

Stakeholder Workshops to Explore Ecological Risk Assessment (ERA) as a Potential Prioritization Tool to Support Fisheries Management in California

June 15, 2017 - Long Beach, California | July 27, 2017 - Santa Rosa, California

Summary of Key Themes and Discussion Highlights

Ocean Science Trust (OST) is exploring a class of tools called ecological risk assessments (ERAs) that may help the State prioritize fisheries for management. This pilot project is being developed in partnership with, and for consideration by, the California Department of Fish and Wildlife (CDFW) to help inform the State's process to amend the Marine Life Management Act (MLMA) Master Plan.

On June 15 (Long Beach) and July 27 (Santa Rosa) 2017, two workshops were convened to introduce draft ERA tools to interested stakeholders and solicit their input on the tools' utility and function related to CDFW and stakeholder priorities. Both workshops followed a similar [agenda](#), although the Santa Rosa workshop reflected updates to the ERA tool and workshop structure in response to recommendations made by Long Beach workshop participants. At each workshop, participants were invited to:

- Review overall draft ERA scores for nine pilot fisheries as examples of considering the risk of fishing activity to target stocks, bycatch species, as well as to habitats, and provide feedback on the draft tools related to CDFW and stakeholder priorities;
- Review specific attributes and scores for one of the nine pilot fisheries as an exercise to gain a deeper understanding of the process of scoring;
- Explore Productivity Susceptibility Analysis (PSA), another type of risk assessment, which focuses on the risk of fishing activity to target species, and its preliminary results; and
- Learn about the MLMA Master Plan amendment process, including how ERAs may support CDFW's broader prioritization goals.

Across both workshops, the Project Team engaged with 28 participants, including fishermen, agency staff, academic scientists, and environmental organization representations. Invited participants were those community leaders, or "key communicators," who have direct access to target audiences and are interested in serving as a liaison to disseminate information to their constituents. In an effort to invite fishermen from the nine fisheries that were piloted in this project, targeted outreach was conducted to increase commercial and recreational fishing representation. Lastly, all interested stakeholders who learned about the workshops through various communication channels and expressed interest in attending were extended an invitation.

This document provides an overview of the discussion topics, key questions, and identified next steps that emerged from both workshops, as well as input received during informal discussions with participants. Additionally, a list of key resources is available at the end of the document for ready access to materials and products referenced during and/or developed for the workshops. This summary is intended to capture high-level details and key themes, rather than a transcript of the discussion.

All final products from this project, including a final report that will include this summary of key themes, will be submitted to CDFW for review and may be integrated, in full or in part, into a draft Master Plan Amendment.

Additional information about the amendment process, including key resources and additional opportunities for stakeholder engagement, is available [here](#). For information about the ERA pilot project, contact Errin Ramanujam at errin.ramanujam@oceansciencetrust.org or visit <http://www.oceansciencetrust.org/projects/era/>.

Overview

About the MLMA Master Plan

The [MLMA Master Plan for Fisheries \(Master Plan\)](#) is a planning document that describes how California fisheries are managed. The Master Plan is intended to help focus management efforts on the highest priority species and to describe the specific tools and approaches to be applied to achieve the goals of the MLMA. The current Master Plan was developed by CDFW with input from stakeholders and approved by the Fish and Game Commission in 2001 and has not been updated in over 15 years. CDFW has been in the process of amending the MLMA Master Plan since late 2015 to better achieve the mandates of the MLMA and provide enhanced transparency and consistency in the state's approach to fishery management. The amended Master Plan will also enable the state to apply scientific advances in fisheries management, be more responsive to potential impacts due to changing climate and oceanic conditions, and increase our understanding of socio-economic drivers and human dimensions to better support healthy marine ecosystems and sustainable fisheries.

About the PSA and ERA Pilot Projects

Building off their previous research, over the past 18-months, OST has assisted CDFW in exploring and performing pilot tests of two different risk assessment tools, ERA and PSA, as one of 13 [MLMA Master Plan amendment information gathering projects](#) to help inform the state's process to amend the MLMA Master Plan. These risk assessment tools may help CDFW to prioritize fisheries for consideration for management actions such as fishery management plans (FMPs), harvest control rules, or data collection and monitoring activities. For both of these projects a "fishery" is defined as a combination of a species, fishing gear type, and sector (recreational or commercial). For example the California Halibut, recreational, hook-and-line fishery is analyzed separately from the California Halibut, commercial, hook-and-line fishery. However, the results can also be integrated to enable a higher-level understanding and visualization of the target species.

As a first step, a PSA pilot project was conducted by a consultant team, [MRAG Americas](#), that worked with the Project Team to conduct a National Oceanic and Atmospheric Administration (NOAA) PSA¹ on 45 fisheries, each composed of a species/gear/sector type combination, representing 36 California state-managed marine species. Each PSA was subsequently reviewed by a CDFW fishery expert, or CDFW staff responsible with overseeing the management of specific fisheries, and some scores were revised. The PSA was focused on understanding the risk of fishing activity to target species. A final report "[Productivity and Susceptibility Analysis for Selected California Fisheries](#)" (MRAG Americas, December 2016) was published that summarizes the tool framework and preliminary results.

Parallel to the PSA information gathering project, an ERA pilot project was initiated with CDFW and NOAA researchers to customize an existing NOAA ERA ([Samhour and Levin, 2012](#)) to expand upon the goals of the MLMA and consider the relative risk that a fishery may cause not only to the target stock, but also to bycatch species, and marine and coastal habitats. CDFW fishery experts conducted initial draft ERAs on nine pilot fisheries, each composed of a species/gear/sector type combination for five California state-managed marine species. The species that were piloted were Pacific herring, California halibut, Kelp bass, California spiny lobster and White sturgeon. The two workshops focused on discussing the draft ERA tool and potential additional considerations and improvements for tool refinement from stakeholders. Draft ERA scores were intended to inform the pilot project, and not developed for direct management use at this time.

¹ NOAA Fisheries Productivity Susceptibility Analysis http://www.nmfs.noaa.gov/sfa/laws_policies/national_standards/psa.html

Stakeholder Workshops, Key Themes & Discussion Highlights

Workshops were timed so the Project Team (OST, CDFW, NOAA) could present, discuss, and learn how to improve the draft ERA tool to make it more accurate and inclusive of stakeholder knowledge and priorities. This exchange of ideas and opportunity for real-time feedback was key to the pilot's early stages of development. Generally, workshop participants were interested in exploring the PSA and ERA tools and the draft results, considering the potential role of risk assessment tools in California fisheries management prioritization, and providing feedback on how the tool should be developed as well as how it might take stakeholder engagement into consideration. The majority of stakeholders expressed an appreciation to see a work in progress and were empowered to contribute suggestions to improve and enhance the integrity and utility of the draft ERA tool.

Stakeholder feedback and fishermen's knowledge were instrumental in guiding the further refinement of the draft ERA tool and revision of scores. Significant modifications were made to the draft ERA tool between the two workshops based on recommendations by participants shared during the Long Beach workshop and continued discussions by the Project Team. Following modifications to the draft ERA tool, CDFW fishery experts performed a second round of scoring to incorporate new information learned. Revised scores were presented at the Santa Rosa workshop and participants that attended both workshops were generally satisfied with the tool refinement and outcomes, and were pleased that their feedback had been considered and integrated. The updated results that were presented at the Santa Rosa workshop more accurately aligned with stakeholders' knowledge and understanding of the pilot test fisheries and the relative impact of fishing on target species, bycatch species, and habitats. Santa Rosa workshop participants offered additional insight and suggestions to improve the draft ERA tool. This led to additional revisions to the tool and another round of revised scoring by CDFW fishery experts. Feedback from both workshops will be included in the final report to CDFW.

The following captures high-level discussion topics and questions that were priorities shared among stakeholders during both workshops. Additional suggestions, concerns, and clarifying questions made by individual workshop participants and other stakeholders interested in the pilot project were captured in the Project Team's notes and also taken into consideration while refining the draft ERA tool and workshop structure.

For a full list of ERA definitions and terms, scoring attributes, and access to a sample scoring sheet, [click here](#).

Participants were interested to understand how draft results from the PSA and ERA pilot projects will be used by CDFW in the MLMA Master Plan amendment process to prioritize fisheries for management consideration and/or action.

- The MLMA [objectives](#) require the State to identify a process to prioritize future management actions both among and within fisheries. PSA and ERA are two potential tools that may be used to inform the State's prioritization process *among* fisheries.
- CDFW will evaluate the tools and recommendations from the 13 information gathering projects, together with input from stakeholders, and consider integrating findings in part or full into the draft amended Master Plan. PSA and ERA constitute one of these information gathering projects.
- Draft scoring results for pilot fisheries are not intended to be used for management purposes at this time, but rather to help the Project Team evaluate the functionality of the tool and identify areas in need of improvement and further ground-truthing.
- In addition to this Key Themes Summary, OST will deliver a report to CDFW that summarizes the ERA tool framework and recommendations for tool use and further refinement that consider lessons learned

from the pilot project and stakeholder feedback learned during workshops. This report will be made publically available via the [OST ERA webpage](#). This report, together with the MRAG Americas PSA report, will be used by CDFW to inform their approach to prioritization as part of the draft amended framework for MLMA-Based Management.

- CDFW aims to arrive at a draft approach to prioritization in Fall 2017 and will share information with stakeholders and solicit feedback during a public discussion as part of the MLMA amendment process stakeholder discussion series (tentatively scheduled for September 2017).

There are some attributes and guilds within the bycatch and habitat assessments that are more useful than others when assessing risk from fisheries and should be weighted more heavily so the draft scores better reflect the relative usefulness of these attributes and guilds.

- Building on Project Team discussions regarding weighting specific attributes and guilds, Long Beach participants offered several suggestions:
 - For bycatch species, participants identified the exposure attribute ‘magnitude’ and sensitivity attribute ‘release mortality’ as ones which should be weighted more heavily than the other attributes. When considering risks to habitats, participants suggested the exposure attribute ‘MPAs’ and sensitivity attribute ‘damage’ should be weighted more heavily.
 - In response to the feedback and suggestions, ‘magnitude’ and ‘release mortality’ attributes were modified to account for 50% of the weight of the exposure and sensitivity attributes, respectively, for bycatch impacts. ‘Gear footprint’ and ‘damage’ attributes were modified to account for 50% of the weight of the exposure and sensitivity attributes, respectively, for habitat impacts.
- Participants discussed the need to present results that more accurately reflect the relationship between a fishery’s interaction with bycatch species and habitat.
 - For example, when discussing potential risk to bycatch, stakeholders highlighted the importance of identifying fisheries that interact with the guild threatened and endangered species (mammals, birds, salmonids). Similarly, when discussing risk to habitat, stakeholders suggested highlighting the number of habitats with which the fishery interacts, and having the score reflect the relative proportion of habitats in which the fishery operates.
 - In response to this feedback, the size of the points on the draft bycatch results graphs was changed to be proportional to the number of threatened and endangered species with which the fishery interacted. Similarly, the size of the points on the draft habitat results graphs was changed to be proportional to the number of habitats with which the fishery interacted.
 - Additionally, the overall score of the fishery was weighted to reflect the percentage of the fishery that occurred in a particular habitat. For example, if 95% of a fishery occurred in pelagic (open ocean) habitat and 5% in nearshore soft bottom, the scores for pelagic accounted for 95% of the overall score.
- Lastly, stakeholders noted that there needed to be a method to account for the differences in the gear types of different fisheries.
 - In response to this feedback, two options for considering weighting of gear type were presented. The first option was to introduce a new weighted attribute, ‘gear footprint’, to account for the

differences in damage to a habitat caused by a gear type. For this option, gear footprint and damage to habitat attributes were weighted.

- The second option was to not include 'gear footprint' as an attribute and instead apply a different approach that considers gear type, causing a trawl fishery to always score "higher risk" than a hook-and-line fishery. For this option, MPAs and damage to habitat attributes were weighted.
- Updates related to weighting made to the ERA tool between the two workshops were intended to provide examples of weighting approaches that reflected the input and priorities of the workshop participants. Should CDFW decide to pursue the development and use of the draft ERA tool, it will be at the purview of CDFW, with input from stakeholders, to determine the best weighting approach and whether further refinements are needed.

In addition to weighting some attributes and guilds, there are improvements to the definitions and scope of existing attributes that are needed, as well as additional attributes that should be considered to contribute to the development of a more comprehensive draft ERA tool.

- Participants at both workshops suggested the definitions of specific attributes be refined to improve the objectivity of the attribute and promote more uniform interpretation by CDFW fishery experts and stakeholders.
 - The Project Team updated several attribute definitions and included examples within scoring bins between the Long Beach and Santa Rosa workshops.
 - Based on feedback heard during the Long Beach workshop the threatened and endangered guild was clarified to be broader and encompass all threatened or endangered species.
 - Additionally, an exposure attribute, 'damage to habitat from fishing,' was added to the habitat assessment to consider the effects of different gear types.
 - Several participants at the Santa Rosa workshop recommended an attribute that considers the use of multiple habitats by anadromous fish be included in the habitat assessment, and an attribute that takes into account the different selectivity of gear types be incorporated into the target assessment. These suggestions will be included in the report to CDFW as potential options to pursue during future modifications to the draft tool.
- Participants questioned how the quality of available data and information is factored into scoring, and specifically if scores are higher or lower depending on the robustness of the information.
 - Currently, the draft ERA tool has a separate score of 'data quality' which reflects the robustness of the data. This score is higher if there is ample data pertaining to the attribute, based on extensive samples collection and peer-review literature. It is lower if there is less data available or anecdotal/ observational.
 - The Project Team acknowledged there would be value in additional discussion internally and with stakeholders regarding data quality factors.

Bycatch may be defined differently across stakeholder's views and priorities, which can make the bycatch assessment of an ERA more challenging.

- For the purposes of the ERA pilot project and workshops, the working definition of bycatch was defined as "catch that is returned to the water".

- The Project Team highlighted there is no “right” way to define or apply bycatch. The definition of bycatch can change over time and change the way experts score a fishery, but it does not change the mechanics of the tool itself. Rather, it is more important to have a definition and application, once finalized and agreed to, that is consistently applied within the ERA tool.
- One MLMA information gathering project, convened by the Fish and Game Commission (FGC), is currently working to review how the State considers bycatch. It is anticipated that the FGC Bycatch Working Group will inform the amended Master Plan through their review of bycatch language and definitions, as well as any action items that may result within the scope of FGC authority.
- Participants considered whether the working definition of bycatch was accurate since some species (e.g., sea lions) jump into nets and are not caught, and some fisheries (e.g., White sturgeon) carry out ‘catch and release.’ There is a need to consider how to address ‘catch and release’ within the draft tool since the Project Team stated that they had not considered this issue.
- Workshop participants discussed whether sub- and supra- legal sizes of a target species should be considered bycatch species, or whether they should be incorporated into the target assessment as they are target species. There was support and interest in both applications.
 - The definition of bycatch and application to include sub- and supra- legal sizes of a target species as bycatch species is specific to this pilot project only. Both can be modified should CDFW decide to adopt and modify the draft ERA tool in the future as part of the amended Master Plan.

The determination of the spatial scale (e.g., regional or statewide) at which the draft ERA tool is applied is important and can lead to different results.

- Workshop participants highlighted that draft ERA scores may not be reflective of an entire fishery since, depending on where fishing is taking place (e.g., southern or northern California), there are differences in bycatch species, the habitat in which the fishery may operate, the gear types used, and the relative benefits of MPAs. Applying the draft ERA tool at different scales (e.g., local, regional, statewide) could lead to different scores for the overall fishery.
 - For this pilot project, the draft ERA tool was applied statewide. Should CDFW choose to adopt and modify the draft ERA tool in the future as part of the amended Master Plan, there would be value in a discussion about the decision to apply the tool at the regional or state scale. The trade-offs in time, resources, staff capacity, and additional information gained will need to be weighed.

A draft ERA tool should consider changing atmospheric and oceanic conditions.

- CDFW requested the ERA pilot focus on ecosystem impacts as they relate to bycatch and habitat, since they are primary goals of the MLMA.
- The draft ERA tool does not explicitly consider how changing atmospheric and oceanic conditions may impact fish species (target and bycatch) and habitats. Some of the attributes, such as life history traits, can indirectly incorporate climate change impacts on the growth and survival of a species. The draft tool does incorporate natural climate variability.
 - The framework of the draft ERA tool can allow for the inclusion of climate change as a stressor to fisheries should CDFW decide this is a priority for future work.

- One MLMA information gathering project explored the issue of climate change in the sustainable management of California fisheries, and the effects of changing ocean conditions on fisheries (including social, ecological and governance dimensions). [The project](#) also explored ways of building resilience to buffer against potential effects.

There are other stressors that impact fisheries, bycatch species, and habitats - aside from fishing activity - that should be considered as part of the draft ERA tool and CDFW's approach to prioritization.

- Some workshop participants expressed frustration that fishing activity is what prompts the draft ERA tool to point to possible management attention. Other non-fishing activities can also have negative impacts on fish populations, including dredging, coastal development, and an increase in agricultural run-off. Additionally, changes in concentrations of marine invertebrates could cause negative impacts to habitat (e.g., increased populations of purple urchins).
 - CDFW's management authority only applies to regulating fishing activity. Management authority that falls outside fishing requires cooperation and agreement among several agencies with specific, and different, jurisdictions. Attaining a more integrative and comprehensive approach to management action that can address these other stressors to fisheries is a goal of CDFW that this both important and difficult to achieve.
- Some participants stated that socioeconomic considerations should be included in the draft ERA tool.
 - While the draft ERA tool does not currently include attributes specific to socioeconomic considerations, one MLMA information gathering project is focused on identifying the needs and opportunities for gathering socioeconomic information to guide fishery management efforts consistent with the MLMA. Information from [this socioeconomic project](#) may help to inform management decisions that reduce community and socioeconomic impacts and prioritize data collection efforts as part of the department's prioritization approach.

Stakeholders should be involved in the development and implementation of a draft ERA tool.

- Stakeholder input and fishermen's knowledge contributed immensely to the evolution of the draft ERA tool and pilot test scores between the Long Beach and Santa Rosa workshops.
 - Participants across both workshops expressed appreciation to be included in the discussion and evaluation of a tool that was still in its draft form and under consideration by CDFW. While the 'incompleteness' of the draft ERA tool was concerning to some, the majority viewed their involvement in the pilot project as confirmation that CDFW is working towards increased transparency and inclusivity of stakeholders' expertise and priorities.
- Participants discussed recommendations for engaging stakeholders in an ERA process, if CDFW were to adopt an ERA tool as part of the State's approach to prioritization.
 - Stakeholders expressed interest in having small working groups that are representative of the diverse perspectives held within a fishery in the continued development of a draft ERA tool and its potential approach to implementation. The unique composition of each fishery should be considered and reflected in any working group. Emphasis was placed on having a small number of individuals work together to both maximize efficiency and minimize duplicity in points of view and priorities.
 - Stakeholders felt that ERA information and results should be shared with the broader public for their feedback, but that the general public should not play a role in suggesting amendments to

the tool and results. It would be the responsibility of working group members to serve as a liaison to their constituents and convey recommendations and concerns.

- A process for evaluating scores that are informed and/or developed by stakeholders will benefit from further discussion and consideration.
- It was also suggested that progress and/or recommendations made by the Bycatch Working Group to the FGC should be considered by CDFW, especially with respect to the bycatch species assessment.

Next Steps

Stakeholders

- Workshop participants and other interested stakeholders are invited to share additional feedback and insights about the ERA workshops, [ERA pilot project](#), and/or best ways to share updates and products with stakeholders by directly contacting Errin Ramanujam (OST) at errin.ramanujam@oceansciencetrust.org.
- All feedback received from stakeholders and interested members of the public by the end of September will be considered by the Project Team (OST, CDFW, NOAA) as they develop a final report for CDFW that will include recommendations for future draft ERA tool refinement and stakeholder engagement.

Project Team (OST, CDFW, NOAA)

- A final report that includes a summary of the evolution of the draft ERA tool, pilot test results, lessons learned, information about the two workshops, and a comprehensive list of recommendations related to future tool refinement and stakeholder engagement opportunities will be developed and delivered to CDFW to inform the draft amended MLMA Master Plan.
- CDFW will continue to evaluate the utility of the draft ERA tool to inform the State's prioritization process, including the role of stakeholders in reviewing further tool refinement and updated scores. Additionally, CDFW has updated its [timeline](#) to include public review of an initial draft of the Master Plan Amendment prior to submitting a draft to the Fish and Game Commission.

Key References

For more information about the ERA Pilot Project, please visit OST's webpage: <http://www.oceansciencetrust.org/projects/era/>, or contact errin.ramanujam@oceansciencetrust.org.

Materials referenced during the stakeholder workshops are available online at <http://www.oceansciencetrust.org/projects/era/>, including:

- [Workshop Agenda](#)
- [July 27 Santa Rosa ERA Workshop PowerPoint Presentations](#) (at the bottom of the page)
- [Productivity Susceptibility Overview Document](#)
- [Draft Scoring Spreadsheet](#)
- MRAG PSA Report '[Productivity and Susceptibility Analysis for Selected California Fisheries](#)'
- Information about the [Climate Change and California Fisheries Information Gathering Project](#) as part of the MLMA Master Plan Amendment process, including the final scientific guidance document '[Readying California Fisheries for Climate Change](#)' and [report summary](#)

For more information about the MLMA Master Plan Amendment Process, including future opportunities for stakeholder discussions, please visit CDFW's webpage: <https://www.wildlife.ca.gov/Conservation/Marine/MLMA/Master-Plan>, or contact MLMA@wildlife.ca.gov.

Contact Information

For information about the pilot test fisheries and/or scoring approach, please contact the appropriate CDFW fishery expert:

- For California halibut, contact Paul Reilly at Paul.Reilly@wildlife.ca.gov
- For Pacific herring, contact Ryan Bartling at Ryan.Bartling@wildlife.ca.gov
- For Kelp bass, contact Heather Gliniak at Heather.Gliniak@wildlife.ca.gov
- For California spiny lobster, contact Travis Buck at Travis.Buck@wildlife.ca.gov
- For White sturgeon, contact Marty Gingras at Marty.Gingras@wildlife.ca.gov

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