Developing a vision, criteria and options for the future of the OREHP: Situation Analysis

Photo: Hubbs Sea World Research Institute

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Executive Summary

Background: The OREHP is an experimental hatchery program investigating the feasibility of using cultured marine finfish to successfully enhance wild fish populations. Its primary focus has been on spawning, rearing and releasing the white seabass (WSB) (*Atractoscion nobilis*) and assessing the impacts of these releases on the wild stock and fishery. In operation since 1983, the program underwent its first independent Evaluation by a scientific advisory panel in 2017. The Evaluation concluded that the OREHP has contributed to research discoveries surrounding the biology and culture of all life stages of WSB, developed appropriate hatchery and tagging methods, successfully evaluated the post-release survival of hatchery fish and their contribution to the WSB stock, and conducted valuable education and outreach programs. However, the tagging program showed a low contribution of hatchery fish to the WSB stock. The Evaluation indicated a need to adaptively manage and reform the OREHP in the light of its measured outcomes and recommended to undertake a stakeholder-participatory and science-based reform process. In 2020, the California Legislature provided a framework for OREHP reform in AB 1949. The bill establishes a permanent scientific advisory committee (SAC), requires solicitation of input from stakeholders, and requires the California Department of Fish and Wildlife (CDFW) Director to issue a report on progress of the OREHP in meeting its goals and objectives prior to a sunset provision to take effect in 2028.

Purpose of this report: In 2022, CDFW contracted California Sea Grant (CASG) to help develop clear and shared goals for the OREHP, as well as success criteria and options for future development. The contract stipulates a two-stage process, with an initial situation analysis informing the design of a participatory process to develop the vision, goals, and criteria. The situation analysis was conducted based on a review of relevant developments since the 2017 OREHP review and on a series of in-depth, semi-structured interviews conducted with twenty-four OREHP stakeholders reflecting multiple voices across the range of stakeholder groups. Questions aimed to elicit characteristics of fisheries stakeholders, their experiences with the program, views on the OREHP outcomes and governance, and visions for its future. Interview data were analyzed with conventional content analysis. This report details the results of the initial situation analysis.

Stakeholder identities, positions and interest: Stakeholders, defined as persons or entities that have an interest in, may affect, or may be affected by the OREHP, were identified based on past and present direct and indirect associations with the various aspects of the OREHP (e.g., California Department of Fish and Wildlife (CDFW), Hubbs SeaWorld Research Institute (HSWRI), program volunteers, educational program participants, scientists, recreational anglers, commercial fishermen, Coastal Conservation Association (CCA) California members, and environmental non-government organizations (ENGOs). HSWRI, CCA and educational participants were broadly supportive of the OREHP in its current form, whereas other stakeholders expressed varied opinions and levels of support.

Stakeholder perspectives on the OREHP stock contributions and other outcomes. Many stakeholders accepted the results of the 2017 Evaluation and viewed the program's contribution to the WSB stock and fishery as ineffective. Others, particularly those associated with CCA or the OREHP's educational program "Seabass in the Classroom" (SITC) expressed a strong belief that the program had contributed far more to the WSB stock and fishery than estimated from the tagging program and concluded in the Evaluation. The latter group felt vindicated by a recent genetics study which hinted at potentially larger hatchery contributions, and which is currently being peer reviewed by the SAC. There were also comments about the lack of integration of the OREHP and a recent stock assessment into fisheries

management, and that data collection and research opportunities available through collaboration with other users were not being utilized. A sense of contributing to resource stewardship among program volunteers, K-12 educators, and engaged anglers represents a positive social outcome. The SITC K-12 educational program was viewed as valuable but was criticized by some for not providing accurate information about the OREHP's ultimate contribution to the WSB stock Whereas the stated purpose of the OREHP is research on hatchery production and the efficacy of hatchery releases for the enhancement of stocks, most stakeholders considered the realized or potential contribution of the OREHP to enhancing the WSB stock as a key measure of OREHP performance. The confidence in the contributions to the WSB stock and fishery that were calculated using the OREHP's tagging data differed widely across the variety of stakeholders and was influenced by the stakeholders' fundamental beliefs in the value of the program, personal experiences fishing and/or with the OREHP and overall trust in fisheries science.and fishery. Lastly, it was noted that many stakeholders at large are likely not familiar with the program, its operation, the questions surrounding its contribution, or the governance process.

Stakeholder perspectives on governance: There was no consensus on the goal of the OREHP and the criteria for evaluating its effectiveness. The perceived success of the program varied depending on whether the main goal was viewed as being to conduct research for the enhancement of WSB, or to verily enhance the WSB population. Stakeholders broadly supportive of the program were concerned about the sunset provision in AB 1949, the short timeframe for demonstrating success and the uncertainty over how success would be defined and measured. Stakeholder representation in the governance of OREHP was an issue brought up by many. AB 1949 provides for obtaining input from all fishing stakeholders, the broader public and non-governmental organizations. However, many interviewees felt that in practice, the discourse surrounding the OREHP has been dominated by recreational fishing stakeholders and K-12 educators closely connected with OREHP through personal or organizational ties. It is therefore important to create opportunities for stakeholders from other groups (e.g., commercial and charter fishing operators, the wider public, and NGOs) and from recreational and educational stakeholders not closely connected with the OREHP to learn (more) about the Program and contribute effectively to the discourse. Some stakeholders felt that CDFW and HSWRI were in a public relations dilemma given the length of the program and limited contribution to the stock and the fishery while at the same time needing to maintain their reputation and stakeholder support in order to continue operations.

Perspectives on the future of the OREHP: Many stakeholders shared the view that the OREHP needs better integration with fisheries management, better monitoring of contributions to the WSB fishery, and greater accountability. Many stakeholders also suggested a need for more diverse and fair representation of stakeholders in the Ocean Resources Enhancement Advisory Panel (OREAP) including more scientists and a broader representation of non-traditional perspectives. Stakeholders also provided some specific ideas about program operation and research. Supporters of the Program in its current form wanted to see funding and spending authority for the WSB increased. Others proposed reallocating funds to: i) create an open call for stock enhancement proposal, ii) conduct stock assessments, iii) strengthen focus on equity and environmental justice, iv) buy out the remaining gillnet fishermen, or v) create a broader WSB 'Conservation Fund' rather than the current 'Enhancement Fund'.

Implications of situation analysis results for developing a vision, criteria and options for the OREHP:

(1) The OREHP reform initiated with AB 1949 provides a framework for the development of a vision, criteria and options for the OREHP. The current CASG project is designed to aid this process by developing a vision, criteria and options for the Program.
(2) Most stakeholders considered the realized or potential contribution of the OREHP to enhancing the WSB stock as a key measure of OREHP performance. Working towards a shared understanding of this contribution is important to inform the future direction of the OREHP.
(3) Engaged stakeholders such as grow-out volunteers and K-12 educators perceive a strong sense of resource stewardship associated with their activities. It is important to build on this asset in the reform process and to explicitly consider this and other dimensions of social well-being alongside ecological and technical criteria.
(4) Many interviewees felt that the discourse surrounding the OREHP has been dominated by recreational fishing stakeholders and K-12 educators closely connected with OREHP. It is important to create opportunities for stakeholders from other groups and for those not closely connected with the OREHP to contribute effectively to the reform discourse.
(5) Many stakeholders, including most fishing stakeholders, are not familiar with the Program and its performance. It is therefore important to develop a concise and balanced Program summary with input from the SAC and OREAP to accompany survey and outreach efforts.
(6) A broad set of options is available to modify the focus and operation of the Program to enhance its contribution to agreed goals and objectives. A more specific, tractable set of options should be developed with input from stakeholders, the SAC and OREAP.

Process for developing a vision, criteria and options: The CASG project aims to support the OREHP reform process within the overall framework provided by AB 1949. Working closely with CDFW and the advisory bodies OREAP and SAC, the project will provide additional expertise and services in the areas of fisheries enhancement, design and planning of collaborative processes, meeting facilitation, and survey design and implementation. The proposed process has three major elements: Focus groups, a survey of ocean enhancement validation holders, and one or more public meetings. Focus groups will be the "workhorse" of the process: the venue where goals, objectives, criteria, and options are developed and refined through extended engagement of stakeholder representatives. The survey will incorporate outreach using a concise and balanced Program summary. The survey will be sent to a representative sample of ocean enhancement validation holders in an internet-based and/or mail format. Public meeting(s) will be included to provide additional feedback opportunities for stakeholders and may be held by CASG or under the auspices of CDFW, depending on preferences.

Table of Contents

I. Introduction

The California Ocean Resources Enhancement and Hatchery Program (OREHP) is an experimental hatchery program investigating the feasibility of using cultured marine finfish to enhance the abundance of wild fish populations. Its primary focus has been on spawning, rearing and releasing the white seabass (WSB) (*Atractoscion nobilis*) and assessing the impacts of these releases on the wild stock and fishery. Following over 40 years of development and operation, the OREHP is undergoing a process of evaluation and reform. The California Department of Fish and Wildlife (CDFW) has contracted California Sea Grant (CASG) to engage OREHP stakeholders in developing a vision, criteria, and options for the future OREHP. This report details the results of a situation analysis aimed at informing this reform process by characterizing stakeholders and their positions, interests and experiences with the OREHP, their views on the governance of the program and its future, and the scope for engaging them in subsequent stages of the reform process.

II. Background

2.1 Marine Hatchery and Stock Enhancement Programs

The Ocean Resources Enhancement Hatchery Program (OREHP) is a large-scale, experimental marine stock enhancement program. Hatchery programs are widely used to enhance fisheries and to conserve or restore fish populations (Bell et al., 2008; Trushenski et al. 2015; Lorenzen et al., 2021). Different types of hatchery programs can be distinguished based on their circumstances, goals, and operations (Bell et al., 2008; Lorenzen et al. 2010). 'Ranching' programs release hatchery fish for direct recapture in fisheries without the aim of enhancing or restoring natural spawning populations. Stock enhancement and restocking programs aim to enhance both fisheries catches or opportunities to catch and the naturally spawning population, either continuously (stock enhancement) or temporarily to aid stock recovery from a period of low abundance (restocking). Conservation hatchery, supplementation, and captive breeding programs aim specifically to conserve very small populations that are in danger of extinction in the wild. These different types of hatchery programs have different operating criteria and practices (Naish et al. 2007; Lorenzen et al. 2012)

Hatchery programs hold the promise of actively enhancing or rebuilding fisheries and fish stocks, and often enjoy strong support from fisheries stakeholders keen to be proactive and make a difference (Lorenzen 2014; Harrison et al. 2018). The biological and economic effectiveness of hatchery programs has been found to be highly variable. Some are success stories, but many fail to achieve the desired enhancement or rebuilding outcomes, and some have deleterious effects on the natural recruiting components of the target stocks (Hilborn, 1998; Naish et al., 2007; Kitada 2018). Often, failure to achieve desired outcomes of hatchery programs is the result of biological constraints on the contribution hatchery fish can make to enhancing natural populations, rather than a failure of the hatchery/aquaculture operation. Even the best-run hatchery programs can fail. It is therefore crucial to carefully assess proposals for new hatchery enhancement programs and to adaptively manage and

reform existing programs in the light of their achieved outcomes. The Updated Responsible Approach to Marine Stock Enhancement (Lorenzen et al. 2010) and the Hatchery Reform processes implemented for major salmon hatchery programs in the Pacific Northwest (Mobrand et al. 2005; Paquet et al. 2011) provide practical guidance for the implementation of such reform processes.

2.2 The OREHP White Seabass Enhancement

The Ocean Resources Enhancement and Hatchery Program (OREHP) is the longest running stock enhancement program for a marine fish species (as opposed to anadromous salmonids) in the U.S., and one of the longest running and most well-documented in the world (CASG, 2017). In the typology described above (Section 1.1), OREHP is a 'stock enhancement' hatchery program aimed at increasing stock abundance and fisheries catches through releases of hatchery fish on a long-term, continual basis.

2.2.1 Overview of the OREHP white seabass enhancement

The OREHP began in 1982 with legislation (Assembly Bill 1414) to work on enhancing California halibut (*Paralichthys californicus*) and white seabass (*Atractoscion nobilis*; WSB), but the latter soon became the program's primary focus. WSB is an economically important species for both recreational and commercial fisheries, and its stock abundance and fisheries catch numbers had declined to historically low levels in the late 1970s (Valero & Waterhouse 2016) when the idea of the OREHP was conceived.

The OREHP was established by the California State Legislature in 1983 to conduct a program of basic and applied research on the artificial propagation, rearing and stocking of important marine fish species occurring in ocean waters off southern California (FGC § 6592). Over the years, the Legislature has modified language describing the intent of the program; current legislative intent provides a focus on determining if hatchery-released fish can enhance stocks of wild species through increased hatchery production of fish, and monitoring fisheries to assess hatchery contributions (FGC § 6590). The ultimate intent of the OREHP legislation is "to enhance populations of marine finfish species important to California for their sport and commercial fishing value." The "primary goal" of the OREHP is "to evaluate the economic and ecological feasibility of releasing hatchery-reared fish to restore depleted, native, marine fish populations to a higher, sustainable level."

The California Department of Fish and Wildlife (CDFW) administers the OREHP with the assistance of the 10-member Ocean Resources Enhancement Advisory Panel (OREAP). The program is primarily funded by revenue from the federal Sport Fish Restoration Act and sales of California Sport Fishing Ocean Enhancement Stamps. The primary hatchery facility at which the OREHP activities take place is the Leon Raymond Hubbard, Jr. Marine Fish Hatchery in Carlsbad, California. Personnel from Hubbs-SeaWorld Research Institute (HSWRI) are contracted to operate the fish hatchery in Carlsbad. As part of their OREHP contractual obligations, HSWRI has developed the culture protocols required to raise WSB and has conducted research on culture protocols for other species, including California halibut *(Paralichthys californicus)*, yellowtail *(Seriola lalandi)*, giant sea bass *(Stereolepis gigas)* and California sheephead *(Semicossyphus pulcher)*. The pilot-scale enhancement program for WSB has been the mainstay of the

OREHP since the 1990s. WSB are spawned and reared at the hatchery in Carlsbad and released either directly from the hatchery or from on-growing cage facilities operated by project partners throughout southern California. Since 2001, the program has released around 100,000 juvenile WSB of 8-10" length annually. The OREHP receives base funding of approximately $1.6 million per year. This is supplemented by around $400,000 from grants and contributions from private and government sources obtained by HSWRI.

2.2.2 Independent Evaluation of the OREHP white seabass enhancement

The OREHP, created in 1983, is the longest-running pilot marine fish stock enhancement program in the United States. Until 2015, there were no formal assessments of the program. In 2015, CDFW requested that California Sea Grant (CASG) coordinate a comprehensive review of the OREHP and its progress in achieving its goals and objectives. With guidance from CDFW, CASG created a 9-member Science Advisory Committee to conduct the evaluation (henceforth referred to as the Evaluation SAC or E-SAC). The E-SAC is comprised of scientists from around the country, tasking them with evaluating the success of the OREHP in achieving its goals and objectives. The E-SAC included members with expertise in a wide variety of disciplines including aquaculture, fish pathology, population dynamics, genetics, and water quality. Comprehensive and rigorous evaluations of marine enhancement programs are, in general, lacking, making this thorough and detailed Evaluation one of the first of its kind. The E-SAC conducted a review of the OREHP hatchery and enhancement operations to assess the hatchery's functionality and efficiency, consider alternative hatchery uses, assess environmental impacts, document scientific accomplishments, assess economic costs and benefits, and evaluate the extent to which the OREHP has succeeded in enhancing wild WSB stocks.

The E-SAC concluded that several of the OREHP objectives have been partially or fully met. The biggest achievement of the OREHP was its contributions to research discoveries surrounding the biology and culture of all life stages of WSB. Other notable successes included the development of appropriate hatchery and tagging methods for WSB and the constant improvements in practices that have been made over the years. Through its program of tagged fish releases, and fisheries independent and dependent monitoring of released fish, the OREHP had successfully collected enough data to evaluate the post-release survival of hatchery fish and the contribution of hatchery fish to the WSB stock, both of which have been determined to be low. Substantial outreach regarding WSB life history and culture had been conducted to the sportfishing community, K-12 students, and members of the interested public. Further, there was no evidence that the program has caused any adverse environmental impacts at the production levels to date. While the maintenance of genetic diversity had not been sufficiently addressed throughout the program, the lack of significant hatchery contribution to the wild population had prevented any adverse genetic effects to the wild population to that point.

Other OREHP objectives, or aspects of objectives, had not been achieved. The analysis of tag-recapture data revealed that hatchery fish had made only a very small contribution (about 0.25 % on average since the late 1990s) to the WSB fishery stock and catches. This was the result of very high mortality rates suffered by hatchery fish after release, likely due to domestication issues, fish health and fitness challenges, and uncertainty about optimal release strategies. The WSB stock did show recovery

throughout the 1980s, and increased dramatically in the 1990s, but this was attributed to a period of strong natural recruitment rather than to hatchery releases. The recovery of the WSB stock was posited to have occurred naturally due to a combination of more stringent fishing restrictions and favorable environmental conditions. Recruitment returned to much lower levels in the 2000s, and as a result, spawning stock biomass has been declining over the past decade.

The Evaluation also made several recommendations:

- Strengthen and update organizational structure. It is necessary to clarify, for example, who has the authority to make decisions relating to research priorities and issues that influence hatchery operations or put hatchery operations and scientific research into conflict with one another.
- CDFW should reconsider how best to utilize an advisory panel, and restructure and reform the OREAP.
- CDFW should form an independent science and technical advisory group with expertise in hatchery science (and associated issues), population dynamics, release and recapture strategy optimization, and genetics to develop quantitative criteria, benchmarks, and timelines to be used in the future evaluation of the program.
- CDFW and HSWRI should engage an independent panel of experts to resolve controversies surrounding deformities in hatchery-reared fish and their implications and management.
- More clearly defined assessment metrics to allow for more efficient, and maybe more frequent, assessments of the program and provide clearer guidance to OREHP staff and researchers.
- HSWRI and CDFW should make greater efforts to keep information about the OREHP openly available to each other and to the public, and to improve consistency and transparency of outcomes and incidences, particularly for issues of public interest.

The E-SAC's evaluation of the OREHP objectives, goals, intent and budget revealed that it was timely for the relevant authorities and stakeholders to review the overall focus and strategy for the OREHP in terms of focal species and stocks, and the potential role of enhancement as an additional tool used in the management of those fisheries.

2.2.3 Town hall meetings

Following the Evaluation (CASG 2017), a series of town hall meetings were held to obtain public input on the future of the OREHP and to inform recommendations and decisions to be made by CDFW (CASG 2018). Three town hall meetings were conducted in June 2018, hosting 118 attendees. An additional 77 people submitted post-town hall comments. Over half of the comments received were from the recreational fishing stakeholder group, which is reflective of the proportionally large financial and social contributions of the group to the OREHP. One third of responses were from the K-12 education group, the main benefactor of the OREHP's educational efforts (e.g., Seabass in the Classroom). The rest of the responses came from the other five groups, including commercial fishing, environmental and/or educational non-profits, and academic science. The specific preferences for the future of the OREHP and likely motivations varied among the stakeholder groups. Recreational fishing, K-12 education, and academic science participants were overwhelmingly in support of continuing the OREHP's WSB enhancement program and/or adding another enhancement species, usually California halibut. Most

people in these groups were not driven by concerns about personal income but rather had personal connections to the OREHP due to direct involvement, and valued the hands-on education experiences, scientific discoveries, and stewardship opportunities the OREHP provided. The recreational fishing group additionally valued the opportunities for leisure and recreation provided by the OREHP, and harbored skepticism about the recent Evaluation (CASG 2017), which found a 0.25% average contribution of cultured WSB to commercial and recreational catches in California.

Discontinuation of the OREHP was favored by the commercial fishing group and was suggested by 7-20% of participants in the non-profit, K-12 education and recreational fishing groups. Most who preferred discontinuation called for continued collection of Ocean Enhancement Stamp funds to support other efforts that benefit fisheries and the ocean, including research on wild stock dynamics and the efficacy of management actions (e.g., gear bans, updated quotas), stock assessments, and regional fishery management efforts (e.g., collaboration with Mexico). Many who preferred discontinuation valued the scientific discoveries and stewardship opportunities that the OREHP has provided.

Although the scientific discoveries of the OREHP were valued by all groups, there was a disconnect between the population enhancement science, or the scientific concepts and approaches underlying the Evaluation (CASG 2017), and both the K-12 science education and community involvement in growout and other operations. Largely lacking was public exposure to fisheries and population biology, the sampling designs and approaches needed to address various research questions, and the interpretation of scientific results. These concepts and their applications seemed to underlie many of the concerns expressed about the Evaluation results.

An underlying distrust of the CDFW also emerged, which was likely fueled by the skepticism surrounding the Evaluation data and findings, the need for strengthened communication between CDFW, OREHP partners and the public, and a clearer definition of program leadership. Therefore, the Town Hall report (CASG 2018) recommended the development and implementation of an inclusive, open process for making decisions about the OREHP's future. The town hall meeting responses provided a glimpse of different stakeholder perspectives on the successes, goals and future of the program, but outcomes of town hall meetings are limited. Town hall meetings do not systematically gather contributions from a diverse array of stakeholders but rather are often biased toward the viewpoints of people who are available to participate, which may not represent the views of a broader swath of stakeholders.

III. OREHP Reform and developments since the Evaluation

3.1 OREHP Reform: Assembly Bill 1949

The passage of Assembly Bill 1949 in September 2020 (hereafter AB 1949) marks the start of the formal reform process with elements of the legislation aimed at bolstering inclusivity throughout the Program through pathways that potentially engage broader types of stakeholders and interests, strengthening the OREHP's evaluation process (e.g., more frequent, independent assessments and feedback), and increasing accountability (e.g., sunset provision).

More specifically, AB 1949 amended the OREHP statute by updating the Program's management processes and expanding the program's capabilities and public-private partnerships. Of note is the inclusion of a requirement that the department solicits input from every person who buys an Ocean Enhancement validation (stamp), authorization to accept volunteer assistance with program operations (i.e., increasing diversity in engagement and accessibility to program opportunities), and an expansion of the department's research contracting authority to include any public or private entity (in addition to the previous contracting with non-profit organizations meeting certain criteria).

Furthermore, the structure of the OREAP was reformed by adding one voting member representing the public or nongovernmental organization interests, and its remit was amended to be an advisory rather than decision-making body.

AB 1949 also re-established a Scientific Advisory Committee (SAC) as a permanent advisory body. SAC members were appointed in 2022, and the SAC now has 11 members with expertise in most aspects of enhancement science. The SAC is charged with providing recommendations on science and technical matters related to the program to the department and advisory panel. The SAC will also annually present outcomes of the year's efforts and evaluations and an outlook for the program's future activities (informed by progress, opportunities and challenges so far).

Finally, AB 1949 introduced a sunset provision stating that a status report on the program, including the SAC's evaluation, a budget review, and an overall evaluation of the program's progress toward achieving its goals and objectives is due to appropriate State legislative committees and offices by July 1, 2027, for consideration of continued funding effective January 1, 2028.

With this framework for reform in place, collaborative discussions are needed to develop specific, feasible, and broadly beneficial goals and objectives, assessment criteria and a vision for the program.

3.2 WSB hatchery operation and stocking

Since the Evaluation (CASG 2017), OREHP has continued to operate its WSB hatchery and release program normally but discontinued the gill net monitoring program for released juveniles.

3.3 Modeling of California halibut enhancement potential

To help explore alternative development options for the program, HSWRI and collaborators have undertaken population modeling to assess the potential contribution of a California halibut enhancement program to that stock and fishery (McNamara et al. 2022). A quantitative model was developed to assess the cost of increasing harvestable California halibut abundance in the Southern California Bight via releases of cultured juveniles. A target increase in abundance of harvestable (≥559 mm total length; TL) California halibut by 5% in the entire Southern California Bight could potentially be achieved by releasing large numbers (0.1–1.6 million per year) of larger-sized juveniles (40–200 mm TL). However, this was strongly mediated by their survival and sex ratio. Increasing harvestable abundance in the Southern California Bight to achieve this 5% target was estimated to cost US$ 0.2–2.9 million annually, or US$ 14–219 per additional harvestable California halibut in the wild. This modeling study implements a core element of the Updated Responsible Approach to Marine Fisheries Enhancement, namely the quantitative appraisal of enhancement potential prior to development of a hatchery program (Lorenzen et al. 2010).

3.4 Genetics study and review

The Evaluation (CASG 2017, Section 3.3) recommended two top priorities for genetics research: (1) A genetic survey of the wild population to resolve the size and structure of the wild population. This survey also could discover markers for a parentage-based study. (2) A parentage-based genetic monitoring system. This would allow for estimations of the effective population size in the hatchery from released offspring and the contribution of hatchery produced fish to the wild population.

A study aimed at addressing these priorities has been conducted collaboratively between the South Carolina Department of Natural Resources and the OREHP (Reiber & Darden 2022). A microsatellite marker panel was developed and optimized. Analyses of population structure using juvenile and adult samples collected from southern California to Mexico (1982-2019) indicated no significant population structure, supporting a single population from southern California to Pacific Baja, Mexico. Genetic health metrics indicated a large and diverse population of WSB (He = 0.69 ± 0.25) throughout the study area which experienced no effects of inbreeding (FIS = 0.09) or population bottlenecks (p = 0.87 ±0.13) during the study period. The genetic history of hatchery production was recreated back to 1996, with 96% of the 456 available hatchery broodstock successfully genotyped. The resulting genetic data allowed for both parent-pair and single-parent parentage models to be developed and validated via simulations in the program CERVUS. Genetic parentage assignment using the new microsatellite marker panel indicated potentially higher contributions of hatchery fish to the WSB population in the wild.

The study is being peer reviewed by two independent reviewers with expertise in large-scale genetic parentage studies and the SAC. Preliminary conclusions of the peer review indicate that the microsatellite marker panel and the analysis of wild population structure and genetic health are overall sound and reliable. However, the method used for parentage assignment in mixed samples of wild and hatchery fish (i.e., the samples used to estimate hatchery contribution) was deemed unsuitable for this purpose and likely to lead to a substantial level of false assignments. Additional analyses are being

conducted at the time of writing to estimate the level of false assignments resulting from this method in order to establish whether the method provides a sufficiently reliable means of identifying released hatchery fish. Results of the additional analyses are expected in May 2023. At that point, a determination will be made by the SAC as to the reliability of the study's parentage assignment results and recommendations provided for further genetic research.

3.5 Developing a vision, criteria and options for OREHP

The governance changes implemented in AB 1949 provide an overarching framework for OREHP reform. A core task now is to create a shared management vision and implementation strategy for the future of the OREHP. This goal can be met by combining stakeholder input with scientific information from both the Evaluation and additional enhancement analyses to develop a consolidated set of management objectives with implementation options that include concise evaluations of likely outcomes and acceptability to different stakeholder groups. The management vision, objectives, and options should be developed with broad stakeholder input through a transparent and open process. As a first step, it was recommended to conduct a Situation Analysis based on individual stakeholder interviews in order to provide a broad characterization of stakeholders and their values and attitudes with respect to fisheries management and conservation, and the role of the OREHP program. The Situation Analysis would then inform the design of subsequent process elements including, for example, workshops, surveys, and decision processes.

This report is to set out the results of the initial Situation Analysis aimed at understanding the characteristics of fisheries stakeholders involved in the OREHP, their perceptions, attitudes, and experiences with the program.

IV. Stakeholder characterization and perspectives

4.1 Methodology of the interview study

A qualitative interview study was conducted as part of the situation analysis to better understand the characteristics of fisheries stakeholders involved in the OREHP, and their perceptions, attitudes, and experiences with the program. The purpose of qualitative interview studies is to capture the more nuanced, subjective, and less quantifiable aspects of people's perceptions, attitudes, and experiences. Qualitative studies do not aim to quantify the prevalence or relative strength of perceptions or attitudes – that is the purpose of quantitative surveys.

This qualitative situation analysis was conducted by first compiling a contact list of OREHP Stakeholders, defined as persons or entities that have an interest in, may affect, or may be affected by the OREHP. Stakeholder groups and individual key informants (i.e., people with in-depth knowledge and/or engagement) within each group were identified based on past and present direct and indirect association with the OREHP including the WSB broodstock, hatchery, growout and release programs, Seabass in the classroom (SITC) program, the OREHP Evaluation (CASG 2017), the 2018 OREHP Town hall meetings (CASG 2018), and the commercial and recreational WSB fishery. Topics explored during interviews included: stakeholder identity and involvement with the OREHP; perceptions of the OREHP; perceptions of other stakeholder groups; and shaping the future of the OREHP (see Appendices A and B for more details).

Data were obtained using twenty-four in-depth, semi-structured interviews that were completed with key informant stakeholders in California using a general interview guide approach (Weiss, 1995). These were conducted using the contact list reaching a wide range of fisheries stakeholders. Most of the sampling was purposive to ensure diversity and maximize information requirements (Berg, 2004). Four of the interviewees were found through snowball sampling (i.e., suggested by key informants interviewed). The methodology used for this research was conventional content analysis (Hsieh & Shannon, 2005). In conventional content analysis, codes emerge from the data and these codes are then sorted and categorized into subcategories. This process is repeated until the data clusters into a smaller number of categories. Data saturation was met when no additional data was being found that could develop categories further (Glaser & Strauss, 1967), and the data was analyzed using NVivo 11 Pro software.

Individuals typically had one to three identities; for example, a member of the Advisory Panel could also be a commercial fisherman, or a scientist be an angler, etc. Therefore, Table 1 does not add up to the total number of interviewees, but it shows instead the multiple identities of the interviewees. All interviews were over the phone or via zoom and the length of the interviews ranged from 30 to 60 minutes. All interviews are confidential, and for this reason, stakeholder descriptors are sometimes not provided.

Table 1. Summary of the 24 interviewees' identities – more than one identity can apply to an individual. (CCA-Cal= Coastal Conservation Association California; CDFW= California Department of Fish and Wildlife; HSWRI= Hubbs Sea World Research Institute; OREAP= Ocean Resources Enhancement Advisory Panel)

Identity (more than one per interviewee)	Number of interviewees
Recreational angler	8
OREAP member	4
CCA-Cal	4
Commercial fisherman	2
Charter operator	2
Educator	2
Scientist	5
HSWRI	4
Environmental non-governmental organization	2
CDFW	2
Aquaculture professional	1
Volunteer	2
Spearfisher	1

Results are arranged in sections: Stakeholder identities, positions and interests; perspectives on the outcomes of OREHP; perspectives on the governance of OREHP; and perspectives on the future of OREHP.

4.2 Stakeholder identities, positions and interests

Stakeholders are defined as any person, group or entity that affects or is affected by the OREHP and its future. Stakeholders were identified in two ways: Interviewees self-identified their role(s) as stakeholders, and identified other stakeholders they felt were important in the context of the OREHP.

Identified stakeholder groups include CDFW, HSWRI, program volunteers, educators, scientists involved with white seabass (WSB) research, recreational anglers of different backgrounds, avidity, and affiliations, charter and commercial, Coastal Conservation Association (CCA), and environmental NGOs (ENGOs)

An overview of stakeholder groups and their positions, interests and perspectives on success related to the OREHP is given in Table 2. The information in this table has been synthesized and combines firsthand information from the stakeholder interviews including both views of stakeholders on their own group, and comments and insights made by stakeholders from other groups.

Stakeholder positions ranged from support for continuing the program more or less as-is, to disbanding the program and reallocating funds to other endeavors in fisheries management and conservation. Many stakeholders supported modifying the program by changing the focal species and/or broadening

activities to include greater emphasis on fish and fisheries monitoring, stock assessment or habitat-related issues. The stakeholder groups of recreational, charter, commercial, scientists and ENGOs held varied positions. On the other hand, HSWRI staff, program volunteers, educators, and CCA were less variable and strongly supported continuation of the program, possibly with modifications.

Interests of most stakeholder groups included contributing to and/or enjoying the benefits of an abundant WSB stock and good fishing opportunities. Beyond that, some stakeholders such as HSWRI have clear economic interests in continuing the program in its current form or with moderate modifications. Many stakeholders have interests in the program related to their sense of contributing to resource stewardship and their institutional or personal legacy and reputation.

The relative influence of different stakeholder groups is highly variable. Notably, while some stakeholders derive influence from their formal position in the governance system (e.g., CDFW), others rely strongly on networks including informal networks and their ability to influence public opinion or the legislative realm. For example, volunteers have power by the numbers, and HSWRI and CCA-Cal have compounded influence through inner links among their Board members.

Perspectives on OREHP success are often aligned with positions and interests. For example, with a neutral position and interests focused on balanced use of resources and good stakeholder relations, CDFW adopts a nuanced perspective on OREHP success and reform needs. Stakeholders who are strongly vested in the program and its legacy tend to view the program as successful.

Table 2. Summary of the OREHP stakeholder position on the future of the program, interests related to the OREHP, and both level and type of power in influencing decisions collected during Situation Assessment interviews. N=23 key informants from across 1-3 stakeholder groups.

Stakeholder	Position (options in the Evaluation decision tree)	Interest	Relative Influence	Perspective on OREHP success
California Department of Fish and Wildlife (CDFW)	Neutral stance on continuing the program or not	Balance the use and conservation of the WSB fishery and environment Contribute to abundant WSB stock and good fishing opportunities Maintain and strengthen good public relations, including providing fair responses to different stakeholders served, minimizing stakeholder conflicts, save/improve department's reputation and image	High degree of influence Ultimate decision maker Non-voting member in advisory panel (AP)	Largely aligned with Evaluation and continued scientific review, supportive of reform
Hubbs-SeaWorld Research Institute (HSWRI)	Continue the program, possibly with modifications	Secure increased levels of funding to support research Secure funding needed to have an ongoing assessment program, e.g. addressing WSB short term mortality, culture research, acoustic tracking of fish, genetics component Contribute to abundant WSB stock and good fishing opportunities	High degree of influence Primary OREHP contractor (began releasing WSB in 1986) External grant writing, fundraising and PR capacity Close connections to CCA through reliance on members/volunteers for operations. A Board Member is also CCA-Cal Chairman and	Views OREHP as success, conflicted between own monitoring results showing low contribution, divergent stakeholder perspectives, and maintaining program and its legacy

Stakeholder	Position (options in the Evaluation decision tree)	Interest	Relative Influence	Perspective on OREHP success
		Continue aquaculture research and remain ahead in the field Open to redirecting research Safeguard their reputation and image	son of the founders of HSWRI	
Program volunteers (i.e. participants in growout facilities, save your WSB head program and broodstock collection)	Continue the program	Be good stewards including giving back to the environment and being a part of a bigger effort Contribute to abundant WSB stock and good fishing opportunities	Moderate degree of influence Large numbers of members who can be very vocal Some individuals members of CCA	Emphasize good stewardship motivation and believe that OREHP is making a difference
Educators and students	Continue the program, specifically the education components (i.e., Seabass in the Classroom [SITC] program)	Have a flexible and hands-on science/ conservation program that offers experiential learning opportunities Encourage good stewardship in students: including giving back to the environment and being a part of a bigger effort	Minimal degree of influence Large numbers when students are included, can be very passionate about the impactful experiences of SITC. However, knowledge of the OREHP is often limited to SITC activities	Emphasize educational value of SITC, generally view OREHP as successful but without going into specifics
Scientists (non-HSWRI)	Varied positions 1. Continue the program and reallocate funds (e.g. lower releases and focus	Provide independent scientific information	Low degree of influence Disenchanted and no longer want to be involved in the program. Feel powerless	Overall varied perspectives, tend to view enhancement success as low in line with Evaluation

Stakeholder	Position (options in the Evaluation decision tree)	Interest	Relative Influence	Perspective on OREHP success
	on survival research; new species) 2. Discontinue the program	Possibly increase access to research funding through OREHP	because they do not feel heard	
Recreational anglers	Varied positions depending on their background 1. Continue the program as is 2. Continue the program and reallocate funds (e.g. new species, habitat restoration)	Varied interests depending upon their background and familiarity with the program Abundant WSB stock and access to good fishing opportunities	Low to high influence Higher power if their interests are represented by an organized recreational fishing group May have more power through numbers of sport fishing license holders (with stamps), however, most are not organized or affiliated with an organization	Varied perspectives, not well documented Most anglers are likely unfamiliar with the program and may not have strong or well-informed views
Charter fishing businesses	Varied positions 1. Discontinue the program and reallocate funds 2. Continue the program	Abundant WSB stock and access to good fishing opportunities	Low degree of influence Low representation- many independent businesses throughout the region and only one industry group which holds one seat on the OREAP	Varied perspectives
Commercial fishers	Varied positions 1. Discontinue the program 2. Continue the program with a different species (one that is not commercially harvested. E.g. sandbass) 3. Reform the program and use funds for other efforts to support	Abundant WSB stock and access to good fishing opportunities Limit/reduce potential risks and losses associated with WSB decline or fisheries management measures targeting commercial fishers	Low degree of influence Low representation- many independent operations/businesses with few representative organizations	Varied perspectives

Stakeholder	Position (options in the Evaluation decision tree)	Interest	Relative Influence	Perspective on OREHP success
	fisheries (e.g., stock assessments)			
Coastal Conservation Association -California (CCA)	Continue the program but open to refocusing efforts (e.g. other species, habitat restoration)	Abundant WSB stock and access to good fishing opportunities Increase CCA membership Keep volunteers content Be good stewards including giving back to the environment and being a part of a bigger effort. Have good publicity	High degree of influence Holds three seats on the OREAP Large member base Have the ability to lobby with state authorities to garner state support of the program Provide a lot of support to the program through funds and labor (volunteers) CCA CAL Chairman is Board member of HSWRI	Strong belief in success of OREHP Distrust in science suggesting low contribution
Environmental NGOs	Varied positions depending on their missions and relationships 1.Continue the program increasing collaborations with local ENGOs 2.Discontinue the program and reallocate funds.	Varied interests depending upon their missions and relationships 1.Continue existing partnerships with HSWRI on habitat restoration 2. Equity and environmental justice	Low degree of influence ENGOs hold one seat on the OREAP ENGOs can have a large membership and savvy vocal leadership but environmental impacts of the OREHP are negligible and fishery contributions are not often in direct line with NGO	Varied, taking broader view of program success metrics and future potential

Stakeholder	Position (options in the Evaluation decision tree)	Interest	Relative Influence	Perspective on OREHP success
			missions so NGOs tend to be disconnected	

4.3 Perspectives on the outcomes of the OREHP

There are wide-ranging opinions about the success of the OREHP and its value. To better understand the nuances of these opinions, this section will describe the Program components that emerged as meaningful indicators of stakeholder attitudes.

4.3.1 OREHP contribution to the WSB stock and fishery

Whereas the stated purpose of the OREHP is research on hatchery production and the efficacy of hatchery releases for the enhancement of stocks, most stakeholders considered the realized or potential contribution of the OREHP to enhancing the WSB stock as a key measure of its performance. As described above (Section 1.2), the OREHP Evaluation (CASG 2017) concluded, based on long-term monitoring data from the OREHP and a stock assessment, that the contribution of hatchery fish to the fishery stock of WSB had been very low (0.25%) and that the recovery of the stock in the 1980s and 1990s was driven by natural recruitment rather than OREHP hatchery fish.

Many stakeholders accepted the results of the OREHP coded wire tagging program and the Evaluation (CASG 2017) and viewed the program's contribution to the WSB stock and fishery as ineffective. Others, particularly those associated with CCA or the OREHP's educational program "Seabass in the Classroom" (SITC) expressed a strong belief that the program had contributed far more to the WSB stock and fishery. An angler relayed that *"right now we see good catch rates"* and *"there are state records being broken recently*", attributing this at least in part to the contributions of the hatchery program. "*Many enjoying the resource think that [the results of OREHP coded wire tagging program and CASG Evaluation] cannot be accurate when the fishing experience is so different […] There are more out there! We just know."* Another stakeholder from this group felt that *"[the Evaluation] was totally flawed and completely inappropriately researched*" and mentioned that "*a white seabass* [on] *hook and line was caught that had been released 20 years ago. Statistically, that fish should have been dead a long time ago. How could an angler catch it?! Because the model predicts less survival."* An educator shared about their students that "*Kids understand the success rate* […] *They are working on a successful program*".

Not surprisingly, stakeholders also differed in their assessment of the recent genetics study (Reiber & Darden 2022; also see Section 1.2.4 of this report) which hinted at potentially larger hatchery contributions and is currently being reviewed by the SAC. Stakeholders who accepted the results of the tagging program assessment and the Evaluation tended to express doubts about the contribution estimates derived from the genetic parentage assignments: "*There are a lot of red flags on the study and the conclusions are being reported before the research has actually been peer reviewed […] I'd be very concerned if there was a 46% contribution rate. This would mean that the population is way smaller, so genetic variation would be a concern from the hatchery influence! If half your fish are from the hatchery then that can be a problem."* Conversely, stakeholders who believe that the tagging program was flawed expressed feelings of vindication by the genetics study: "*Wire tags are not working! They have either fallen out or grown out or lost the magnetic indicator*" and "*Now they have this new genetic study, it's fantastic! That was always a downside, 'we don't know if it works' but now it changed."*

Fundamental beliefs about the program strongly influence stakeholder views on its effectiveness. Interviewees expressed that *"individuals are stark supporters regardless of what data is provided"; "you can show all the data and they don't care."*; and "*You could really view it as a religion. Either you believe or you don't."*

Mistrust in fisheries science and its use in decision making is not limited to the question of OREHP fishery contribution. Some recreational anglers and commercial fishermen believe that there is "*biased reporting*", that "s*tock assessment models don't reflect what is going on*" and that "*in hearings, they kept changing the parameters of the studies showing that it was unsustainable, when it was not."* Conversely, scientist stakeholders not involved with the OREHP program expressed confidence in the stock assessment (Valero & Waterhouse 2016) and posited that the wild WSB population is not doing well: "...*if you look at stock assessments, wild stocks have been in a ten-year decline*", insinuating that neither fishery management nor the hatchery program has been effective at counteracting the stock decline.

4.3.2 Lack of integration of OREHP with fisheries management

Fisheries management in California state waters is under purview of CDFW, and stakeholders were asked about the role of fisheries management and its connection to the OREHP. Only commercial fishermen, avid recreational anglers and scientists had comments to make about this.

Stakeholders who were familiar with fisheries management agreed that "*fisheries management and OREHP are separate […] they know about each other but don't have direct ties with each other*." They are also described as "*two separate arms that do not seem to intermingle or talk to each other*." The perceived lack of integration works in both directions: Data from the OREHP are not integrated into stock assessment and management, and results of the stock assessment or fishery management considerations are not brought to bear on the operation of the OREHP. A science stakeholder shared that "*hatchery data has not been incorporated or used into the assessment at all. [They] only used performed gillnet surveys and that was used as a general measure for recruitment but not to do with the hatchery itself*." That was seen at least in part as a result of the OREHP's low contribution to the stock: "*there is no one that said, 'we don't believe in this data so it's not used'; it's just that the data to date is that the contribution is miniscule so it was not used.*" Another stakeholder expressed that "*there needs to be a better effort in integrating OREHP into management, so that when we see it is not working, we can pivot and make it change***."**

4.3.3 Volunteer program

Volunteers contribute to the program with their time, skills, assets and money. Some are involved in collecting WSB heads and broodstock, sometimes even using their own boats to do so, and "*They build pens, donate time, donate money*", "*facilitate grow out; they are the ones handling fish, feeding and involved in releasing the fish. And a lot of aspects of grow out activities they are intimately involved with.*"

The value of the volunteers for the program is undeniable and is explicitly acknowledged in AB 1949. Volunteers contribute materially, but they often serve as ambassadors of the program as well. Some stakeholders viewed volunteers as biased; "*People are subject to an outreach program that changed their lives, so […] they won't say anything negative about that*." Some stakeholders perceived a strong connection between CCA and the volunteer program, expressing that many volunteers are members of CCA and that CCA manages some of the volunteering efforts. There are also volunteering efforts led by other fishing clubs and associations, however.

4.3.4 Seabass in the Classroom– Education component

The education component Seabass in the Classroom (SITC) was strongly supported and valued by the educators interviewed, as well as some other stakeholders who see the value in creating "*appreciation for the ocean*" and "*teaching that if you're willing to do the work you can make a change."* Educators really appreciate the hands-on experience for their students and having the tanks and the animals inside the classroom, since this was an "*opening way to talk about environment, impact of people, fisheries stocks… why are we doing this? That is the perfect question for kids to ask. Why are we raising these fish to put them back in the ocean? It really gets them thinking."* This educator also expressed that "*a lot of inner-city students did not leave their neighborhood, so they have no exposure. They like the beach, but they have no exposure for them to see that and learn more of what is out there."*

Another educator expressed that "*when you bring a living thing, it awakens everybody. Even an at-risk kid, coming from a divorce, or an abusive non supportive household. They look at a living thing to take care of it*." Students benefit from learning technical skills, learning about environmental issues and aquaculture, and having hands-on experience. Less privileged students have also benefited from this program through broadening personal experiences and facilitating connection to nature:

> "*My classroom is 3 miles away from the beach […] Due to social economics 90% of the kids have not been to the beach, but I could add grant funded field trips to visit the local beach, white seabass release and kids come and see, wow, this is why we need to care of white seabass and street run off and pollution."*

The flexibility of the curriculum was especially appreciated by the educators. "*What I love and wouldn't change much is that this program gives you core curriculum and freedom to differentiate it with age groups and demographic students […] This gives me freedom while giving me a launching point*." There is no strict structure that impedes the teacher's creativity, so an educator even explained, "*with my honors student, we have a Socratic seminar, and they have a debate. Is it in the public's interest to, in a way, tax fishermen to support restoration programs?*"

Divergent views were expressed with respect to the extent to which SITC provides a full and balanced account of the OREHP's contribution to fisheries enhancement and conservation. One of the educators expressed, "*I'm not sure if it's directly from their school but kids understand the success rate and that they are working on a successful program […] Hubbs has given us and other educators, showing articles with the benefit of the program."* Another educator shared, "*Hubbs is great and share out articles and research that has been done to really show this is helping the wild population."* Other educators, despite

being overall positive about the opportunities provided by the education component, expressed concerns that it did not adequately or honestly describe the impact of the OREHP. Some described the education component as a "*public relations piece*", "*it's part of a promotion. It makes it seem like, oh! It's a great program!*" Another stakeholder was concerned specifically about the broader message of suggesting that the hatchery program is an effective fix for fishery and habitat management issues: "*thousands of students […] have been indoctrinated to view hatchery as a fix. That it's ok to kill and decimate wild stock and then you can make up for it with the hatchery."* Overall, this feedback from educators illustrates both a need and an opportunity to expand the scope of SITC to address broader fishery conservation issues and provide a more in-depth and balanced perspective on the role of the OREHP.

4.3.5 Sense of resource stewardship and legacy among engaged stakeholders

Engaged stakeholders such as volunteers and SITC educators often alluded to a sense of contributing to the stewardship of the WSB stock and fishery, which can therefore be considered an important social well-being outcome of the OREHP. This factor was acknowledged even by stakeholders who were more critical of the OREHP: *"[People] that grew them in pens and saw the population rebound saw themselves responsible […] people feel good thinking 'I did something good'. That is what promoted it."* A related aspect, particularly given the long history of the program, is related to legacy and reputation. "*People who are invested, want to continue and those with the facility want to keep funding […] The hatchery program has been around and supports a lot of people […] it's deeply rooted.", "Groups like CCA want to say we helped bring back white seabass".*

Contributing to resource stewardship is a common motivation for stakeholders to engage in fish hatchery programs (e.g., Harrison et al. 2018, 2019). Stewardship is also an important ingredient promoting sustainability of resource management institutions as well as a component of human well-being (Jax et al. 2018). It is therefore important to engage with this aspect constructively in the reform of the OREHP.

4.3.6 Familiarity with the OREHP among stakeholders at large

Stakeholders who have strong personal links with the OREHP often are strong supporters and have been described as "*program cheerleaders*''. Their direct experience and way of receiving information can be practical (through volunteering in hatchery operations or as an educator); communicative (through publicity or PR channels); procedural (participating in OREAP); or structural (informed by own vested interests). The two latter experiences (procedural and structural) come with a higher level of awareness of the program, its nuances and politics. On the other hand, some educators and former volunteers who are not currently involved in the Program felt they could not make a fully informed comment on the current state of affairs or future of the Program. It could be inferred that fishing stakeholders-at-large who merely pay the stamp fee may either not know about the program or be misinformed. An interviewee explained that *"There is a lot of people that don't even know [OREHP] exists. So, the*

majority don't know it's there and don't know enough to formulate an opinion on it. […] I talk to people all the time and they just buy the stamp because they need it in the fishing license but they don't know what it's for. […] People buy it 'cause they have to buy it." This indicates a need to combine consultations and surveys regarding the future development of OREHP with outreach and education about the program and its outcomes.

4.4 Perspectives on the governance of OREHP

Apart from attitudes related to specific program elements, there were themes emerging from some invisible aspects that exist within the psyche and interpersonal relations that, in a way, drive much of the OREHP. The attitudes of stakeholders with regards to these invisible aspects are described in this section.

4.4.1 Unclear goals

The goal stated in the OREHP legislation is to investigate the economic and ecological feasibility of using cultured fish to enhance wild populations. The interpretation of this goal is not agreed on by the stakeholders interviewed. One interpretation is that the program should explore the feasibility of enhancement (i.e., perform research) by conducting basic and applied research on the propagation, rearing, stocking, and distribution of WSB, and determine if hatchery-released fish can enhance wild stocks. The other interpretation is that the program should directly enhance the WSB fishery stock. This distinction influenced the perception of the OREHP overall.

The success of the program cannot be measured without a common goal, which emphasizes the value in the current attempt of the OREAP to outline and agree upon common goals and measurable objectives.

4.4.2 Legislative changes and sunset provision

The most recent legislation [Assembly Bill 1949, 2020) contains a sunset provision ending OREHP in 2028 unless the program is shown to meet certain goals. Stakeholders who are aware of this have varying views on this provision. An interviewee commented:

> "*it is a wakeup call in the sense that legislation is written such that the program needs to demonstrate progress each year and report that. […] But is it realistic to make white seabass work in 5 years? It's a fine concept but when does that clock start? Because we can't start that clock until you have the money to do the assessment and so forth and things move slowly […] It takes white seabass five years to recruit to the fishery, so this is an ambitious timeline"*

Another interviewee said that *"[CDFW] want to slow play it. You go have these meetings, and in five years we will say nothing has happened, so no more funding*." Those who are aware of the sunset

provision see the relatively short timeline as unrealistic and view it with some distrust. The delays created by species life cycles and bureaucracy could possibly impact the future of the OREHP given this piece in the legislature. However, this legislation also provides the opportunity and structure for stakeholders and interests to efficiently and inclusively agree upon a goal and vision for the OREHP as well as develop feasible criteria and tractable options for fulfilling criteria.

4.4.3 OREAP representation and funding

People from both CDFW and the OREAP commented on the broadened representation of members of the reconstituted Ocean Resources Enhancement Advisory Panel (OREAP) and the effort being made to include diverse perspectives as per the Evaluations's recommendations. An interviewee from these groups shared that "*There is a broad suite of stakeholders in the panel, and we have established conditions and terms of that representation […]"*

However, some other stakeholders questioned the effectiveness of the OREAP reform: "*I had such hope with the restructure and haven't seen change in any real way*." These stakeholders, including external scientists and others closer to the program, perceive representation to be skewed in favor of recreational fishing stakeholders closely aligned with the OREHP, particularly members of CCA: "*The Chair [of OREAP] now is a sports guy. CCA is there, it is loaded with recreational members, who are always the ones that speak up too*." Even though private recreational fishing stakeholders are not in the overall majority on the OREAP, they are perceived to have a louder voice than others due to their influence on agenda-setting and vocal advocacy. Some close to the program commented on the inability or hesitancy of minority voices to speak up and a lack of overall responsiveness once spoken.

One stakeholder questioned whether the predominance of recreational fishing stakeholders on the OREAP and limited representation of the wider community was missing important voices. "The *Advisory Panel don't have science or equity background […] There needs to be more scientists on the panel. SAC just give data and recommendations* [to the OREAP] *and the Advisory Panel do what they want […] There needs to be more sustainability experts on the panel […] more diverse voices and younger voices [...]"*

Greater attention to the way in which the OREAP selects topics for consideration and facilitates fair and open dialogue during its meetings may help address the perceptions related to skewed representation. Avenues for greater input from the wider community may be created through the visioning process.

4.4.4 Funding

The topic of funding was also divisive between stakeholders with two general sides. On one hand, people who viewed the goal of the Program as tangibly enhancing the fishery stock believed that the funding for OREHP should be redirected, or at least reconsidered. To one extreme, an interviewee shared "[The program has] *already wasted 40 million dollars of private federal and state funding, and what is the point of continuing?"* However, most of the interviewees discussed funding reallocation to other programs, calls for proposal, fisheries management, stock assessments, etc.

On the other hand, someone who supported the program said "*The program has been starved of its funding […] They haven't had an increase in funding in years. So how do you run the same level of business with a third or less of your funding?*" The stark difference in opinions about funding are linked to the level of support for the program.

4.4.5 Influence and power

Stakeholders shared their views on who they perceived to be the decision makers, and influential groups or individuals. Several stakeholders perceived that "*a lot of it goes down to an economic venture […] vested interests."* Some noted that the OREAP, CCA and HSWRI were strongly connected through personal ties, which influences their coordinated public and legislative outreach. CCA was also perceived by some stakeholders as being a strong advocate and outwardly more vocal than others.

> *"CCA and individuals […] who are louder than others and strong advocates. They seem to drum up a lot of momentum in the community when they need it […] Messages from the recreational side are the loudest in the room [OREAP] and then it's up to CDFW to say if they want to make changes or address the issues."*

CCA was also perceived as a strong supporter that wants *"to boost membership or get more people on board […] Something to hang their hat on and say that they are doing a good job."* Their influence was visible for example in the 2018 town hall meetings (CASG 2018) and in their representation on the OREAP. Some interviewees questioned the degree to which CCA really represents anglers-at-large: "*Realistically I'm not sure how many people they actually represent. A lot of these people paying into the program are not part of the fishing associations. So, how do you get [the anglers] in?"*

CDFW was also seen as an influentially dominant party given their decision-making power, since they have the final say in acting on the recommendations that the OREAP and SAC put forward. HSWRI was viewed in its own right as an influential player since it is able to mobilize political support in addition to the support of the stakeholders already mentioned.

OREAP, CDFW, HSWRI and CCA all have different levels of social, political and financial capital. It is how these are leveraged that can create a different landscape of power within the program. CDFW and HSWRI have additional considerations regarding how the communication and framing of decisions about the future of the OREHP may affect their reputations.

Volunteers were also seen as influential. As described earlier, they provide necessities: free labor (fund savings), political support by vocal participants, and good publicity through being avid supporters. Many volunteers come from organizations such as CCA that can potentially leverage their influence.

4.4.6 Public relations

Public relations surrounding the OREHP takes multiple forms and is handled primarily by the OREHP's contractors, partners involved in the Program activities and, to a lesser extent, CDFW. HSWRI and

project partners, mainly CCA, issue press releases and social media posts about the OREHP and contribute to local and recreational fishing-focused media. The messages from HSWRI are often focused on raising awareness about the hatchery operation and its conservation purpose without delving into details of conservation impact. CCA's outreach advocates for the OREHP with a focus on Program benefits and support, including highlights of stewardship opportunities and messaging that relays the group's positive perceptions of the contributions to conservation. CDFW outreach is limited mostly to administrative announcements about the OREHP, and CASG issued a press release in conjunction with the publication the 2017 Evaluation Report, which they facilitated.

Some stakeholders suggested that CDFW and HSWRI were in a public relations dilemma given the 40+ year duration of the program and the small, estimated contribution to the stock, their incentive to maintain their reputation, and their reliance on stakeholder support. This dilemma is perhaps most acute for HSWRI given the tensions surrounding its own monitoring program showing low hatchery contributions, perceptions of much greater contributions held by some stakeholders- especially supportive, vocal and/or public-facing groups- and the need to maintain support from different stakeholder groups and CDFW to continue the program. One stakeholder observed: "*It's hard to sell, it's a hard public relations dilemma" and "Hubbs and the Department are just protecting their own image."* At the same time, there was also a different perspective on HSWRI not doing enough press and outreach to inform the public about the program and what is happening: *"[HSWRI] never get themselves in the news and media […] so a lot more outreach could be happening to let people know it's working."*

Balanced, evidence-based outreach and public relations about the outcomes of the OREHP and the reform process have an important role to play in garnering informed public input.

4.4.7 Science and scientists

Science and scientists play a key role in both the development and operation of the OREHP and in the evaluation of its outcomes for the WSB stock and fishery. A scientist working close to the Program expressed frustration with funding limitations: *"Resources are not being provided, […] I don't want to wallow on the bare minimum to keep it going, but want the next level of discovery."* This scientist also felt that: "[…] the *government side of things are not thinking of the world with new discoveries. Their job is to manage the fishery so they use a precautionary approach […] We haven't cured cancer, so I guess we better not try."* On the other side, scientists involved in research on wild WSB ecology and fisheries management expressed frustration with the low responsiveness of the Program to external scientific advice and reform: "*I have given up. I just provide my opinion and it just won't change […] Recently there was a call for advisors […] and one reason why multiple colleagues declined was because it meant that we were going to be the minority on a larger group of supporters, so it's going to be a lot of work but will go nowhere."* Scientists further expressed concerns with the process of the SAC: "*Scientists haven't shown up in the meetings […] Comments were not being included in meeting minutes […] to sit in the meetings when comments are not even recorded is not an incentive."* These issues have been at least partially addressed since the interviews. Additional members have been recruited to the SAC, and detailed meeting minutes are being produced.

4.5 Perspectives on the future of the OREHP

4.5.1 Future scenarios

A broad set of options is available to modify the focus and operation of the Program to enhance its contribution to agreed goals and objectives. On one side of the spectrum, some people believe the program is a complete success and should be continued as-is with increased funds allocated to it. On the other side of the spectrum are stakeholders who believe that the program should be dismantled and that funds should be fully reallocated. This range of opinions aligns with the OREHP Action and Decision Tree described in the Evaluation (CASG 2017), as well as with the Evaluation's program-level observations and recommendations, and conclusions regarding the future of OREHP. There are three main future scenarios described in the 2017 evaluation: i) Continue the OREHP: WSB; ii) Continue the OREHP: New focal species; and iii) Discontinue the OREHP (which included ending the Program altogether, or reallocating money to fishery conservation and management efforts). Stakeholder responses spanned these same options.

Continue as is: Some stakeholders- mostly anglers- were in favor of the program continuing without major changes, saying "*Keep it like it is, don't cut it*", and "*I'd love for it to continue […] Continue to release hatchlings into the water and continue to provide a vibrant fishery for white seabass*." Other stakeholders were against continuing with the OREHP as it is.

Change focal species: The idea of introducing other species was repeatedly brought up. California halibut was mentioned the most, followed by California yellowtail and abalone. Anglers were supportive of this possibility and shared enthusiasm. However, there were also some concerns about the potential risks of growing halibut: "Changing *species sounds like a dream of let's switch to something else […] but there are lots of issues with the [halibut] culture process, pigmentation and deformities. I heard talks of switching species and I don't think it's the best approach."*

Broaden the focus beyond enhancement: Some interviewees suggested re-allocating efforts and funds to include broader fisheries conservation priorities such as increasing fish and fisheries monitoring, supporting stock assessments, or habitat-related initiatives. One stakeholder- a commercial fisherman- highlighted opportunities for co-operative research: "*State run fisheries can't afford good data collection […] There could be co-management between commercial fishermen and the state to make data collection affordable, and this has been talked about for 20 years […]*". Another stakeholder commented on the reactive vs. proactive approach of overall management, giving as an example: "*The data that was provided in stock assessment still haven't been incorporated into management. Management has a lot of projects, and there are more pressing issues that are still being addressed so not much is being done with white seabass data."*

Discontinue: Some stakeholders suggested: *"Dismantle the enhancement piece […] The white seabass enhancement is a clear failure so that needs to stop", and* "*the program ought to be shut down and try something else."*

4.5.2 Improving representation and accountability in the process

Some stakeholders discussed the need to integrate the OREHP into fisheries management to better monitor and create accountability. A fairer representation in the OREAP has been brought up as a need moving forward. A scientist shared that:

> *"The process needs to be more open and with more oversight […] that we have participation by others – outside a small group of supporters, and not say 'let's increase the diversity of the panel' but 'we have to'. […] Do we have people from all perspectives? Do we have experts for the problems that exist? Outside the community and also outside of the box? […] And they can't be the minority on the panel."*

One stakeholder was vocal about the program needing to be more inclusive ranging from the OREAP to hatchery practices and the educational component. It was one voice speaking for inclusion of minorities, broadening the range of representation to non-traditional voices, using the OREHP as a platform to create teaching opportunities on diversity and inclusion, and creating indigenous partnerships and incorporating indigenous knowledge. This stakeholder expressed that:

> *"Bring more people to the table; non-traditional voices. […] Have more seats on the panel for non-profits or voices that exist out of the fisheries interests. It is such an echo tunnel a lot of the time, there is no voice of opposition. Maybe incorporate an indigenous partnership [...] Involve more diverse voices in general. This money comes from stamps so I don't think it should be dictated by this very specific demographic. It should come down to generating a stock that is more widely beneficial than just the sportfishing industry."*

4.5.3 Research priorities

Various stakeholders interviewed mentioned different ways to improve the monitoring and evaluation system, many of which are at least generally in line with the recommendations detailed in the Evaluation report (CSG 2017):

Release fewer better quality fish: "*Make it from a pathologic and genetics standpoint, make it as risk free as possible to the wild populations. Which would mean downsizing the releases significantly and increasing the tracking and identifying and monitoring of health issues. […] This means releasing fewer better quality healthy fish. […] Measuring success with the number of fish is not very good."*
Study fish distribution and movements: *"How far have they gone? Are they offshore or in Baja? Are those our fish?"* A science stakeholder suggested *"Do another assessment of where the fish are and the loud voices and big proponents can say where to do it, so they can't say, 'oh, you didn't do it where they are.'"*

Address mortality: *"To address some questions of the evaluation like short term mortality, we need to introduce more creative approaches to assess it. Not just fall back on the gillnet sampling program, but have funding to support acoustic tracking of fish, more info in the short term of your fish, etc."*

Have a baseline for new species: "*If you insist in doing something, pick a species where you might see some effect and do a good baseline. Know your starting point and continue for ten years."*
Monitoring partners: *"There is a lot of monitoring they could do. They use anglers to do it, but organizations could do it."*

New protocols: "*Come up with a formula, a protocol, for us to make the next jump up. In white seabass productivity we need x fish to this size and release them for five years. Maybe 100,000 fish, with an adequate monitoring program to track them."*

Prioritize disease control: *"Focus on the health of the fish. There is prevalence of viral, parasite and bacterial outbreaks, so if you can eliminate those, that is a huge success internally."*

More genetics research: Several stakeholders advocated for more genetics research to better understanding stock enhancement effectiveness. Some stakeholders believe that there should be more funding directed towards genetic studies, and to have an annual assessment.

4.5.4 Funding allocation and mechanism

Supporters of the OREHP want to see funding increased and get "*more spending authority*", with an NGO member acclaiming that *"[HSWRI] are a funnel for money […] it funnels out to NGOs, museums, aquariums, restocking, research."*

Other stakeholders including those from science and the OREAP, however, had ideas of how to reallocate the funds. For example, one person expressed that funding could be used to "*create an open call for stock enhancement proposals."* or "*Put money out to request for proposals so others get a chance to get the money. Give 100K grants and that could change a lot of organizations."* A commercial fisherman said, "*there is a lot of things that we could do with the budget. For example, use it for stock assessments."* Another stakeholder mentioned that *"[Funds] would be better allocated towards a program that involved equity and environmental justice."* A non-commercial stakeholder had the idea that the "*Money collected could be better used to pay out gillnetting commercial fishermen, cause it's only a few guys. Just pay them, make them happy."* Another scientist said, "*I would be in favor of reallocating OREHP funds towards a white seabass ''Conservation fund'' rather than an ''Enhancement fund'' if that is even a possibility."*

4.5.5 Education component

Several stakeholders including and in addition to educators would like to see the education program continue and even be expanded to more schools. An educator specified that *"schools could do it, but they don't want to […] Once it is going on, it's okay, but the initial settling it in, it takes extra time […] Teachers might feel incentivized with a stipend, like $500 for the setup in the classroom. If I were sitting on the fence, I would have done it for money."*

A recreational angler mentioned that the student input at public meetings *"was something for the department to learn that it was not just tanks at Hubbs. There were students after students speaking at the public forum. […] [CDFW] put money on research, while there is all this education program volunteered into the classroom."*

The education component has been built on volunteer educators with the support of HSWRI providing curriculum and infrastructure. There is also support from a local NGO to develop and bring this to schools in different regions. Educators and students benefit from it, but there is room for improvement in inclusiveness and transparency.

V. Implications for developing a vision, criteria and options

5.1 Synthesis of situation assessment and implications for process design

The OREHP reform initiated with AB 1949 provides a framework for the development of a vision, criteria and options for the Program by (a) establishing the SAC with a remit to provide scientific guidance, (b) reforming the OREAP to provide an advisory-only function and moderately broadening its membership, (c) including a sunset provision to take effect in 2028, (d) requiring the solicitation of input from every person who purchases an ocean enhancement validation, and (e) providing for the CDFW director to report on the Program's progress in meeting its goals and objectives with input from the SAC by 2027.

AB 1949 states that the purpose of the OREHP is to "advance research on the artificial propagation, rearing, stocking, and distribution of marine fish species […], including research on the efficacy of artificial enhancement of stocks of these marine fish species through hatchery production". The legislation does not state specific goals and objectives to guide the direction, adaptive management, and evaluation of the program. Developing such goals and objectives is the purview of the CDFW Director with advice from the SAC and the OREAP. The current CASG project is designed to aid this process by developing a vision, criteria and options for the OREHP.

Whereas the stated purpose of the OREHP is research on hatchery production and the efficacy of hatchery releases for the enhancement of stocks, most stakeholders considered the realized or potential contribution of the OREHP to enhancing the WSB stock as a key measure of OREHP performance. Different stakeholders expressed widely different perspectives on the level of WSB stock enhancement achieved and implications for the future direction of the OREHP. Perspectives reflected differences in trust in and interpretation of scientific information, fundamental beliefs, and values such as resource stewardship and legacy. Working towards a shared understanding of this contribution is important to inform the future direction of the OREHP. The SAC has a key role in clarifying the scientific evidence (e.g., by concluding the review of the genetics study) and this needs to be complemented by a stakeholder process.

The high value with which engaged stakeholders such as grow-out volunteers and K-12 educators attach to the sense of resource stewardship associated with their activities is notable. A sense of resource

stewardship among stakeholders contributes to their wellbeing and strengthens the fisheries management system. It is therefore important to build on this asset in the reform process and to explicitly consider this and other dimensions of social wellbeing alongside ecological and technical criteria when evaluating outcomes and future directions of the OREHP. Appropriate indicators should be considered in the CASG Project in conjunction with the SAC, OREAP and CDFW.

AB 1949 provides for obtaining input on the direction of the OREHP from all fishing stakeholders who purchase an ocean enhancement validation, and from the broader public and non-governmental organizations by designating a voting member representing these constituencies on the OREAP. However, many interviewees felt that in practice, the discourse surrounding the OREHP has been dominated by recreational fishing stakeholders and K-12 educators closely connected with OREHP through personal or organizational ties. It is therefore important to create opportunities for stakeholders from other groups (e.g., commercial and charter fishing operators, the wider public, and NGOs) and from recreational and educational stakeholders not closely connected with the OREHP to contribute effectively to the discourse. This can be achieved in the CASG Project through focus groups with broad representation and by surveying a representative sample of ocean enhancement validation holders. Broad representation and engagement could be further enhanced by adopting good facilitation practices in OREAP meetings to ensure that all members can contribute effectively.

Obtaining input from stakeholders not closely connected and familiar with the OREHP is an important aspect of developing a vision, criteria and options, as well as for informing the progress evaluation to be completed by 2027 given the provision to solicit input from every person who purchases an ocean enhancement validation. Many stakeholders, including most fishing stakeholders, are not familiar with the program, its operation, the questions surrounding its contribution, or the governance process. A concise, informative and balanced summary should be developed with input from the SAC and OREAP to accompany survey and outreach efforts.

A broad set of options is available to modify the focus and operation of the OREHP to subsequently enhance its contribution to agreed-upon goals and objectives. This could include changing the focal species being propagated and released; partially shifting emphasis and resources to better understanding the ecology of released hatchery and wild fish or to fisheries monitoring efforts; or broadening the content of the SITC K-12 education. In addition, the level and modality of disbursements from the OREHP fund could be modified; including, for instance, allocating some funds through open competition. These ideas are just examples of options that could be developed with input from stakeholders, the SAC and OREAP.

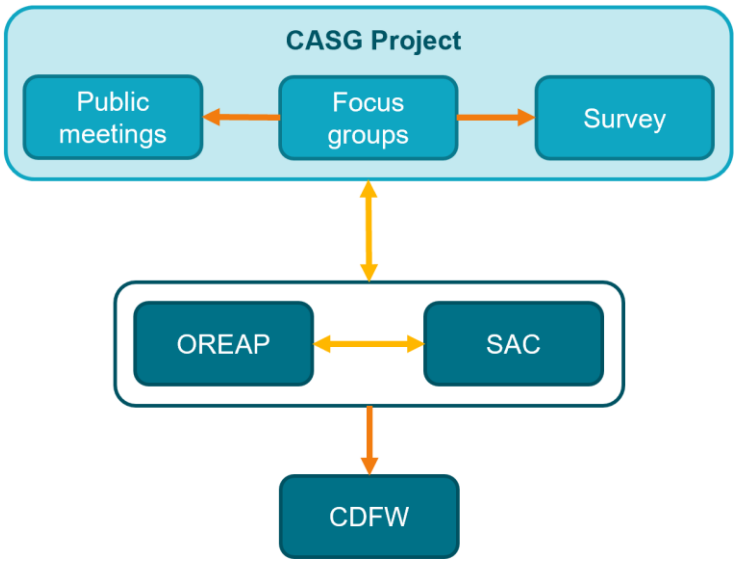
5.2 Process outline

The CASG project aims to support the OREHP reform process within the overall framework provided by AB 1949. Working closely with CDFW and the advisory bodies OREAP and SAC, the project will provide additional expertise and services in the areas of fisheries enhancement, design and planning of collaborative processes, meeting facilitation, and survey design and implementation. In doing so, the project will also work with HSWRI and with representatives of different stakeholder groups and organizations. The project is not a decision-making body but rather aims to support the work of the

formally constituted decision-making and advisory bodies. Project activities will be discussed with, and project outputs provided to, the CDFW, OREAP, and SAC.

The proposed process has three major elements: Focus groups, a survey of ocean enhancement validation holders, and one or more public meetings (Figure 1). Focus groups are the "workhorse" of the process: the venue where goals, objectives, criteria, and options are developed and refined through extended engagement of stakeholder representatives. The composition of the focus groups and the schedule of activities will be developed in consultation with stakeholder representatives and CDFW, OREAP, and SAC. Membership of the focus groups will be by invitation, ensuring diverse representation of key stakeholders who are willing and able to participate in extended, constructive engagement. Members may be identified from and/or include members from the OREAP, HSWRI, interviewees from the situation assessment and people from their networks, others with a relevant stake or interests identified from the Sea Grant network. The aim of focus groups is to develop a shared understanding of what success looks like for the program and its components and to identify specific goals, objectives, criteria and options for the OREHP. Evaluation criteria and metrics will be drafted for attaining goals in the short term (by 2028) and in the long term. The timing, format, content, attendee lists, and outcomes of the workshops will be developed by the project team with input from CDFW and their advisory committees (OREAP, SAC) during late spring/early summer 2023.

Figure 1. Process outline and interactions



The second component is a survey of ocean enhancement validation holders, informed in part by outputs from the focus groups. This survey will collect information on respondent's characteristics, perceptions related to fishing and the OREHP, and attitudes to specific candidate goals, objectives, criteria, and options drafted by the focus groups, CDFW, OREAP, and SAC. The survey will incorporate outreach using a concise, informative and balanced summary and will be developed with input from the SAC and OREAP (see above). The survey will be sent to a representative sample of ocean enhancement validation holders in an internet-based and/or mail format.

Public meeting(s) will be included to provide additional feedback opportunities for stakeholders and may be held by CASG or under the auspices of CDFW, depending on preferences.

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Appendix A

Consent form for interviews

Informed Consent: Please read this consent page carefully before you decide to participate in this interview.

Purpose of this interview: The purpose of these interviews is to learn from your experiences in the Ocean Resources Enhancement and Hatchery Program (OREHP).

Time required: 30-60 minutes

Risks and benefits: There is no risk to you from participating in this study. There is no direct benefit to you in participating in this interview, other than the opportunity to make your experiences and views known to researchers and management agencies.

Compensation: There is no compensation for participating in this study.

Confidentiality: Your identity will be kept confidential to the extent provided by law. Your information will be assigned a code number not connected with any identifying information. Your name will not be used in any report. If quotes or paraphrases are used in subsequent reports, your name will not be used and we will strive to avoid including anything that could identify you or others.

Audio recording: With your permission, we would like to audio record this interview. Recordings will only be accessible to researchers and their assistants.

Voluntary participation: Your participation in this study is completely voluntary. There is no penalty for not participating, and you may withdraw your consent to participate at any time without penalty.

Whom to contact if you have questions about this project (IRB Study no. IRB202200879): Susana Hervas, Ph.D., School of Forest, Fisheries and Geomatic Sciences, University of Florida, Gainesville, FL 32653, Phone: (352) 283-1147 E-mail: shervas@ufl.edu OR Kai Lorenzen, Fisheries and Aquatic Sciences Program, University of Florida, 7922 NW 71st Street, Gainesville, FL 32653, E-mail: klorenzen@ufl.edu

Whom to contact about your rights as a research participant in this study: IRB2 Office, Box 112250, University of Florida, Gainesville, FL 32611-2250, Phone: (352) 392-0433.

WOULD YOU LIKE TO PARTICIPATE IN THIS STUDY?

ARE YOU 18 YEARS OLD OR OLDER?

IF YES: Thank you! We'll continue on to the interview.

IF NO: Thank you for your time!

Appendix B

Interview guide

Section 1: Stakeholder Identity and Involvement in OREHP

When and how did you get involved in OREHP?

What stakeholder group do you identify most closely with (e.g. commercial fisher, rec fisher, educator, environmentalist, etc.)?

What does OREHP mean to you?

How do you participate in OREHP? (frequency / tasks / ind v gr)

To fishers (rec/commercial):

What species do you target? White bass? Halibut?

Section 2: Perceptions of OREHP

What has your experience with OREHP been like?

What do you like most about the program?

What do you like least?

What is the goal of OREHP? How does it work towards the goal?

What parts of the program do you feel are most/least successful?

Have there been changes in the fishery?

How is the wsb fishery managed? Is OREHP part of the process?

Is management doing anything differently for the management of wsb because of OREHP? Or are they managing like any other stock?

How effective is management?

Section 3: Perceptions of other groups – "peripheral" stakeholders don't know

Who is involved in OREHP? (stakeholder groups, organizations, agencies, institutions…)

Are there any groups that you articularly disagree with?

In what way are they involved?

Are there any objectives common to all stakeholders?

Who makes decisions about OREHP? (influence-power / who is left out / who shouldn't be there)

Who has influence on management decisions?

Who?

Why do you think that is?

Are any groups left out of the decision-making process?

Who?

Why do you think that is?

Are there any groups/ people who shouldn't be involved in decision-making?

Who?

Why?

What do you think everyone wants?

Section 4: Shaping the future of OREHP

How do you see the future of OREHP?

How can OREHP be improved? (enhancement with other species/different focus away from enhancement)

Is there anything else you would like to share?