to the groundfish management plan, I hope you will now increase protections for important Pacific Ocean habitat on the shelf, slope, and seafloor.

Please take the next step toward implementing a bottom trawling closure in deepwater areas beyond 3,500 meters off the California coast to protect this pristine region and the fragile deep-sea corals known to exist there. Such an action is within the authority of the council and would be consistent with its forward-thinking, ecosystem-oriented management approach.

I also encourage the Council to develop a broad range of alternatives for new or modified bottom trawling closures on the continental shelf and slope. Fishing activity taking place here may be affecting vulnerable habitats that could otherwise be protected without undue impact on fishermen. These alternatives should include a conservation package to ensure that effective protections are not lost and that important marine habitats are safeguarded and enhanced. I support reopening areas that can be fished sustainably without adverse effects on habitat, but vulnerable areas of corals and sponges within any long-standing closures must remain closed.

Healthy marine habitats along the U.S. West Coast help ensure a sustainable supply of fish for commercial and recreational fisheries and build a legacy we can pass to future generations. Again, please move comprehensive habitat protection forward for the Pacific shelf, slope, and seafloor.

Sincerely,

*[Signers listed on the following pages]*

First Name	Last Name	City	State		First Name	Last Name	City	State
John S.	Sonin	Juneau	AK		Barry	Hershon	Detroit	MI
Martin	Antuna	Anchorage	AK		Lisa	Tann	Oak Park	MI
Deborah	Voves	Anchorage	AK		Marlena	Ceselli	Ferndale	MI
Brenda	Martin	North Pole	AK		Kenneth	Large	Harbor Springs	MI
Della	Coburn	Kasaan	AK		John	Korovilos	Trenton	MI
Charles	Bingham	Sitka	AK		Sheryl	Olson	Ann Arbor	MI
Paula	Muschinske	Eagle River	AK		Christine	Mathews	Fenton	MI
kara	johnson	Cordova	AK		Marci	Reilly	Bloomfield	MI
Jayson	Minio	Eagle River	AK		Olga	Castaneda	Holland	MI
Anne	Fuller	Juneau	AK		Mary	Zech	Saint Joseph	MI
dogan	ozkan	Fairbanks	AK		Alberta	Sabin	Chelsea	MI
Patty	Daugharty	Eagle River	AK		jerry	gillissen	lansing	MI
Jef	Harvey	Palmer	AK		Deborah	Semo	Ironwoo	MI
Edith	Crowe	Wasilla	AK		lakshmi	raman	Ann Arbor	MI
Carla	Dummerauf	anchorage	AK		Tina	Anderson	Howard City	MI
Dione	Cuadra	Juneau	AK		Michelle	Borkosh	Troy	MI
Marianne	Mills	Juneau	AK		Bridgit	Thieme	Grand Rapids	MI
Michael	McCurdy	Homer	AK		Mary	Christman	Muskegon	MI
Darlene	Cheek	Sitka	AK		Ronald	Smith	Quincy	MI
jean	hoegler	Juneau	AK		Rob	Roberts	Warren	MI
Ken	Maurice	Anchorage	AK		Terri	Shoop	Birmingham	MI
Angela	Ferrari	Anchorage	AK		Elektra	Petrucci	Ferndale	MI
Jennifer	Armstrong	North Pole	AK		Jerry	Bierens	Milford	MI
Paula	Beneke	Anchorage	AK		MAURA	DEREY	LAPEER	MI
Larry	Casey	Eagle River	AK		Randolph	McMillan	Suttons Bay	MI
David	Hribar	Palmer	AK		maria	magalios	sterling hts	MI
Johnathan	Reynolds	DOUGLAS	AK		Rosemary	Wolock	Huntington Wood	MI
Kathleen	Holman	Anchorage	AK		Barbara	Olson	Middleville,	MI
Pete	Braun	Girdwood	AK		Bonnie	Taylor	Gladstone	MI
Elisabeth	Genaux	Juneau	AK		Kay	Steiner	Kentwood	MI
sharon	tieman	chugiak	AK		Chester	Sermak	Ann Arbor	MI
C	L	anchorage	AK		Michael	Ray	Southgate	MI
Lita	Lubitsh-White	Anchorage	AK		Robert	Aguirre	Linden	MI
Alix	Bowman	Anchorage	AK		Patricia	Cummings	Clawson	MI
Jill	Wittenbrader	Kodiak	AK		Elizabeth	Melton	Edmore	MI
Ingrid	Everson	Eagle River	AK		Gary	Zerr	North Branch	MI
Elida	Horn	Seward	AK		Gerald	Fisher	Dearborn Heights	MI
Lori	Cheezem	Kenai	AK		John	Christopher	Paw Paw	MI
carmen	valentine	anchor point	AK		James	Berkey	Herron	MI
Karen	Spradlin	Jacksonville	AL		Mary	DeCraemer	Clarkston	MI
Evelyn	McMullen	Montgomery	AL		John	Bhend	Harrisville	MI
Sara	Booth	daphne	AL		soumya	naidu	West Bloomfield	MI
Ginger	Geronimo	Birmingham	AL		Tracy	Crawford	Mt Pleasant	MI
Harold	Robinson	Talladega	AL		rosella	palazzolo	union pier	MI
David L.	Smith MD	Spanish Fort	AL		Josh	Halvorsen	Wayland	MI
Christina	Viljoen	Irondale	AL		Florence	Ticknor	Romulus	MI
Pam	Turbeville	Birmingham	AL		Peter	Thompson	Ypsilanti	MI
margaret	bish	birmingham	AL		Kim	Cain	Indian River	MI

September 2, 2015

Ms. Dorothy Lowman, Chair  
Pacific Fishery Management Council  
7700 NE Ambassador Place, Suite 101  
Portland, OR 97220

**RE: H.8 Amendment to Modify Groundfish Essential Fish Habitat and to adjust Rockfish Conservation Areas**

Dear Ms. Lowman and Council Members:

The Pacific Fishery Management Council (Council) and National Marine Fisheries Service (NMFS) are poised to take action to address the obligations under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to minimize harmful fishing impacts to groundfish Essential Fish Habitat (EFH). In 2006—after lengthy and contentious litigation—NMFS took action to protect EFH off the West Coast. Since then, the scientific underpinning of West Coast habitat management has greatly improved. As the result of a major Council and NMFS investment in the groundfish EFH five-year review, the data on habitats is far ahead of where it was a decade ago. Now that the Council is in the final stages of its mandatory five-year review and has begun to update EFH designations and protections, changes must be based on the best information currently available.

The Council is simultaneously considering changes to the groundfish trawl Rockfish Conservation Areas (RCA), which have been closed to bottom trawling since before NMFS adopted measures to minimize adverse effects to EFH from fishing. The Council must consider the effects of lifting RCA protections together with revisions to EFH designations and protections. Because these actions raise substantial questions of significant impacts to the environment, the National Environmental Policy Act (NEPA) requires that you consider the effects of this action in an Environmental Impact Statement (EIS). This analysis should be informed by a broad range of alternatives that prioritizes the continued prohibition of bottom-trawling in areas of important habitat and accounts for the best available scientific data.

We previously submitted a letter<sup>1</sup> requesting that the Oceana, Ocean Conservancy and Natural Resources Defense Council 2013 Coastwide Conservation Proposal be included as a distinct alternative in the NEPA process. That letter also describes proposed modifications to our 2013

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<sup>1</sup> Letter from Geoff Shester and Ben Enticknap, Oceana, to Dorothy Lowman, Chair, Pacific Fishery Management Council (Aug. 14, 2015), available at [http://www.pcouncil.org/wp-content/uploads/2015/08/H8b\\_PubCom2\\_SEPT2015BB.pdf](http://www.pcouncil.org/wp-content/uploads/2015/08/H8b_PubCom2_SEPT2015BB.pdf); see also Oceana, et al., Proposal to the Pacific Fishery Management Council to Modify Groundfish Essential Fish Habitat Designation, Conservation, and Enforcement (July 2013).

proposal based on new information and feedback we received since submitting the proposal. Please consider those comments in addition the ones provided here.

### Legal Background

The five-year review is a part of an ongoing legal mandate to evaluate new scientific information for the identification of EFH and adverse impacts to EFH. NMFS must take action based on the best available science and information brought forward in the review process to minimize adverse impacts to the extent practicable and consider and adopt actions to ensure the conservation and enhancement of EFH. The Council and NMFS may not simply assert that existing measures provide “enough” protection but, rather, must determine whether existing protections are reflective of the best available science for the EFH areas under consideration. In so doing, the Council and agency must comply with the requirements of NEPA, including evaluation of a full range of alternatives.

### MSA Obligations

Since the passage of the 1996 Sustainable Fisheries Act, designation and protection of EFH has been an essential feature of federal fisheries management. Recognizing that “[o]ne of the greatest long-term threats to the viability of commercial and recreational fisheries is the continuing loss of marine, estuarine, and other aquatic habitats,” Congress required that every FMP “describe and identify [EFH],” “minimize to the extent practicable adverse effects on such habitat caused by fishing,” and identify “other actions to encourage the conservation and enhancement of such habitat.”<sup>2</sup> The MSA therefore requires three categories of actions with respect to EFH: 1) designating EFH, 2) minimizing harmful fishing impacts to EFH, and 3) actively protecting and enhancing EFH. In this case, we are focused on the second obligation, the requirement to minimize harmful fishing impacts to EFH.<sup>3</sup>

EFH is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity.”<sup>4</sup> “Waters’ include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; ‘substrate’ includes sediment, hard bottom, structures underlying the waters, and associated biological communities; ‘necessary’ means the habitat required to support a sustainable fishery and the managed species’ contribution to a healthy ecosystem; and ‘spawning, breeding, feeding, or growth to maturity’ covers a species’ full life cycle.”<sup>5</sup> “EFH for Pacific Coast Groundfish includes all waters and substrate within areas with a depth less than or equal to 3,500 m[eters] . . . shoreward to the mean higher high water level or the upriver extent of saltwater intrusion . . . .”<sup>6</sup>

This Council must “prevent, mitigate, or minimize any adverse effects from fishing, to the extent practicable, if there is evidence that a fishing activity adversely affects EFH in a manner that is

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<sup>2</sup> 16 U.S.C. §§ 1801(9), 1853(a)(7).

<sup>3</sup> Although the EFH regulations call on the Council and NMFS to review all EFH provisions of FMPs, including actions that should be considered to ensure the conservation and enhancement of EFH, in April, the Council removed conservation and enhancement from the scope of issues to be advanced. <http://www.pcouncil.org/wp-content/uploads/2015/04/0415decisions.pdf>.

<sup>4</sup> *Id.* § 1802(10).

<sup>5</sup> 50 C.F.R. § 600.10.

<sup>6</sup> 50 C.F.R. § 660.75.



more than minimal and not temporary in nature.”<sup>7</sup> An adverse effect is “any impact that reduces quality and/or quantity of EFH,” and may include “direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH.”<sup>8</sup> “Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.”<sup>9</sup>

Congress recognized the need to identify and conserve EFH on an ongoing basis, requiring the Secretary, acting through NMFS, to establish a schedule for Councils to review and update EFH designations and protections “based on new scientific evidence or other relevant information.”<sup>10</sup> NMFS regulations state that Councils and NMFS should conduct a complete review of all EFH information at least once every five years and “revise or amend EFH provisions [of FMPs] as warranted based on available information.”<sup>11</sup> Amendment 19 outlines the procedures the Council follows to review and update EFH information, and incorporates the agency’s regulatory guidance.<sup>12</sup> The review is intended to accommodate “progress in scientific understanding of marine habitat” and “should include, but not be limited to, evaluating published scientific literature and unpublished scientific reports; soliciting information from interested parties; and searching for previously unavailable or inaccessible data.”<sup>13</sup>

All conservation and management measures promulgated pursuant to the MSA, including EFH identifications and revisions, must be based on the best available science.<sup>14</sup> NMFS regulations reflect this requirement, calling on Councils to obtain EFH information from “best available sources,” including peer-reviewed literature and unpublished scientific reports.<sup>15</sup> Councils must ensure that their EFH designations are accurate and up to date by “soliciting information from interested parties . . . and searching for previously unavailable or inaccessible data.”<sup>16</sup> While Councils should factor in the scientific rigor of information when determining whether to use it to identify or revise EFH, they may not refuse to use information simply because it may be incomplete or uncertain.<sup>17</sup> Rather, Councils are to “interpret [EFH] information in a risk-averse fashion to ensure adequate areas are identified as EFH for managed species.”<sup>18</sup>

The Council should determine whether it is practicable to minimize adverse fishing impacts to EFH based on the “nature and extent of the adverse effect on EFH and the long and short-term costs and benefits of potential management measures to EFH, associated fisheries, and the nation . . . .”<sup>19</sup> The Council’s review of EFH measures must contemplate new actions to continue to minimize adverse effects on EFH based on current information, and may not rely on a determination that existing measures provide sufficient protection. In cases where

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<sup>7</sup> 50 C.F.R. § 600.815(a)(2)(ii).

<sup>8</sup> *Id.* § 600.810(a).

<sup>9</sup> *Id.*

<sup>10</sup> 16 U.S.C. § 1855(b)(1)(A).

<sup>11</sup> 50 C.F.R. § 600.815(a)(10).

<sup>12</sup> Groundfish FMP Amendment 18/19 §§ 7.6-7.7.

<sup>13</sup> *Id.* § 7.7.

<sup>14</sup> 16 U.S.C. § 1851(a)(2).

<sup>15</sup> 50 C.F.R. § 600.815(a)(10).

<sup>16</sup> *Id.*

<sup>17</sup> 50 C.F.R. § 600.815(a)(1)(ii)(B).

<sup>18</sup> *Id.* § 600.815(a)(1)(iv).

<sup>19</sup> 50 C.F.R. § 600.815(a)(2)(iii).

there is evidence that a fishing activity adversely affects EFH in a manner that is more than minimal and not temporary in nature, . . . FMPs should identify a range of potential *new* actions that could be taken to address adverse effects on EFH, include an analysis of the practicability of potential new actions, and adopt any new measures that are necessary and practicable. Amendments to the FMP or to its implementing regulations must ensure that the FMP continues to minimize to the extent practicable adverse effects on EFH caused by fishing.<sup>20</sup>

These regulations should be read in the context of the MSA's call for actions that ensure both the conservation and enhancement of EFH.<sup>21</sup>

### NEPA Obligations

Congress enacted NEPA in recognition of "the profound impact of man's activity on the interrelations of all components of the natural environment."<sup>22</sup> The Act serves as the basic charter for the environment, stating the policy of the federal government "to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans."<sup>23</sup> To that end, the federal government must use all practicable means to "attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences."<sup>24</sup> The Act encourages informed agency decision-making that carefully considers the environmental effects of actions affecting the environment, and requires the consideration of reasonable alternatives to such actions.

Federal agencies must prepare an environmental impact statement (EIS) when they propose "major Federal actions significantly affecting the quality of the human environment."<sup>25</sup> These actions include revised agency rules, regulations, plans, policies, or procedures.<sup>26</sup> A significant effect includes both beneficial and adverse effects.<sup>27</sup> In determining whether to prepare an EIS, an agency must determine whether the proposed action is one which normally requires an EIS,<sup>28</sup> or normally does not require either an EIS or an environmental assessment (EA).<sup>29</sup> If neither of these conditions applies, then the agency must prepare an EA and based on this assessment, determine whether to prepare an EIS.<sup>30</sup> An EIS is required where there are substantial questions about whether a project may have a significant environmental impact.<sup>31</sup> An agency may forego issuing an EIS in some circumstances if it adopts mitigation measures that "constitute an

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<sup>20</sup> *Id.* § 600.815(a)(2)(ii) (emphasis added).

<sup>21</sup> See 16 U.S.C. § 1855(b)(1)(A).

<sup>22</sup> 42 U.S.C. § 4331(a).

<sup>23</sup> *Id.*

<sup>24</sup> *Id.* § 4331(b)(3).

<sup>25</sup> 42 U.S.C. § 4332(2)(C).

<sup>26</sup> 40 C.F.R. § 1508.18(a).

<sup>27</sup> 40 C.F.R. § 1508.27(b)(1).

<sup>28</sup> *Id.* § 1501.4(a)(1).

<sup>29</sup> *Id.* § 1501.4(a)(2) (a proposed action that normally does not require either an EIS or EA is categorically excluded from full NEPA analysis).

<sup>30</sup> *Id.* § 1501.4(b)-(c).

<sup>31</sup> *Idaho Sporting Cong. v. Thomas*, 137 F.3d 1146, 1150 (9<sup>th</sup> Cir. 1998).

adequate buffer against the negative impacts that may result from the authorized activity.”<sup>32</sup> NOAA Administrative Order (AO) 216-6 provides additional guidance and requires NMFS to prepare an EIS for FMPs, FMP amendments, regulatory actions, or projects which will or may cause a significant impact on the quality of the human environment.<sup>33</sup>

Where, as here, a proposed action “involves unresolved conflicts concerning alternative uses of available resources,” the Council must “study, develop, and describe appropriate alternatives to [the] recommended . . . action.”<sup>34</sup> This obligation requires “full and meaningful consideration [of] all reasonable alternatives,”<sup>35</sup> as “dictated by the nature and scope of the proposed action.”<sup>36</sup> “The choice of alternatives is ‘bounded by some notion of feasibility’ and an agency is not required to consider ‘remote and speculative’ alternatives.”<sup>37</sup> Instead, the “touchstone” for determining whether a range of alternatives is sufficiently broad “is whether [the agency’s] selection and discussion of alternatives fosters informed decision-making and informed public participation.”<sup>38</sup>

In certain circumstances, agencies must consider separate proposed actions together.

Agencies shall make sure the proposal which is the subject of an environmental impact statement is properly defined. Agencies shall use the criteria for scope (§ 1508.25) to determine which proposal(s) shall be the subject of a particular statement. Proposals or parts of proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement.<sup>39</sup>

In other words, “whether an agency must prepare a single EIS for more than one proposal turns on the criteria set forth in § 1508.25.”<sup>40</sup> “The scope of the [EIS] extends to ‘connected, cumulative, and similar actions.’”<sup>41</sup> Cumulative actions are those, “which when viewed with other proposed actions have cumulatively significant impacts,” and similar actions are those, “which when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography.”<sup>42</sup> Although cumulative actions should be discussed in the same impact statement, agencies are afforded more discretion for similar actions; such actions should be analyzed when the best way to adequately assess “the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single impact statement.”<sup>43</sup>

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<sup>32</sup> *Nat’l Parks & Conservation Ass’n v. Babbitt*, 241 F.3d 722, 733-34 (9<sup>th</sup> Cir. 2001).

<sup>33</sup> NOAA Administrative Order (AO) 216-6, § 6.01 (May 20, 1999).

<sup>34</sup> National Environmental Policy Act (NEPA), 42 U.S.C. § 4332(2)(E).

<sup>35</sup> *Te-Moak Tribe of Western Shoshone of Nev. v. United States*, 608 F.3d 592, 601-02 (9<sup>th</sup> Cir. 2010); *Citizens for Better Henderson v. Hodel*, 768 F.2d 1051, 1057 (9<sup>th</sup> Cir. 1985) (stating that the “existence of a viable but unexamined alternative renders an environmental impact statement inadequate”).

<sup>36</sup> *Friends of Yosemite Valley v. Kempthorne*, 520 F.3d 1024, 1038 (9<sup>th</sup> Cir. 2008).

<sup>37</sup> *Westlands Water Dist. v. United States*, 376 F.3d 853, 868 (9<sup>th</sup> Cir. 2004) (quoting *Vt. Yankee Nuclear Power Corp. v. Natural Res. Def. Council, Inc.*, 435 U.S. 519, 551 (1978)).

<sup>38</sup> *Id.* (quoting *California v. Block*, 690 F.2d 753, 767 (9<sup>th</sup> Cir. 1982)).

<sup>39</sup> 40 C.F.R. § 1502.4(a).

<sup>40</sup> *Pac. Coast Fed’n of Fishermen’s Ass’ns v. Blank*, 693 F.3d 1084, 1098 (9<sup>th</sup> Cir. 2012).

<sup>41</sup> *Sierra Club v. BLM*, 786 F.3d at 1225 (quoting *W. Watersheds Project v. Abbey*, 719 F.3d 1035, 1046 (9<sup>th</sup> Cir. 2013)).

<sup>42</sup> 40 C.F.R. § 1508.25(a)(2)-(3).

<sup>43</sup> *Earth Island Inst. v. United States Forest Serv.*, 351 F.3d 1291, 1306 (9<sup>th</sup> Cir. 2003) (quoting 40 C.F.R. § 1508.25).

This Council has experience with the interplay between its NEPA and EFH obligations. In 2000 a federal court found NMFS's analysis of this Council's initial 1998 EFH amendment lacking.<sup>44</sup> In that case, the amendment contained no measures to reduce the adverse effects of fishing based on the reasoning "that there was virtually no information connecting fishing gear or activities to destruction of EFHs within [this Council's] jurisdiction, nor was there information on the efficacy of methods to reduce any adverse effects."<sup>45</sup> NMFS prepared an EA on the amendment and analyzed only two alternatives – the status quo and the amendment.<sup>46</sup> The EA summarized the potential impacts of fishing gear on EFH, but did not analyze the long-term or cumulative impacts of such gear on EFH.<sup>47</sup> The government argued a full EIS was not required because it had taken a hard look at the effects of the amendment, considered all relevant factors, and determined that the risks or impacts were either unknown or insignificant.<sup>48</sup> The government also argued that its decision not to prepare a full EIS was reasonable in light of how little scientific evidence was available on the adverse effects of fishing on EFH.<sup>49</sup>

The Court found this analysis failed to comply with NEPA, the CEQ's implementing regulations, and NOAA's own administrative order.<sup>50</sup> More specifically, the EA failed to consider all relevant and feasible alternatives, and failed to fully explain the environmental impact of the proposed action and alternatives. Instead, the EA "discussed the environmental impacts of the proposed action and alternative[] in vague and general terms, without discussing what the impact would be to specific EFHs that the [a]mendment[] was intended to protect."<sup>51</sup> Moreover, there was "no substantive discussion of how fishing practices and gear may damage corals, disrupt fish habitat, and destroy benthic life that helps support healthy fish populations," no specification of which EFHs needed protection and why, no discussion of why no significant impact would result from adopting the amendment, and no discussion of "any changes that were considered or made to reduce any possible impact to the environment."<sup>52</sup>

On remand, NMFS used an EIS to analyze a range of alternatives designed to minimize, to the extent practicable, adverse effects to EFH from fishing.<sup>53</sup> To implement the regulatory provisions of Amendment 19 to the Pacific Coast Groundfish FMP, NMFS adopted fishing gear restrictions, closed areas to bottom trawling, and closed areas to all fishing that contacts the bottom.<sup>54</sup> NMFS determined that precautionary management was appropriate "particularly due to the highly sensitive nature of some habitat types such as deep sea corals and the very little fishing effort necessary to have high levels of impact."<sup>55</sup> Although NMFS could not "quantitatively predict increases in the production of groundfish or enhanced ecosystem function that would result from specific management measures," NMFS "concluded that adverse impacts to habitat were possible that could impair the ability of fish to carry out basic biological functions and potentially

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<sup>44</sup> *American Oceans Campaign v. Daley*, 183 F. Supp 2d. 1 (D. D.C. 2000).

<sup>45</sup> *Id.* at 7.

<sup>46</sup> *Id.*

<sup>47</sup> *Id.*

<sup>48</sup> *Id.* at 15.

<sup>49</sup> *Id.*

<sup>50</sup> *Id.*

<sup>51</sup> *Id.*

<sup>52</sup> *Id.* at 16.

<sup>53</sup> 71 Fed. Reg. 27,412 (May 11, 2006) (explaining that NMFS analyzed twenty-three alternatives, including five that "were designed to accomplish the objective of protecting EFH while minimizing economic impacts on small entities).

<sup>54</sup> *Id.* at 27,408.

<sup>55</sup> *Id.* at 27,409.

have long-lasting or permanent implications at the scale of the ecosystem.”<sup>56</sup> The adopted management measures resulted in the protection of approximately 135,000 square miles of habitat.<sup>57</sup>

### **Council Action**

The management and protection of Essential Fish Habitat is a fundamental cornerstone of sustainable fisheries. Many West Coast groundfish in particular are closely associated with seafloor habitats and rely heavily on three-dimensional structures for feeding, breeding, and growth to maturity. While scientific understanding of the habitat associations of groundfish continues to improve, it is clear that the ability to find shelter, rest safely, hide from predators, and find food are critical to the survival and ultimately the productivity of dozens of commercially and recreationally important fish species. NMFS and the Council, therefore, must take action to update the current EFH protections and must evaluate a full range of alternatives in an EIS as part of the process.

#### *The Council and NMFS Must Take Action to Update the EFH Protections*

In 2005, and in response to the litigation described above, the Council adopted Amendment 19 to the Pacific Coast Groundfish FMP, closing EFH Conservation Areas to bottom trawling.<sup>58</sup> In implementing the amendment, NMFS recognized that rocky habitat, which “may be composed of bedrock, boulders, or smaller rocks, such as cobble and gravel” while one of the least abundant benthic habitats, is one of the “most important habitats for groundfish.”<sup>59</sup> NMFS agreed that bottom trawling may result in physical modification to habitat and a loss in biodiversity in trawled areas, and that precautionary management is appropriate to conserve and enhance EFH.<sup>60</sup> NMFS recognized the amendment’s consistency with the MSA’s mandate to minimize, to the extent practicable, adverse effects of fishing on EFH and described it as having the most acceptable socioeconomic impact on commercial fishers, recreational fishers, and communities.<sup>61</sup>

The data relevant to EFH has improved significantly since the adoption of Amendment 19. For example, there is an increased understanding of hard substrate shape and distribution in federal waters inside and outside EFH Conservation Areas in Northern Washington and throughout Oregon, and in the Gulf of the Farallon Islands region off California; there are numerous sites outside EFH Conservation Areas where corals and sponges have been observed in higher relative numbers off all three states; and we now know that the existing EFH Conservation Areas resulted in minimal disruption of bottom trawl fishery dynamics.<sup>62</sup> In addition, since 2005 the West Coast Groundfish Observer Program observed coral and sponge bycatch data set has become available, highlighting areas of significant impacts to coral and sponge communities that were not assessed during the Amendment 19 process.<sup>63</sup> New studies also have been published on the effects of bottom trawling on seafloor habitats, confirming the National Academy of

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<sup>56</sup> *Id.* at 27,410.

<sup>57</sup> *Id.* at 27,412.

<sup>58</sup> Groundfish FMP Amendment 18/19 § 6.8.5; 50 C.F.R. § 660.130(e)(5)(ii).

<sup>59</sup> *Id.* § 7.3.1.4.

<sup>60</sup> 71 Fed. Reg. 27,408, 27, 409 (May 11, 2006).

<sup>61</sup> *Id.*

<sup>62</sup> Essential Fish Habitat Review Committee, Report on Groundfish EFH Report and Request for Proposals 2 (April 2013).

<sup>63</sup> See <http://efh-catalog.coas.oregonstate.edu/bio/>.

Sciences, National Research Council 2002 conclusion that bottom trawling changes the chemistry, geological structure, biological communities, productivity, and complexity of seafloor habitats, and that these impacts are most severe and long-term in hard bottom areas containing fragile, long-lived coral and sponge habitats.<sup>64</sup> Oceana has contributed to this knowledge base through scientific research expeditions with remotely operated vehicles, documenting new areas with sensitive habitat types and describing new associations between groundfish and biogenic habitats. NMFS recently announced a National Habitat Policy, further underscoring the recognition of the importance of habitats.

The Council must comply with the MSA's mandate to review and update the identification of EFH based on this extensive new scientific evidence and other relevant information. Moreover, because current area protections were based on a determination that such protections met the MSA's mandate to minimize adverse fishing impacts on EFH to the extent practicable, the Council and NMFS must demonstrate that any reopening of bottom trawl closed areas (whether initially closed as EFH or for other reasons) is consistent with that mandate. Because existing trawl RCA closures represented the status quo when NMFS implemented management measures to protect EFH in 2006, adjustments to the RCA require consideration of further measures necessary to continue to minimize adverse fishing effects to the extent practicable. The Council can help address concerns with the additional impacts caused by reopening EFH Conservation Areas by ensuring that any reopenings of areas currently closed to bottom trawling avoid known sensitive habitat types and are compensated by an overall net increase in seafloor habitat protected by both area and features.

*The Council and NMFS Must Prepare an EIS That Evaluates a Full Range of Alternatives*

In light of this new information, and because the scope and breadth of the proposed action raise substantial questions of significant impacts to the environment, the Council should analyze the effects of the action through an EIS. As it prepares an EIS, the Council and agency must consider a full range of alternatives. At the April 2015 meeting, the Council determined the scope of actions, subject areas, and management measures to include in a Fishery Management Plan (FMP) amendment related to groundfish EFH and EFH Conservation Area modifications. The scope includes further evaluation of potential adverse effects of fishing activities on EFH, and minimization of those effects to the extent practicable. It also includes protection of benthic habitats, including deep-sea corals, from the adverse effects of fishing, and comprehensive adjustments to the trawl RCA.<sup>65</sup>

At the upcoming meeting, the Council will adopt a range of alternatives to inform its ultimate EFH and RCA recommendation to the National Marine Fisheries Service (NMFS). We urge you to adopt a broad range of alternatives to aid you in your analysis. It is appropriate for the range to prioritize protection of habitat features particularly sensitive to bottom trawl impacts, including hard substrate, biogenic habitats, submarine canyons, ridges, banks, and escarpments, as well as areas with high regional coral or sponge bycatch. The Council must account for adjustments to RCA by including alternatives that protect sensitive habitats identified within those areas. In

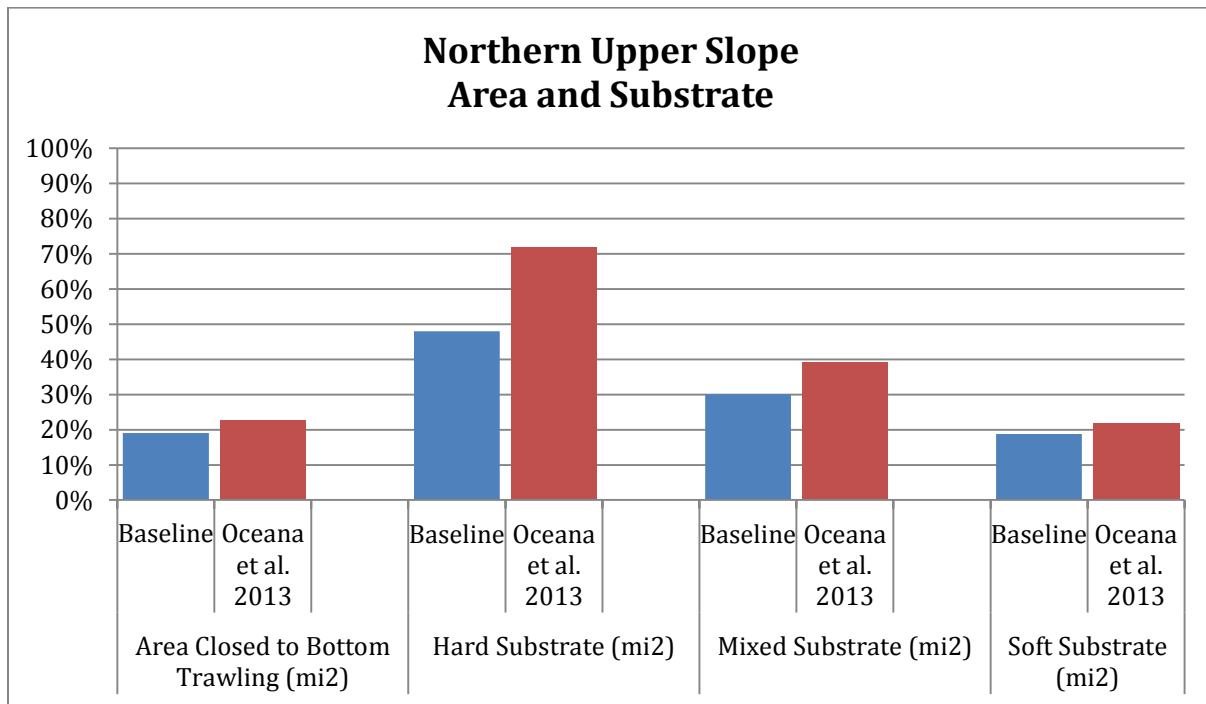
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<sup>64</sup> Pacific Coast Groundfish 5-Year Review of EFH, Report to the Pacific Fishery Management Council App. J (Sept. 2012), available at [http://www.pcouncil.org/wp-content/uploads/Main\\_Document\\_EFH\\_Phase\\_1\\_Sep2012.pdf](http://www.pcouncil.org/wp-content/uploads/Main_Document_EFH_Phase_1_Sep2012.pdf); National Research Council, Effects of Trawling and Dredging on Seafloor Habitat (2002).

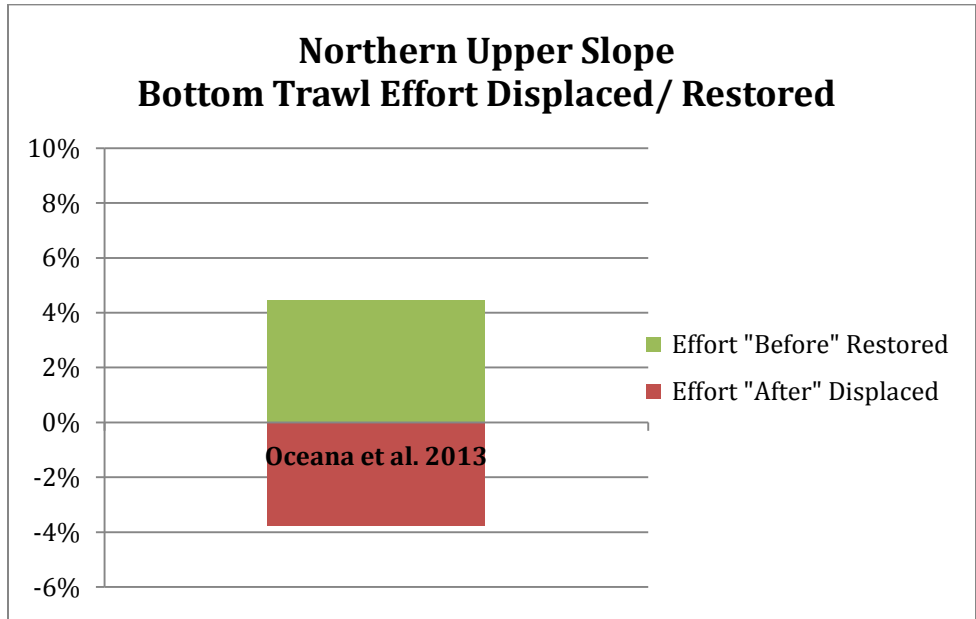
<sup>65</sup> Pacific Fishery Management Council, Decision Summary Document 3-4 (Apr. 11-16, 2015), available at <http://www.pcouncil.org/wp-content/uploads/2015/04/0415decisions.pdf>.

addition to adequately framing the analysis, a comprehensive range of alternatives will allow interested parties the opportunity to move toward further consensus in the coming months, which may assist the Council in its selection of a preliminary preferred alternative in April 2016.

We appreciate the preliminary analyses of our original proposal and other public proposals submitted in July 2013 at this meeting. To best inform an analysis of the cumulative impacts of reopening the trawl RCA and modifying EFH Conservation Areas closed to bottom trawling, it is important to analyze the full suite of changes relative to the status quo baseline, which includes the trawl RCA. It is important to compare spatial coverage at both regional and coastwide scales across a wide suite of biogenic and physical habitat features (e.g., hard substrate and corals) as well as available economic indicators (such as restored fishing effort). As an example, we include here results from a GIS analysis comparing the Oceana, Ocean Conservancy and Natural Resources Defense Council 2013 proposal to the status quo baseline using the datasets compiled by the EFH Review Committee.



**Figure 1.** Comparative analysis of total area and physical substrate closed to bottom trawling under the status quo baseline (all areas closed to bottom trawling, including the year-round RCA), and the Oceana et al. 2013 conservation proposal for the Northern upper slope region.



**Figure 2.** Estimated groundfish bottom trawl effort restored under the Oceana et al. 2013 proposal compared to groundfish bottom trawl effort displaced by designating new EFH Conservation Areas, showing a likely net gain for bottom trawling in the Northern upper slope region.

In addition, at the April 2015 meeting, the Council requested a placeholder in the range of alternatives for a consensus-based proposal (Collaborative Proposal). The collaborative working group for areas North of 40'10" is composed of nongovernmental organizations, including Oceana, and industry stakeholders. We appreciated the opportunity to participate in the collaborative working group that addressed the region North of 40'10". We learned a great deal at these meetings and did our best to find common ground. In several specific areas, this dialogue led to fruitful outcomes and we anticipate supporting the concepts that arose out of the discussions in lieu of the concepts we initially proposed in 2013. However, in other areas we were unable to come to agreement. We did not participate in the collaborative discussions south of 40'10". In both areas, we have yet to evaluate the proposals, and we understand that some areas have not been finalized. Therefore, we look forward to seeing the collaborative proposal analyzed in addition to our original 2013 proposal. Such a comparison will both inform public participation and foster informed decision-making.

We are supportive of most of the preliminary draft collaborative proposal North of 40'10", including re-opening much of the RCA where sensitive habitat features are not known to be present. However, the proposal would re-open parts of some EFH Conservation Areas and parts of the RCA where the science demonstrates there are sensitive habitat features. We do not agree with those proposed areas. Where the best available information suggests there are sensitive biogenic or physical features, these areas should not be reopened. Moreover, if areas are to be re-opened to bottom trawling, equivalent or greater protections should be proposed in other areas within the same region and depth zones (e.g. Northern Upper Slope).

The Council must consider the effects of adjustments to both EFH Conservation Areas and RCA in one EIS. Adjustments to RCA that allow increased bottom trawl fishing activity will adversely affect EFH, reducing both the quality and quantity of EFH currently closed to bottom trawling.



Adjustments to both RCA and EFH Conservation Areas raise substantial questions of significant impacts to EFH, and together may cause cumulatively significant impacts. In addition, the common timing and overlapping geography of the proposed actions warrant simultaneous analysis. The Council must analyze the environmental consequences of each of them together.

All waters and substrate within the following areas are designated as groundfish EFH for all species managed under the FMP:

- Depths less than or equal to 3,500 m to mean higher high water level or the upriver extent of saltwater intrusion;
- Seamounts in depths greater than 3,500 m;
- Areas designated as HAPCs not already identified by the above criteria.<sup>66</sup>

RCA were established as depth-based management measures to reduce bycatch and aid in rebuilding overfished rockfish species by closing areas where overfished species are known to co-occur with other targeted groundfish species.<sup>67</sup> Since 2003 “the Council has used coastwide RCA to reduce the incidental catch of overfished species in waters where they are more abundant.”<sup>68</sup> Because the majority of overfished species are continental shelf species, RCA have primarily been designed to close continental shelf waters.<sup>69</sup> These waters occur in designated groundfish EFH and the closures, although designed to avoid bycatch, were selected based on the known habitats for overfished groundfish species, and effectively provide protection for shelf habitat. Both the reduced mortality and the protection of habitat for these species together have aided their rebuilding.

Trawl RCA were already in place in 2006 when NMFS implemented EFH protections and therefore constituted the status quo. Because the effects of increased bottom trawl effort in these waters, which are designated EFH, have not been considered before, the Council must analyze the effects of these adjustments, and must minimize any adverse effects to the extent practicable. Key questions for the Council to analyze when considering a comprehensive package of EFH and RCA adjustments include:

- Is there an overall net increase in habitat protections across all habitat types and depth zones (e.g., slope, shelf), regionally and coastwide?
- Will there be an overall increase in fishing opportunities?
- Are there known sensitive habitats within areas proposed for reopening?
- Are newly discovered or recognized sensitive habitat types receiving additional protections?

Even in cases where a single, comprehensive EIS is not required, the agency must still adequately analyze the cumulative effects of the projects within each individual EIS. These include “the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such

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<sup>66</sup> Groundfish FMP Amendment 18/19 § 7.2.

<sup>67</sup> See, e.g., 67 Fed. Reg. 57,973, 57,974 (Sept. 13, 2002) (setting depth-based management measures to create a darkblotched rockfish conservation area); 75 Fed. Reg. 60,868, 60,899 (Oct. 1, 2010).

<sup>68</sup> Groundfish FMP Amendment 18/19 § 6.8.2.

<sup>69</sup> *Id.*

other actions.”<sup>70</sup> “Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.”<sup>71</sup> For example, in a case addressing post-wildfire timber sales in the Eldorado National Forest, the Forest Service failed to properly consider the cumulative effects of removing protections of a 1,000-acre spotted owl home range core area on a smaller protected activity center in the adjacent Tahoe National Forest.<sup>72</sup> Similarly here, because both RCA and EFH Conservation Areas occur within designated EFH, and provide related protections for groundfish, this Council must consider revisions to each, and the cumulative effects of the actions, together.

In addition to including our proposed EFH Conservation Area modifications as a distinct alternative, the Council should include Alternative 5b in the range of alternatives. This alternative would revise the description of the EFH habitat components, including identification of major prey species, in Appendix B to the groundfish FMP using new information found during the review of groundfish EFH. Significant new information and analysis occurred during the EFH five-year review, including the development of a novel “major prey index.” While this action does not require an FMP amendment, it reflects new information and additional attention on the forage fish that are relevant to groundfish. In light of the Fishery Ecosystem Plan’s focus on forage species, the extensive work by the EFH Review Committee on this topic, and the inclusion of this as a component of our 2013 proposal, we ask that it be included in the range of alternatives.

The Council also should include in the range of alternatives for this action the protection of deepwater areas in the U.S. West Coast Exclusive Economic Zone outside of currently designated EFH as described in our 2013 proposal. We appreciate the Council’s decision to include the protection of deep-sea corals within the scope of this FMP Amendment, and the ongoing dialogue with Council and Agency staff regarding the most appropriate legal authority under which to implement those protections.

### Conclusion

The Council has a duty under the MSA to minimize adverse fishing impacts on EFH, and to actively protect and enhance EFH. EFH designations and protections must be updated based on new scientific and other relevant information that has become available since this Council first designated groundfish EFH a decade ago. The Council has identified numerous purposes of the proposed action. These include evaluating potential adverse effects of fishing activities on EFH, and minimizing those effects to the extent practicable, protecting benthic habitats, including deep-sea corals, from the adverse effects of fishing, and evaluating and revising RCA closures.

This Council must “give full and meaningful consideration to all reasonable alternatives”<sup>73</sup> that fit within the scope of the action. We urge you to adopt a broad range of alternatives that prioritizes the continued prohibition of bottom-trawling in areas of important habitat and accounts for data acquired since the adoption of Amendment 19 in 2005. Like the approach

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<sup>70</sup> 40 C.F.R. § 1508.7.

<sup>71</sup> *Id.*

<sup>72</sup> *Earth Island Inst. v. United States Forest Serv.*, 351 F.3d 1291, at 1307.

<sup>73</sup> *Te-Moak Tribe of Western Shoshone of Nev. v. United States*, 608 F.3d 592, 601-02 (9<sup>th</sup> Cir. 2010); *Citizens for Better Henderson v. Hodel*, 768 F.2d 1051, 1057 (9<sup>th</sup> Cir. 1985) (stating that the “existence of a viable but unexamined alternative renders an environmental impact statement inadequate”).

adopted by the Council in 2005, our 2013 proposal focuses on minimizing the socioeconomic impact to the trawl fleet while protecting areas known to contain habitat features particularly sensitive to bottom trawl impacts. Because analysis of our 2013 proposal, modified as explained in our August 14, 2015 letter,<sup>74</sup> will foster both informed decision-making and informed public participation, we request that you include it in the range of alternatives. We also support inclusion of the Collaborative Proposal in the range of alternatives, and believe it is a useful comparison to the status quo.

The geographic scope of the action extends along the entire West Coast. The regulatory breadth includes comprehensive trawl RCA adjustments in conjunction with the addition of EFH Conservation Areas and reopenings of existing EFH Conservation Areas. Because the scope and breadth of the proposed action raise substantial questions of significant impacts to the environment, the Council should consider its effects in an EIS, and should consider the cumulative impacts of RCA revisions on groundfish EFH. The common timing and overlapping geography further warrant simultaneous analysis.

Thank you for the opportunity to offer our suggestions for further analyzing and mitigating the effects of fishing on groundfish EFH and building upon your ecosystem-based approach for protecting marine habitats off the U.S. West Coast.

Sincerely,

A handwritten signature in black ink, appearing to read "Mariel J. Combs". The signature is fluid and cursive, with a long horizontal stroke at the end.

Mariel J. Combs  
Pacific Legal Counsel

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<sup>74</sup> Letter from Geoff Shester and Ben Enticknap, Oceana, to Dorothy Lowman, Chair, Pacific Fishery Management Council (Aug. 14, 2015), available at [http://www.pcouncil.org/wp-content/uploads/2015/08/H8b\\_PubCom2\\_SEPT2015BB.pdf](http://www.pcouncil.org/wp-content/uploads/2015/08/H8b_PubCom2_SEPT2015BB.pdf).



September 2, 2015

Ms. Dorothy Lowman, Chair  
Pacific Fishery Management Council  
1100 NE Ambassador Place, #101  
Portland, Oregon 97220

**RE: Agenda Item H.8 (Amendment to Modify Groundfish Essential Fish Habitat)**

Dear Chair Lowman and Council Members:

We write in support of your efforts to protect unique and vulnerable deepwater habitats as part of the ongoing effort to improve the habitat provisions of the Groundfish Fishery Management Plan (“FMP”). In particular, we support the inclusion of explicit alternatives in the Groundfish FMP amendment that would close federally managed waters beyond 3,500 meters in depth to bottom trawling. As we explained in our June 2015 comments (attached), the Council has ample and clear authority under the Magnuson-Stevens Fishery Conservation and Management Act (“MSA”) to implement such a precautionary closure without having to invoke essential fish habitat (“EFH”) provisions or establish a link between protecting this habitat and effects on species managed under the Groundfish FMP.

We ask the Council to clarify its range of alternatives for the Groundfish FMP amendment to expressly include prohibiting bottom trawling in areas beyond 3,500 meters. The Council’s “Purpose and Need” statement suggests that the Council intends to consider such an alternative. The stated purposes under the draft “Purpose and Need” statement include “[p]rotect[ing] benthic habitats, including deep-sea corals, from adverse effects of fishing.” Agenda Item H.8, Attachment 1 at 2. The draft document also includes at least one stated need for the proposed amendment that appears to encompass a precautionary bottom trawling closure beyond 3,500 meters: “[c]onsider new discretionary MSA authorities under Section 303(b) that can be used to protect species and habitats, including deep-sea corals.” *Id.* at 3. We recommend that you delete the word “new” from this statement since the discretionary authority provided by MSA section 303(b)(2)(A) has existed since the enactment of the MSA in 1976 and is fully applicable here. *See* Pub. L. No. 94-265 (April 13, 1976).<sup>1</sup>

The draft document also states the need to “[c]onsider new information on seafloor habitats, the distribution of fishing effort, and the distribution of deep-sea corals as they relate to protecting EFH from adverse effects of fishing.” *Id.* We recommend revising this stated need to clarify that there is a need to consider this information as it relates to “protecting EFH, *as well as species and habitats in waters that are not currently part of EFH, including waters beyond 3,500m in depth.*”

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<sup>1</sup> This provision was originally enacted as “303(b)(2).” It was redesignated “303(b)(2)(A)” when Congress added the deep sea coral provision (303(b)(2)(B)) in 2006, but its text was unchanged.

In addition to clarifying the Purpose and Need statement, we ask the Council to add alternatives to close waters beyond 3,500 meters to bottom trawling based on MSA discretionary authorities, including MSA section 303(b)(2)(A). Table 1 of the report on the draft range of alternatives suggests that Alternative 1a through 1f encompass alternatives that address the purpose of applying MSA 303(b) authorities to “protect species and habitats including deep-sea corals.” However, Alternatives 1a-1f are explicitly limited to modifications of closed areas within designated EFH, using EFH authority. Adding alternatives that explicitly addresses closing deep water areas based on MSA discretionary authorities is necessary to fulfill the stated purpose and need for the amendment and to provide adequate opportunity for public comment and consideration of those alternatives.

Closing currently unexploited areas to fishing for the sake of protecting sensitive habitats is not without precedent. For example, the Mid-Atlantic Fishery Management Council recently adopted a measure very similar to the one proposed here, establishing a precautionary closure covering 38,000 square miles of pristine deep water habitat, much of which lies beyond the practicable reach of fishing fleets. It is worth noting that the Mid-Atlantic Council relied on discretionary MSA authority to enact this impressive habitat protection measure, and did so based on a similar level of deep sea coral data as is available here.

In 2009, the North Pacific Council exercised its MSA authority to develop the Arctic Fishery Management Plan, which closed all U.S. Arctic federal waters to commercial fishing until sufficient information is available to enable a sustainable commercial fishery to proceed. As the National Marine Fisheries Service noted in approving and promulgating that FMP, “[t]he Arctic FMP is a precautionary, ecosystem-based approach to fisheries management.” 74 Fed. Reg. 56734 (Nov. 3, 2009). Notably, that action was expressly aimed at protecting the marine environment rather than promoting growth of species managed under other FMPs. *See id.* (“this action prevents potential adverse effects on the Arctic marine environment from unregulated commercial fishing”). The North Pacific Council’s action is but one recent example of the types of far-reaching, precautionary measures that a council may establish using its MSA authority.

In sum, we encourage the Council to exercise its clear discretionary authority to enact protections for unique and vulnerable deep water habitats. Such an action would be firmly based in your legal authority under the MSA and supported by the best available scientific information. Thank you for your time and consideration of this issue. Please do not hesitate to contact me with any questions.

Sincerely,



Andrea A. Treece  
Staff Attorney, Oceans Program

Attachment



June 10, 2015

Ms. Dorothy Lowman, Chair  
Pacific Fishery Management Council  
1100 NE Ambassador Place, #101  
Portland, Oregon 97220

**RE: Agenda Item D.6.a. NMFS Report**

Dear Chair Lowman and Council Members:

We write to clarify the Pacific Fishery Management Council's ("PFMC's") authority under the Magnuson Stevens Fishery Conservation and Management Act ("MSA") to protect habitat in the Exclusive Economic Zone ("EEZ"), regardless of the relationship of that habitat to managed species. Councils have multiple sources of authority under the MSA to incorporate habitat protections into FMPs, including but not limited to protections for deep sea corals ("DSC"). As explained below, NMFS's suggestion that the Council's authority to protect marine habitats, with the exception of the Council's specific DSC authority, "requires a relationship to the managed fishery" does not have a sound basis in the plain language of the MSA and contradicts Congressional intent. Cf. NMFS Report to Council, Agenda Item D.6.a., June 2015, p.1 [http://www.pcouncil.org/wp-content/uploads/2015/05/D6a\\_NMFS\\_Rpt\\_AuthoritiesEFHandRCA\\_JUN2015BB.pdf](http://www.pcouncil.org/wp-content/uploads/2015/05/D6a_NMFS_Rpt_AuthoritiesEFHandRCA_JUN2015BB.pdf). In reality, the PFMC has clear authority to close waters beyond 3,500 meters to bottom trawling.

**The MSA Gives the Council Broad Authority to Protect Habitat**

The MSA provides broad authority to manage and conserve marine habitats within the U.S. EEZ. The notion that discretionary conservation and management measures under the MSA must have a direct link to a currently exploited fishery ignores the findings and purposes of the Act. A primary purpose of the MSA is "to conserve and manage the *fishery resources* found off the coasts of the United States, and the anadromous species and Continental Shelf *fishery resources* of the United States, by exercising . . . sovereign rights for the purposes of exploring, exploiting, *conserving*, and managing *all fish* within the exclusive economic zone. . . ." 16 U.S.C. § 1801(b)(1) (emphasis added). The MSA defines "fishery resources" to mean "any fishery, any stock of fish, any species of fish, and any habitat of fish." *Id.* § 1802(15). Recognizing that habitat loss posed one of the greatest long-term threats to fisheries, Congress also emphasized that "[h]abitat considerations should receive increased attention for the

conservation and management of fishery resources of the United States.” 16 U.S.C. § 1801(a)(9).

The MSA definition of “fishery resources” is thus substantially broader than the definition of “fishery,” which is “one of more stocks of fish which can be treated as a unit for purposes of conservation and management and which are identified on the basis of geographical, scientific, technical, recreational, and economic characteristics; and any fishing for such stocks.” *Id.* § 1802(13). Notably, even the term “fishery” encompasses more than a particular stock of fish; it also encompasses the activity of attempting to catch those fish, including the methods and gear used to catch them.

The statutory definition of “conservation and management” also underscores the broad scope of MSA authority. “Conservation and management” refers to legal measures “required to rebuild, restore, or maintain, and which are useful in rebuilding, restoring, or maintaining, any fishery resource *and* the marine environment; and . . . which are designed to assure that . . . irreversible or long-term adverse effects on fishery resources *and* the marine environment are avoided.” *Id.* § 1802(5) (emphasis). This definition makes clear that “conservation and management” measures authorized by the MSA are intended to benefit not just current or future fisheries, but the marine environment as a whole. All of these provisions reflect Congress’s intent to foster forward-looking measures to protect marine habitats.

These longstanding legal authorities for habitat protection were bolstered and emphasized in the 2007 re-authorization of the MSA, which reinforced existing authority by adding new provisions for ecosystem protections. The authority for Councils to implement ecosystem protections was specifically referenced in the Senate Report on the 2007 reauthorization of the MSA, noting that,

A number of the Councils have already demonstrated progress in implementing ecosystem approaches to fisheries management using existing Magnuson-Stevens Act authorities. In recognition of these achievements, and *to clarify existing statutory authority to incorporate ecosystem considerations in FMPs*, section 105 includes a provision that would expressly authorize FMPs to contain management measures for the conservation of non-target species and habitat.

S. Rep. 109-229, 109<sup>th</sup> Cong. 2<sup>nd</sup> Sess. 2006, 2006 WL 861883 \*23 (emphasis added).

In sum, the Council has the authority under the MSA to close waters beyond 3,500 meters to bottom trawling to protect the marine ecosystem. As discussed in more detail below, multiple MSA provisions give the Council authority to conserve and manage marine habitats by

prohibiting certain types of fishing or gear, regardless whether that habitat area has a relationship to a currently managed fishery.

### **MSA Section 303(b) Does Not Require that Habitat Protections Be Related to the Managed Fishery**

MSA section 303(b) provides that the Council may include a number of discretionary provisions in any FMP prepared for any fishery. 16 U.S.C. § 1853(b). Plainly read, this section of the statute simply authorizes Councils to undertake certain types of measures – many of which are expressly oriented toward conserving the marine environment – and include them in their FMPs. NMFS notes that it disapproved a similar deepwater closure in 2006 based on the notion that such measures must be “necessary and appropriate for the conservation and management of the fishery to prevent overfishing and rebuild overfished stocks, and to protect, restore, and promote the long-term health and stability of the fishery” and suggests that the same standard applies here. NMFS Report to Council, Agenda Item D.6.a., June 2015, p.1 [http://www.pcouncil.org/wp-content/uploads/2015/05/D6a\\_NMFS\\_Rpt\\_AuthoritiesEFHandRCA\\_JUN2015BB.pdf](http://www.pcouncil.org/wp-content/uploads/2015/05/D6a_NMFS_Rpt_AuthoritiesEFHandRCA_JUN2015BB.pdf) (“Two of these authorities, §303(b)(2)(A) and §303(b)(12) require a relationship to the managed fishery.”). NMFS’s argument was incorrect in 2006 and it remains incorrect now.

The “necessary and appropriate” language NMFS relies on is found in section 303(a)(1), which sets forth measures that Councils are “required” to include in every FMP. 16 U.S.C. § 1853(a)(1). The same language does *not* appear at the beginning of section 303(b).

One of the most basic rules of statutory interpretation dictates that where particular language appears in one section of a statute but not in the other, Congress only intended that language to apply to the section where the language explicitly appears. “When Congress includes a specific term in one section of a statute but omits it in another section of the same Act, it should not be implied where it is excluded.” *Arizona Elec. Power Co-op. v. United States*, 816 F.2d 1366, 1375 (9th Cir. 1987). NMFS’s superimposition of language from section 303(a)(1) onto section 303(b) violates this basic principle and would inappropriately limit the Council’s discretionary authority.

In fact, the phrases “necessary for the conservation and management of the fishery” and “necessary and appropriate for the conservation and management of the fishery” appear in only three discrete places in 303(b) – 303(b)(3), 303(b)(8), and 303(b)(14), none of which is at issue here. 16 U.S.C. §§ 1853(b)(3), (8), (14). Here again, basic rules of statutory interpretation require that we assume that Congress acted knowingly and intentionally when it included that language in one subsection but omitted it in the others. The fact that the “necessary and



appropriate” language appears only in those particular subsections and not at the beginning of 303(b) indicates that the requirement only applies to those subsections.

To the extent NMFS assumes that some “relationship to the managed fishery” is required by the language in subsections 303(b)(2)(A) and 303(b)(12) themselves, that assumption lacks any clear basis in the statute. Section 303(b)(2)(A) simply allows the Council to designate zones where and time periods when fishing will be limited or prohibited, or only specified types of gear will be permitted. 16 U.S.C. § 1853(b)(2)(A). The plain language of this provision does not require that the area to be regulated be subject to any current fishing activity or that it even support a currently managed fishery. Indeed, the provision does not specify any criteria for selecting a zone in which to restrict fishing. Rather, the most rational, obvious reading of the provision is that it allows the Council to prospectively regulate fishing activity in order to *prevent* adverse impacts to zones where the Council chooses to do so.

Section 303(b)(12) is similarly broad, allowing the Council to “include management measures in the plan to conserve target and non-target species and habitats, considering the variety of ecological factors affecting fishery populations.” 16 U.S.C. § 1853(b)(12). The provision’s requirement for the Council to “consider” such ecological factors affecting fishery populations does not translate to a requirement that management measures to conserve non-target species and habitats have a direct relationship to a managed fishery. The Senate Committee on Commerce, Science, and Transportation characterized the purpose of this provision, which was added in the 2007 Magnuson Act amendments, as “to allow an FMP to include management measures that consider a variety of ecological factors affecting fishery populations, including the conservation of target and non-target species. This provision is intended to encourage Councils to continue to include ecosystem considerations in FMPs.” S. Rep. 109-229, 109<sup>th</sup> Cong. 2<sup>nd</sup> Sess. 2006, 2006 WL 861883 \*24. Far from requiring the Council to focus narrowly on the needs of the managed fishery, this provision is meant to foster broader efforts to address the needs of the ecosystem, recognizing that healthy fishery populations depend on healthy ecosystems.

In sum, the Council has the authority under the MSA’s discretionary 303(b) provisions to close waters beyond 3,500m to bottom trawling to protect the marine ecosystem regardless whether such a closure is considered “necessary and appropriate for the conservation and management” of the groundfish fishery. In fact, NMFS’s own regulatory guidelines specify that “[a]n FMP may describe, identify, and protect the habitat of species not in [a fishery management unit].” 50 C.F.R. § 600.805(b)(1).<sup>1</sup>

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<sup>1</sup> It is worth noting that prey species eaten by fish species within the groundfish FMU likely occur within the proposed deepwater closure area. Because food sources are part of essential fish habitat, the likely presence of prey species makes this area appropriate for designation as essential fish habitat pursuant to MSA section 303(a)(7) and 305(b).

Even if NMFS could identify a rational basis for requiring the Council to demonstrate that the proposed closure has a “relationship to managed fishery,” such a relationship does exist. The potentially harmful gear that would be prohibited in waters deeper than 3,500m is the gear used in the groundfish fishery. That gear is an essential element of the groundfish fishery because it is the means by which stocks in the fishery are caught – *i.e.* trawling is how the fishing is accomplished. That gear is known to cause damage to seafloor habitats. The deepwater closure seeks to prevent such damage, thereby conserving habitat for the broader array of fish stocks within Council jurisdiction, prey for managed species, and the marine environment as a whole. As discussed above, however, the Council need not establish these connections in order to use its clear, discretionary authorities under MSA section 303(b).

## **Conclusion**

Congress gave the Councils ample authority to enact forward-looking, precautionary measures to protect all fish stocks and habitats in the United States EEZ, regardless whether such protections have a direct relationship with a currently managed fishery. We encourage the PFMC to exercise this authority as Congress intended. Thank you for your time and consideration of this issue. Please do not hesitate to contact me with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'Andrea A. Treece', with a long horizontal flourish extending to the right.

Andrea A. Treece  
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September 2, 2015

Dorothy Lowman, Chair  
Pacific Fishery Management Council  
1100 NE Ambassador Place, #101  
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RE: Scientists statement on habitat protection for waters beyond 3,500 meters (public comment for agenda item H.8)

Dear Chair Lowman and Council Members,

We the undersigned 101 marine scientists write to request that you include an alternative for closing federally managed waters deeper than 3,500 meters to bottom trawl fishing gear in your upcoming habitat amendment to the Groundfish Fishery Management Plan (FMP). We appreciate the previous steps taken by the Pacific Fishery Management Council (Council) to protect unfished deepwater areas, including the existing bottom trawl closure of seabed between 1,280 meters and 3,500 meters water depth.<sup>1</sup> We also appreciate your past attempt to include waters deeper than 3,500 meters in this protective closure.<sup>2</sup> While that previous attempt was ultimately unsuccessful, new information on the area, a bolstered legal authority for habitat protection, and the current FMP amendment now provide another opportunity to protect this area.

Our scientific understanding of the area in question is still quite limited and yet we know that it has the paired attributes of value and vulnerability that justify protection. The deep sea is of critical importance to the global ecosystem and human society, providing a variety of services that support, provision and regulate everything from shallower-water productivity to the global climate.<sup>3</sup> An ecosystem-based approach to fisheries management (EBFM), which this Council has increasingly used in its decision-making, calls for recognizing the intrinsic value and vulnerability of these pristine deep-sea habitats and protecting them until the potential impacts of any human activity that might be authorized in the future are fully understood and addressed.

### **Deep-sea areas and their characteristics:**

The deep sea, including the abyssal plain areas now under consideration for protection by the Council, is crucial to our lives and to the health of global oceans. The deep sea provides a host of important ecosystem functions and services. It helps reduce the impacts of anthropogenic carbon release by transporting, oxidizing and storing greenhouse gasses like carbon dioxide and methane.<sup>4</sup> It provides important natural resources to humans, from fish stocks to potential new medicine, mineral or energy resources.<sup>5</sup> Off the U.S. west coast, the upwelling that makes the California Current one of the most vibrant and productive marine ecosystems in the world is an example of deep-sea nutrient regeneration, where the bounty of the deep sea is brought back to the surface to fuel primary production and thus harvestable fish stocks.<sup>6</sup> Finally, the living marine habitat of the deep sea, including the corals found beyond 3,500 meters off California, are a crucial foundation of this important ecosystem. In fact, scientists refer to cold-water corals found on deep shelf, slope, and abyssal plain habitats as “ecosystem engineers” because of their role in creating habitats used by invertebrates and fish.<sup>7</sup>

The deep-sea floor can generally be divided into two broad zones: continental margins (~ 200 meters to 4,000 meters depth) and abyssal plains (generally dominated by soft sediments and found from ~ 4,000 meters to 6,000 meters depth).<sup>8</sup> Within these broad zones there are important regional habitats that inject additional structural and biological diversity, such as seamounts, canyons, hydrothermal vents and methane seeps. Combined, deep-sea ecosystems are the largest environment on Earth, with over 63% of the surface area of the globe found deeper than 200 meters. Marine life is similarly concentrated here: 50% of total marine benthic biomass is found below 3,000 meters.<sup>9</sup>

Unprotected seafloor deeper than 3,500 meters makes up ~ 40% of federally managed ocean waters in the Exclusive Economic Zone (EEZ) of the U.S. West Coast. This area is found off California south of the undersea feature known as the Mendocino Ridge. The diversity of habitats found in this region has long been recognized, for example the National Oceanic and Atmospheric Administration's Fisheries Service (NOAA Fisheries) describes this area as follows: "*features that occur beyond 3500m include hydrothermal vents, soft-bottom sediments, and hard bottom areas with biogenic habitats such as deep sea corals.*"<sup>10</sup> While the presence of these features is recognized their location and abundance is still largely uncharted. For example, it is estimated that globally over 100,000 seamounts over one kilometer in height remain uncharted.<sup>11</sup>

Despite its vast size and importance as an ecosystem, the deep sea remains among the least known and understood environments on Earth. According to a National Research Council report, some estimates suggest that as much as 95 percent of the world ocean and 99 percent of the ocean floor are still unexplored.<sup>12</sup> This limited exploration presents fundamental and recognized challenges to sustainable management of extractive industries in the deep sea. For example NOAA's Deep-Sea Coral Research and Technology Program states that "*Currently, it is impossible to ascertain the overall extent of deep coral communities, much less their condition or conservation status in U.S. waters, because so many of the deeper areas these communities inhabit have been explored incompletely or have not been explored at all.*"<sup>13</sup> The deep sea off the U.S. West Coast is no exception. NOAA Fisheries recently described the state of deep-sea habitat surveys in this area: "*seabed habitat mapping has been conducted only over continental shelf and slope and inland seas, and coverage of those areas is very patchy across the West Coast. The abyssal plain and continental rise remain largely un-described for seabed type and extent.*"<sup>14</sup>

Despite the limits of our knowledge, we have learned enough to say that the deep-sea floor is a vibrant ecosystem whose biodiversity rivals that of coral reefs.<sup>15</sup> The deep-sea floor features extensive areas of living marine (biogenic) habitat, three dimensional structures created by organisms including corals and sponges. Deep-sea corals are fragile, bottom-dwelling animals that grow at depths greater than 50 meters with certain species capable of living for more than 4,000 years if undisturbed.<sup>16</sup> Throughout their extensive lives, deep-sea corals are thought to form essential fish habitat.<sup>17</sup> While we do not know the precise distribution of deep-sea corals off California, we do know they occur in the federally-managed waters deeper than 3,500 meters.<sup>18</sup>

While corals are obvious epicenters of biodiversity, much of the total deep-sea diversity is found living in or on mud. These are areas fueled by a steady but slow diet of falling "marine snow" (comprised of mucus, fecal matter, and body parts) with periodic and dramatic "feasts" of organic matter delivered quickly due to a bloom of marine creatures miles above on the surface.<sup>19</sup> Occasionally larger food deposits occur, such as "whale falls" that bring an unexpected bounty of

food to the deep sea and result in a unique community that can persist for a century.<sup>20</sup> Each of these deposits to the deep sea bring with them carbon from the atmosphere, helping to mitigate global climate variability. Concurrently, the activity of animals on the seafloor release the nutrients trapped in this deposited food so they may later fuel the phytoplankton that shallower water fisheries need to thrive.<sup>21</sup>

In addition to the supporting and regulating services that the deep-sea delivers, the mystery of the deep sea provides important cultural and historical services to society. Each new scientific expedition to the deep ocean floor yields new discoveries ranging from novel species, such as a carnivorous sponge found off California,<sup>22</sup> to entirely new habitats, such as new methane seeps found right offshore of San Diego in 2012.<sup>23</sup> In December 2014, deep-sea life made headlines all over the world when an expedition to the Mariana Trench set a new world record for the deepest observation of a living fish, an unidentified and possibly new species of snailfish filmed at 8,143 meters (26,872 feet).<sup>24</sup> Just this year off California, researchers from NOAA led a team that located and surveyed the wreck of the World War Two aircraft carrier USS *Independence* in water half a mile deep within the Gulf of the Farallones National Marine Sanctuary.<sup>25</sup>

These areas and the services they provide are not impervious to human impacts.<sup>26</sup> Climate change is expected to pervasively impact the functions of the deep sea in several ways as a result of ocean acidification, declining oxygen and productivity, and increasing temperature.<sup>27</sup> In addition to these global stressors, the deep sea and its ecosystem services are under increasing demand and pressure on multiple fronts, including fishing, hydrocarbon extraction, and mining.<sup>28</sup> NOAA Fisheries, discussing the seafloor beyond 3,500 meters off California, stated that “*all or most of the deep sea environments are likely to be highly sensitive to impact, including very low levels of fishing effort (e.g. a single trawl), and have extended recovery times (over 7 years). Thus, they can be very sensitive to bottom trawling and would take a long time to recover from this impact.*”<sup>29</sup>

The aforementioned extensive lifespan of deep-sea corals is clearly irreconcilable with requirements in U.S. fisheries law to minimize adverse effects to essential fish habitat that are more than minimal and not temporary, as any fishing impacts cannot be considered temporary on human time scales.<sup>30</sup> The impacts of trawling on these communities has also been shown: deep-sea coral communities that have experienced trawling have a three-fold decrease in the diversity and density of fauna present.<sup>31</sup> Further, impacts such as this that result in biodiversity loss have been found to result in an exponential decline in the functions that occur in the deep sea.<sup>32</sup> There is little question that deep-sea habitats will be exposed to multiple human impacts in the coming decades with unknown ramifications to the ecosystem services they provide. However physical disturbance from extractive fishing practices, if it occurs, would likely exacerbate or overshadow these other stressors by modifying the structure and biodiversity of the deep.

### **Protecting pristine deep-sea floor is consistent with an ecosystem-based approach:**

Almost twenty years ago, in its report to Congress, the Ecosystem Principles Advisory Panel (EPAP) articulated basic policies for implementing EBFM that included two key recommendations consistent with a precautionary bottom trawling closure beyond 3,500 meters: (1) proactively evaluate the effects of potential new fisheries in advance and (2) apply the precautionary approach.<sup>33</sup> Additionally, the EPAP further articulates the importance of habitat protection in its

report for both target and non-target species.<sup>34</sup> More recently, over 200 scientists and policy experts developed a consensus statement on EBFM that highlighted scientific understanding of marine ecosystems and articulated the vision of the scientific community when it recommends ecosystem-based management for the ocean. This 2005 statement includes recommendations that bolster the case for protecting the abyssal plain areas off California now. In particular, the signatories to this statement include the following as one of nine key elements of marine ecosystem based management: *“Require evidence that an action will not cause undue harm to ecosystem functioning before allowing that action to proceed.”*<sup>35</sup> They also articulate what it means to apply a precautionary approach, stating that *“levels of precaution should be proportional to the amount of information available such that the less that is known about a system, the more precautionary management decisions should be.”*<sup>36</sup>

## **Conclusions**

In light of the current lack of information on the remote seafloor beyond 3,500 meters, including the fact that corals and other biogenic habitat are known to exist there but are largely unmapped, it is clear that a precautionary closure is appropriate. The impacts of fishing there cannot be adequately estimated or analyzed at this time given current information, except to say that there would almost certainly be detrimental impacts.

Therefore it is the consensus of the undersigned scientists that protection of this valuable and vulnerable area is a sensible and scientifically defensible action. It is consistent with the best scientific information available and with an ecosystem based approach to management. We recognize and appreciate the past efforts of the Council to implement an ecosystem based approach and to protect important habitats, and we now encourage you to include alternatives to close waters beyond 3,500 meters to bottom trawling.

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*International Signatories:* Many of the ecosystem services provided by the deep sea extend far beyond the jurisdictions of one country. While the stakeholders for the extractable resources in this area are U.S.-based, the stakeholders for the regulating services provided by the deep sea are the global population. As the alternative proposed here has ramifications far outside of the U.S. EEZ, we have included signatories from outside of the U.S. to show support for this letter.

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## Notes:

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- <sup>1</sup> PFMC, [Amendment 19 Final EIS](#), December 2005, page ix
- <sup>2</sup> Ibid.; see also NOAA Fisheries, [Amendment 19 Record of Decision](#), March 2006, pp. 24-25
- <sup>3</sup> Thurber, A.R., Sweetman, A.K., Narayanaswamy, B.E., Jones, D.O.B., Ingels, J., Hansman, R.L. 2013. Ecosystem function and services provided by the deep sea. *Biogeosciences* 11(14), 3941-3963.
- <sup>4</sup> Ibid.
- <sup>5</sup> Ibid.
- <sup>6</sup> Ibid.
- <sup>7</sup> L.A. Dodds, Roberts, J.M., Taylor, A.C, Marubini, F. 2007. Metabolic tolerance of the cold-water coral *Lophelia pertusa* (Scleractinia) to temperature and dissolved oxygen. *Journal of Experimental Marine Biology and Ecology*. 349: 205-214.
- <sup>8</sup> Gage, J. D., and P. A. Tyler. Deep-sea biology: a natural history of organisms at the deep-sea floor, Cambridge University Press. 1991
- <sup>9</sup> Wei, C.-L., Rowe, G. T., Escobar-Briones, E., Boetius, A., Soltwedel, T., Caley, M. J., Soliman, Y., Huettmann, F., Qu, F., Yu, Z., Pitcher, C. R., Haedrich, R. L., Wicksten, M. K., Rex, M. A., Baguley, J. G., Sharma, J., Danovaro, R., MacDonald, I. R., Nunnally, C. C., Deming, J. W., Montagna, P., Lévesque, M., Weslawski, J. M., Wlodarska-Kowalczyk, M., Ingole, B. S., Bett, B. J., Billett, D. S. M., Yool, A., Bluhm, B. A., Iken, K., Narayanaswamy, B. E.: Global patterns and predictions of seafloor biomass using random forests, *PLoS ONE*, 5, e15323, doi:10.1371/journal.pone.0015323, 2010.
- <sup>10</sup> NOAA Fisheries, [Amendment 19 Record of Decision](#), March 2006, p. 25
- <sup>11</sup> Wessel, P., Sandwell, D. T., Kim, S.-S. 2010. The global seamount census. *Oceanography* 23: 24.
- <sup>12</sup> National Research Council, Committee on Exploration of the Seas, [Exploration of the Seas: Voyage into the Unknown](#) ISBN: 0-309-08927-1, 228 pages, 7 x 10, (2003), at p.16
- <sup>13</sup> Lumsden, S.E., Hourigan, T.F., Bruckner, A.W., Dorr, G. (eds.) 2007. [The State of Deep Coral Ecosystems of the United States. NOAA Technical Memorandum CRCP-3](#). Silver Spring MD, at p.32
- <sup>14</sup> Pacific Fishery Management Council, March 2014 Briefing Book, [Agenda Item D.2.c Supplemental NW/SWFSC Report](#), page 3
- <sup>15</sup> Hessler, R., and H. L Sanders. 1967. Faunal diversity in the deep-sea. *Deep Sea Research and Oceanographic Abstracts*. 65–78.
- <sup>16</sup> Husebø, A.A., Nøttestad, L., Fossaa, J. H., Furevik, D. M., and Jørgensen, S. B. 2002. Distribution and abundance of fish in deep-sea coral habitats. *Hydrobiologia* 471: 91–99
- <sup>17</sup> Ibid.
- <sup>18</sup> See Entnoyer and Morgan, [Occurrences of Habitat-forming Deep Sea Corals in the Northeast Pacific Ocean: A Report to NOAA’s Office of Habitat Conservation](#), 2003, p. 15 (which documents bamboo coral (family *Isididae*) at 3,880 meters off Southern California). See also Guinotte, J.M. and A.J. Davies (2012), [Predicted deep-sea coral habitat suitability for the U.S. West Coast](#), Report to NOAA-NMFS. P. 46 (which documents *Scleractinian* corals at approximately 4,000 meters in waters near Davidson Seamount)
- <sup>19</sup> Jørgensen, B. B., and A. Boetius. 2007. Feast and famine — microbial life in the deep-sea bed. *Nat Rev Micro* 5: 770–781.
- <sup>20</sup> Smith, C. R., and A. R. Baco. 2003. Ecology of whale falls at the deep-sea floor. *Oceanography and Marine Biology: An Annual Review Volume* 41: 311–354.
- <sup>21</sup> Thurber, A.R., Sweetman, A.K., Narayanaswamy, B.E., Jones, D.O.B., Ingels, J., Hansman, R.L.. 2013. Ecosystem function and services provided by the deep sea. *Biogeosciences* 11(14), 3941-3963.
- <sup>22</sup> Lee, W. L., Reiswig, H. M., Austin, W. C. and Lundsten, L. (2012), [An extraordinary new carnivorous sponge, \*Chondrocladia lyra\*, in the new subgenus \*Symmetrocladia\* \(Demospongiae, Cladorhizidae\), from off of northern California, USA](#). *Invertebrate Biology*. doi: 10.1111/ivb.12001
- <sup>23</sup> Maloney, J.M., Grupe, B.M., Pasulka, A.L., Dawson, K.S., Case, D.H., Frieder, C.A., Levin, L.A., and N. W. Driscoll. 2015. Transpressional segment boundaries in strike-slip fault systems offshore southern California: Implications for fluid expulsion and cold seep habitats. *Geophys. Res. Lett.* 42: 2015GL063778
- <sup>24</sup> Whitman College, [Whitman College professor and students discover new species in the deepest trench on earth](#), press release, December 19, 2014
- <sup>25</sup> NOAA National Marine Sanctuaries Program, “[NOAA, partners, survey 'amazingly intact' historic WWII-era aircraft carrier](#)”, press release, April 16, 2015

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<sup>26</sup> Ramirez-Llodra, E., P. A. Tyler, M. C. Baker, O. A. Bergstad, M. R. Clark, E. Escobar, L. A. Levin, L. Menot, A. A. Rowden, C. R. Smith, and C. L. Van Dover. 2011. Man and the Last Great Wilderness: Human Impact on the Deep Sea. *PLoS ONE* 6: e22588.

<sup>27</sup> Mora, C., Wei, C.-L., Rollo, A., Amaro, T., Baco, A. R., Billett, D., Bopp, L., Chen, Q., Collier, M., Danovaro, R., Gooday, A. J., Grupe, B. M., Halloran, P. R., Ingels, J., Jones, D. O. B., Levin, L. A., Nakano, H., Norling, K., Ramirez-Llodra, E., Rex, M., Ruhl, H. A., Smith, C. R., Sweetman, A. K., Thurber, A. R., Tjiputra, J. F., Usseglio, P., Watling, L., Wu, T., and Yasuhara, M.: Biotic and human vulnerability to projected changes in ocean biogeochemistry over the 21st century, *PLoS Biol.*, 11, e1001682, doi:10.1371/journal.pbio.1001682, 2013.

<sup>28</sup> Ramirez-Llodra, E., P. A. Tyler, M. C. Baker, O. A. Bergstad, M. R. Clark, E. Escobar, L. A. Levin, L. Menot, A. A. Rowden, C. R. Smith, and C. L. Van Dover. 2011. Man and the Last Great Wilderness: Human Impact on the Deep Sea. *PLoS ONE* 6: e22588.

<sup>29</sup> See NOAA Fisheries, [Amendment 19 Record of Decision](#), March 2006, p. 25

<sup>30</sup> Roark, E. B., Guilderson, T. P., Dunbar, R. B., Fallon, S. J., and Mucciarone, D. A. 2009. [Extreme longevity in proteinaceous deep-sea corals](#). *Proceedings of the National Academy of Sciences of the United States of America*, 106: 5204–5208.

<sup>31</sup> Althaus, F., Williams, A., Schlacher, T.A., Kloser, R. J., Green, M.A., Barker, B.A., Bax, N.J., Brodie, P., Schlacher-Hoenlinger, M. A. 2009. Impacts of bottom trawling on deep-coral ecosystems of seamounts are long-lasting. *Marine Ecology Progress Series* 397:279-294.

<sup>32</sup> Danovaro, R., Gambi, C., Dell’Anno, A., Corinaldesi, C., Fraschetti, S., Vanreusel, A., Vincx, M., and A. J. Gooday. 2008. Exponential Decline of Deep-Sea Ecosystem Functioning Linked to Benthic Biodiversity Loss. *Current Biology* 18: 1–8.

<sup>33</sup> NOAA FISHERIES, “[ECOSYSTEM-BASED FISHERY MANAGEMENT: A Report to Congress by the Ecosystem Principles Advisory Panel](#)”, 1998, p. 1

<sup>34</sup> *Ibid*, at p. 3

<sup>35</sup> McLeod, K.L., Lubchenco, J., Palumbi, S.R., and A.A. Rosenberg. 2005. Scientific Consensus Statement on Marine Ecosystem-Based Management. Signed by 221 academic scientists and policy experts with relevant expertise and published by the Communication Partnership for Science and the Sea at <http://compassonline.org/?q=EBM>.

<sup>36</sup> *Ibid*