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December 1, 2021

Re: Final Report on a three-year study to identify best management practices related to shellfish production (ESSB 6032 Sec 602 (31) of 2018 and ESHB 1109 Sec 606 (1) of 2019).

Washington Sea Grant (WSG) has completed this project, the Washington Coast Shellfish Aquaculture Study (WCSAS) and expended all state-appropriated funds for the project. During the 2018 legislative session the Governor proposed, and the Legislature passed, a supplemental appropriation of $200,000 to Washington Sea Grant (WSG) to "complete a three-year study to identify best management practices related to shellfish production." In the 2019 legislative session an additional $400,000 was appropriated to continue the project for the second and third years. The focus for the project, hereafter referred to as the Washington Coast Shellfish Aquaculture Study (WCSAS) is to produce a collaborative, ecosystem-based management (EBM) framework for shellfish aquaculture, burrowing shrimp and eelgrass—primarily as they affect the continued sustainability of shellfish aquaculture in Willapa Bay and Grays Harbor. For additional project context, see Addendum A.

The bill language requires an annual report by December 1 of each year, of which this is the fourth and final. Progress from the inception of the project to November 30, 2018 (five months) was summarized in the initial report of December 1, 2018. The second report summarized progress from December 1, 2018 through November 30, 2019. The third report summarized progress from December 1, 2019 through November 30, 2020. This report provides WCSAS recommendations and summarizes all project activities and accomplishments, including progress from December 1, 2020 through November 30, 2021.

WSG is housed within the University of Washington's College of the Environment and is a unique unit with federally designated responsibilities to support coastal and marine-related research, education, outreach and communications. Sea Grant programs are formal partnerships between the National Oceanic and Atmospheric Administration (NOAA) and universities in coastal states and territories. WSG serves coastal communities and resource managers by providing grants for applied research, fielding a team of technical specialists based in coastal communities, and engaging the public in activities that promote ecosystem health and ocean

literacy. WSG has a decades-long history helping shellfish aquaculture businesses and public agencies navigate ecological sustainability, economic challenges and environmental change.

Project Recommendations

The members of the WCSAS working group unanimously recommend the formation of an EBM Collaborative for Willapa Bay and Grays Harbor. All 19 working group members who have participated in the project (see Addendum B) responded to a confidential poll administered by WSG. Regarding whether to recommend formation of an EBM Collaborative for Willapa Bay and Grays Harbor, 14 members voted *Yes*, five members voted *Yes, with reservations*, and none voted *No*. In response to whether the member would like to participate in the EBM Collaborative, 14 members voted *Yes*, five members voted *Not sure*, and none voted *No*.

To help focus the working group's recommendations, WSG led the development of a draft charter for the future EBM Collaborative (see Addendum G). This helped the working group synthesize shared understandings, prioritize remaining information needs, reflect on lessons learned, and work toward a shared vision. It is important to clarify, however, that working group members voted on whether to form an EBM Collaborative, *not* whether to endorse the charter. The draft charter is currently in its second iteration and will not be finalized and formally adopted until after an EBM Collaborative is formed and all participants have had the opportunity to provide revisions and approval.

With this important distinction in mind, in the sections below we provide a brief overview of the EBM Collaborative (hereafter, "the Collaborative") framework outlined in the draft charter.

- ***Mission and guiding principles:*** The Collaborative is a non-regulatory body that develops, recommends, and implements management strategies[1] that increase the resilience of local communities and ecosystems while building trust and common understandings between industry, agencies, Tribes and the general public. The Collaborative is guided by the principles of adaptive management, best available science, and environmental, economic and social sustainability.
- ***Initial goals and objectives:*** In addition to finalizing the charter and pursuing sustained funding, during year one the Collaborative will develop tools for communicating about and monitoring the social-ecological system. Specific objectives include developing a communications strategy and producing associated materials and developing ecosystem monitoring and data management frameworks. In year two, the Collaborative will develop and pilot tools for managing interactions between shellfish aquaculture and other species, including assessment methods for comparing habitat conditions and management practices that optimize shellfish production and ecological function.
- ***Structure and participants:*** The Collaborative has three main components.
    1. The *Core Collaborative* is the decision-making body of the Collaborative. Specific membership can shift as goals change, but it generally consists of industry members, Tribes, environmental organizations, and representatives from local government, state agencies, and federal agencies.

[1] A management strategy is a specific combination of a proposed action and the policy instrument(s) used to accomplish it. Management strategies can involve research, public engagement, best management practices, policy/regulatory recommendations, or other activities consistent with the Collaborative's role and goals.

2. *Subgroups* provide a flexible space for a more diverse group of stakeholders to work on specific tasks that advance Collaborative goals. Subgroups and their composition may vary over time, but the following subgroups are suggested for year 1: outreach and social license, emerging issues and research priorities, and resources and funding.
3. A *Planning Committee*, composed of five elected Core Collaborative members and an external Facilitation Team (e.g. WSG), will plan quarterly Collaborative workshops, develop strategic work plans, and propose annual objectives, work plans, and Subgroups for Core Collaborative revision, revision, and approval.

- ***Processes:*** The draft charter currently includes general norms and decision-making processes, and below we highlight specific processes for developing management strategies.
    a. Research needs will be anticipated through coordination between Subgroups and the Planning Committee so that emerging issues are included in strategic research plans. The Collaborative will seek funding for research priorities and communicate results to specific audiences through targeted outreach.
    b. Criteria will be developed to screen alternative management strategies before further evaluation to ensure management strategies are consistent with the Collaborative's mission, guiding principles, and goals.
    c. Alternative management strategies will be evaluated in collaboration with research partners by selecting appropriate indicators and targets and forecasting potential outcomes. Forecasting results will be analyzed in terms of efficacy, efficiency, and equity and shared with the public prior to recommendation by the Collaborative.
    d. The Collaborative will support implementation of recommended management strategies by providing technical assistance and ongoing monitoring/evaluation.

To implement the Collaborative framework recommended by the working group, both initial and ongoing sources of funding are necessary. Goals and objectives for year one could be achieved through online or in-person meetings, but this would require short-term funding that covers event costs and other needs beyond existing staff capacity and resources to enable WSG to serve as the Collaborative Facilitation Team. We are currently exploring potential sources of short-term funding.

Sustaining the Collaborative for the long-term, however, will require ongoing funding to:

- Enable Washington Sea Grant to continue serving as the Facilitation Team.
- Sustain a monitoring program for collecting system-scale longitudinal data on key habitats and species.
- Provide technical support to industry members and agencies for implementation of management strategies.
- Fund a competitive grant program through WSG for activities that support the development, piloting and implementation of management strategies.

WSG and current working group members have discussed longer-term funding opportunities that should be further explored by the Collaborative after its launch. Possible options include a 2023-

2025 state budget request, a Legislative Bill, an MOU with member contributions, Coordinated Resource Management via the Washington State Conservation Commission, etc.

Activities and Accomplishments

An outline for WCSAS was included as Action Item 3.9 in the *Phase II Work Plan for the Washington Shellfish Initiative* (Office of the Governor, 2016). The *Phase II Work Plan*—together with prior grant proposals to fund elements of the work—were used as initial guidance. The scope of work was adapted in response to information collected from working group members, shellfish growers, resource managers and the public during the first 16 months of the project. Those work plan changes were previously reported in progress report 2 (December 2019).

This is how WCSAS activities were described in the shellfish initiative work plan:

> **3.9 Promote collaborative, ecosystem-based management in Willapa Bay and Grays Harbor.**
>
> ...The steps below will promote cooperative, system-scale management by compiling and synthesizing information and addressing important information gaps:
>
> a) Compile, synthesize and maintain historical data, management plans and research findings relevant to system-scale management challenges in Willapa Bay and Grays Harbor, focusing on how these ecosystems function, how they have changed over time and projections of changes that can affect management options. Make the information available via a purpose-built website.
>
> b) Convene resource managers, scientists and stakeholders to verify a common understanding of the ecosystems and the top-priority management challenges in each of them, and to identify research needs and information gaps that represent barriers to tackling the management challenges at a system scale.
>
> c) Help address the needs identified in (b) by matching them with appropriate potential funding sources, sharing the information with other participants and promoting collaborative project proposals.

Items (a), (b) and (c) serve as reference points in the summary below of activities and accomplishments for the entire WCSAS project period (November 30, 2018 to November 30, 2021). Activities and accomplishments specific to year four (December 1, 2020 to November 30, 2021) are indicated with an asterisk (*).

Item (a)—Compile and summarize existing information, and make it widely available.

- Conducted a ***literature review*** and compiled sources to create a publicly accessible online database of prior research (currently on SciWheel). Many of the collected and catalogued source documents recommended by scientists, growers, and agency personnel are currently available only in hard copy.
- Drafted the ***science synthesis*** and distributed it to science advisors for two rounds of ***internal review*** and revision (see Addendum F).
- Solicited and compiled ***working group member feedback on the science synthesis*** to inform additional revisions.*
- Created, launched, and updated a ***website*** to provide public access to workshop products and outreach materials. The WCSAS website currently houses the following products:
    - Project description
    - Project fact sheet

    - Working group process diagram (downloadable; see Addendum C)
    - Aquaculture timeline
    - Workshop 1 Agenda (downloadable)
    - Close captioned videos of recorded presentations on the state of the science
    - Prioritized information needs (downloadable)
    - Close captioned videos of recorded EBM case study presentations*
    - Citation spreadsheet (downloadable) and annotated bibliography (downloadable) summarizing research about the nature and timescale of shellfish farming impacts on eelgrass*
    - Summary of working group discussion about the nature and timescale of shellfish farming impacts on eelgrass (downloadable)*
- Created and started processing ***additional workshop and study products*** for broader dissemination. The following products have been shared with the working group and will soon be posted to the WCSAS website and/or distributed to more targeted audiences:
    - And-But-So statements identifying sources of uncertainty for burrowing shrimp management (for working group and science advisors)*
    - Virtual farm tour videos (for WCSAS and IPM working groups, and for WCSAS website after additional processing and editing)*
    - Close captioned videos of recorded IPM presentations (for WCSAS website)*
    - Baseline grower perceptions of burrowing shrimp distribution and impacts, eelgrass cover, shellfish mortality and sedimentation (for WGHOGA)*
    - Participatory maps of burrowing shrimp distribution and impacts, eelgrass cover, shellfish mortality and sedimentation (for working group, science advisors, and WGHOGA)*
    - Conceptual social-ecological system of Willapa Bay and Grays Harbor (for WCSAS website)*
    - Vision statement themes for EBM in Willapa Bay and Grays Harbor (for WCSAS website; see Addendum E)*
    - Draft charter of EBM Collaborative (for working group and science advisors; some elements for WCSAS website; see Addendum G)*

Item (b)—Convene resource managers, scientists and stakeholders to verify science and management challenges and identify additional research needs (see Addendum C).

- Formed a ***working group*** representing entities that own, manage or regulate shellfish beds, public tidelands and other natural resources in the two bays, including shellfish farmers, tribes, and state and federal agencies. The working group currently has 19 members and additional alternates (see Addendum B for an updated membership list).
- Formed a ***science advisory team*** to conduct field studies, advise the WSG team and working group, and strategically augment the state appropriation with grants from other programs.
- Periodically conducted ***one-on-one meetings and anonymous surveys*** with working group members and science advisors to get feedback on the working group process, and to learn more about their individual priorities, concerns and information needs.*
- Planned and held ***Workshop 1***, which focused on the State of the Science and the System by presenting information related to shellfish aquaculture, eelgrass and burrowing shrimp in Willapa Bay and Grays Harbor, and other regions with similar ecological conditions;

and eliciting discussion among working group members and scientists on management challenges and critical information needs. Workshop 1 activities included:
    - Orientation webinar (October 19, 2019)
    - Field day to orient visiting scientists and facilitate discussions with local scientists (October 27, 2019)
    - In-person workshop for working group, science advisors, visiting scientists, and the general public held at the Willapa Harbor Community Center in South Bend (October 28-29, 2019).
- Planned and facilitated a series of online sessions to adapt ***Workshops 2 and 3*** to COVID-19 restrictions. Through these sessions, which focused on Outside Perspectives and Local Challenges, working group and science advisors were exposed to case study presentations on EBM from other contexts and reflected on challenges associated with the science and management interface from the perspectives of shellfish growers, resource managers, and scientists. The following online sessions were held:
    - Orientation webinar (February 18, 2020)
    - Field research updates (April 30, 2020)
    - "Why Structured Decision Making?," an EBM case study presented by Sarah Converse, Unit Leader and Associate Professor, USGS Washington Cooperative Fish and Wildlife Research Unit, University of Washington (July 28, 2020)
    - "Adapting to the Best Science Available for Sound Decision Making," an EBM case study presented by Kelly S. Andrews, Research Fish Biologist, NOAA Northwest Fisheries Science Center and Dan Tonnes, Washington and Oregon Aquaculture Coordinator, NOAA Fisheries West Coast Region (August 12, 2020).
    - "EBM at Elkhorn Slough: Lessons Learned," an EBM case study presented by Monique Fountain, Tidal Wetland Project Director Elkhorn Slough National Estuarine Research Reserve and Kerstin Wasson, Adjunct Professor, Department of Ecology and Evolutionary Biology, University of California, Santa Cruz (August 25, 2020).
    - "Shellfish Aquaculture and Eelgrass," a session that guided the working group through assessing scientific research on the nature and timescale of shellfish aquaculture and eelgrass interactions and then applying the results to management issues (November 9, 2020).
    - "Oyster Futures," an EBM case study presented by Elizabeth North, Associate Professor, Center for Environmental Science, University of Maryland and Jeff Harrison, President, Talbot Watermen Association (January 13, 2021).*
    - "Tapash Sustainable Forest Management Collaborative," an EBM case study presented by Tessa Vermeul, Community and Landscapes Project Coordinator, Washington Resource Conservation and Development Council, Darcy Batura, Forest Partnerships Manager, The Nature Conservancy, and Reese Lolley, Director of Forest Restoration and Fire, The Nature Conservancy (January 26, 2021).*
    - "Extended EBM discussion, a working group conversation that focused on applying insights and lessons learned from the EBM case studies to Willapa Bay and Grays Harbor; facilitated by WSG (February 2, 2021).*

    - "Dealing with Knowledge Gaps and Uncertainty," a session that focused on how scientists address uncertainty through research design choices and collaboration and invited working group members to identify sources of uncertainty that need to be addressed for burrowing shrimp management (February 23, 2021).*
    - "Farming Methods and Challenges," a session that took working group members on virtual tours of several shellfish farms, explored the pros and cons of different growing methods, and discussed past/present alternatives to chemical controls for burrowing shrimp used by growers (May 4, 2021).*
    - "Integrated Pest Management," a session that included a presentation on the principles of IPM and its application in Washington State from Doug Walsh, Extension Entomologist, Washington State University, as well as updates from the IPM working group from David Beugli, Director, Willapa/Grays Harbor Oyster Growers Association (WGHOGA) (July 13, 2021).*
- Planned and facilitated ***Workshop 4***, which focused on identifying System-wide Understandings by discussing the science synthesis and remaining data gaps, discussing the extent of burrowing shrimp impacts, and defining key components of the Willapa Bay and Grays Harbor social-ecological system (see Addendum D for an agenda). Workshop 4 activities included:
    - Participatory mapping of burrowing shrimp distribution and impacts (conducted by mail, virtual meeting, and/or in-person meeting from June-August, 2021)*
    - Orientation webinar (August 17, 2019)*
    - Working group review of science synthesis summary statements and data gaps (August 17-30, 2021)*
    - Hybrid (in-person/online) workshop for working group members and science advisors held at the Cranberry Museum in Long Beach (August 31-September 1, 2021)*
- Planned and facilitated ***Workshop 5***, which focused on developing Recommendations through reviewing, discussing, and revising a draft charter for the future EBM Collaborative. Workshop 5 activities included:
    - Orientation webinar (September 30, 2021)*
    - Distribution of Draft 1 of the EBM Collaborative charter to working group members and science advisors (October 1, 2021)*
    - Online one-on-one draft charter feedback meetings with working group members and science advisors (October 4-15, 2021)*
    - Online sessions to discuss the mission, objectives, structure, participants, processes, and potential funding sources for the future EBM Collaborative (October 18-19, 2021)*
    - Distribution of Draft 2 of the EBM Collaborative charter to working group members and science advisors (October 25, 2021)*
    - Online closing meeting and voting on EBM Collaborative recommendations (October 26, 2021)*

Item (c)—Secure additional funding, share information, and promote collaboration.

- WSG shared information and collaborated with several independent project teams to help secure federal awards for conducting additional field research related to WCSAS objectives while also expanding the project's reach to the broader Pacific coast region.

    - WSG was awarded $1,193,009 in federal funds over three years (September 1, 2019 to August 31, 2022) from the National Sea Grant College Program to form a ***West Coast Aquaculture Collaborative*** that includes Sea Grant programs in Washington, Oregon, California, and Alaska. WCSAS has served as a pilot for harnessing and applying expertise from Sea Grant programs and their public and private sector partners to address challenges of regional significance to aquaculture. State appropriations for WCSAS provided the required non-federal matching funds for the federal grant.
    - The Pacific Shellfish Institute (PSI) was awarded $1,681,306 over four years (July 1, 2019 to June 30, 2023) from the ***Pacific States Marine Fisheries Commission*** to conduct a coast-wide assessment of eelgrass response to shellfish culture practices to better understand the value of habitats they provide for managed fish and invertebrate species.
- WSG also promoted collaboration, dialogue, and research coordination throughout the study period by participating in several local and regional discussions related to shellfish aquaculture.
    - Contributed to conversations between shellfish growers and state agencies, including WSDA and the Washington Department of Natural Resources Rural Communities Partnership Initiative.
    - Interpreted and discussed interactions between shellfish aquaculture, eelgrass and burrowing shrimp from a West Coast regional perspective as part of the ***West Coast Aquaculture Collaborative***.*
    - Participated as an advisor in meetings of the ***IPM Working Group*** convened under a settlement agreement by WGHOGA and the Washington State Department of Ecology. The arrangement helped ensure communication and coordination between the working groups.*

If you would like copies of this document in an alternative format, please contact Washington Sea Grant at seagrant@uw.edu or (206) 543-6600

Addendum A: Additional Project Context

Washington leads the nation in farmed shellfish, and the state's Pacific Coast estuaries have been top producers for more than a century. The effort described here responds to a confluence of long-standing but continually evolving issues facing shellfish farmers and resource management agencies in Willapa Bay and Grays Harbor, as well as in other estuaries and bays in Washington, Oregon and Northern California. In Willapa Bay, in particular, burrowing shrimp appear to threaten the sustainability of the industry.

This project alone cannot solve the issues being addressed. It can, however, support research and dialogue to make well-founded, consensus-based solutions more likely. Other state-funded projects are closely linked and will inform this project. Significant efforts by the Department of Natural Resources in partnership with WGHOGA, and a recently announced dialogue on integrated pest management led by Ecology and shellfish growers, are focused on the same issues and offer additional avenues to solutions. WSG will continue to collaborate closely with those efforts.

Two recent federally-funded grant initiatives were directed at dealing with challenges to aquaculture that are common across multi-state regions of the U.S. In this context, rising populations of burrowing shrimp and the ways in which native and invasive eelgrass species interact with shellfish aquaculture represent examples of environmental challenges facing aquaculture on the West Coast. Other such challenges are likely to develop as ocean and estuarine conditions change in response to ocean conditions, climate and human uses of coastal waters and watersheds. WSG and PSI—already collaborating on the Willapa Bay and Grays Harbor project—were successful in securing two of these region-scale grants that will use this project as a pilot and test bed for regional collaboration and research across the West Coast states. The regional grants thus supplement state funding for this project.

This project builds on a concept introduced in the *Phase II Work Plan* for the state shellfish initiative. The general approach embodied in Action Item 3.9 is to sustain shellfish aquaculture in Willapa Bay and Grays Harbor under changing environmental conditions by establishing an adaptive, ecosystem-based management framework similar to those established by forest management collaboratives in the state. Forest management collaboratives address ecosystem-scale challenges that cannot be met by a single owner—public or private—managing only their own property, such as dealing proactively with fuel loads on timberlands to reduce catastrophic forest fires. Collaboratives agree on system-scale goals, identify appropriate management practices and support one another in taking action. The pattern of private shellfish farms in the midst of publicly owned tidelands with resources managed by various agencies sets up a parallel opportunity in Washington's coastal bays.

Growers' uncertainty about the future viability of shellfish farming, as well as resource managers' uncertainty about ecosystem-scale impacts on protected and managed species, is driving conflicts over aquaculture practices and regulations. As both the industry and resource managers try to adapt to large-scale environmental changes that are affecting conditions in the bays, new culture practices are being implemented quickly with limited information on their impacts to adjacent shellfish farms or the environment. Meanwhile, the public remains largely uninformed about shellfish growing practices, and some stakeholder opinions appear to be influenced by misinformation.

Three developments in Washington are also shaping this project. First, it directly addresses issues identified by regulators at the "Washington Eelgrass and Shellfish Aquaculture Workshop" held in Seattle on April 11, 2017. The workshop, convened by NOAA's regional aquaculture coordinator, brought together scientists, regulators, tribes and the shellfish industry to address inconsistencies in eelgrass management related to aquaculture. This project will help fill important data gaps identified by scientists and managers who participated in the workshop and will support interagency dialogues. The regional grant secured by PSI directly addresses eelgrass and oyster aquaculture on the West Coast.

Second, the acute need for shellfish growers to control burrowing shrimp—and the projected economic impact if production declines significantly—triggered new dialogues between shellfish farmers and state agencies. A meeting convened by the Governor's Office on February 14, 2018, brought the various conversations together in support of a coordinated approach. The Department of Natural Resources created a Rural Communities Partnership Initiative with WGHOGA, the Washington Department of Agriculture and the Washington State Conservation Commission to specifically focus on alternative control measures for burrowing shrimp. WSG is coordinating its efforts with the DNR/WGHOGA partnership by participating in the partnership's working group.

Third, shellfish growers and the Washington State Department of Ecology—who were locked in an appeal process over Ecology's decision to deny a permit for using imidacloprid on burrowing shrimp—developed a settlement agreement that will result in a new dialogue on Integrated Pest Management solutions. The working group for that dialogue is highly likely to include members of this project's working group, and any solutions it recommends can be incorporated into this project.

An important feature of this project is to explore the value and feasibility of establishing a management collaborative that can persist beyond the project's timeline. Through a facilitated workshop process WSG and its collaborators will support the working group in assembling an ecosystem-based framework with the following components:

- a shared understanding among scientists, resource managers and stakeholders of how the ecosystem functions, how shellfish farming interacts with the system, and what is at risk;
- objective methods for assessing how shellfish farms and other tidelands contribute to habitat values and ecosystem processes in the bays;
- ecosystem-based aquaculture practices that optimize the value of shellfish farms for both shellfish production and as habitat; and
- an ongoing structure for collaborative management, patterned after forest management collaboratives or other proven models.

These components are reflected in the deliverables identified in the scope of work.

The dialogue and consensus building process is as important as scientific and technical information in determining the success of this project. A diverse constituency will be able to participate in the process through public workshops, working group meetings and outreach efforts. Information from the project will be widely available on websites and in publications and outreach materials.

Addendum B: Working Group Membership (Updated)

Working group members have been recruited from entities that own, manage or regulate shellfish beds, public tidelands and other natural resources, including shellfish farmers, public agencies and tribes. Working group primary members and their alternates as of October 26, 2021, are listed below.

Primary	*Alternate(s)*	*Organization*
Mark Ballo	(David Beugli*)	Brady's Oysters
Annie Herrold		Chetlo Harbor Shellfish
Kyle Deerkop	Tim Morris	Coast Seafoods
Hope Rieden	Harry Chesnin	Confederated Tribes of the Chehalis Reservation
Kathleen Nisbet-Moncy	(David Beugli)	Goose Point Oysters
Kim Patten		Independent Shellfish Grower
Ken Wiegardt	(David Beugli)	Jolly Roger
Dan Tonnes	Scott Anderson	National Oceanic and Atmospheric Administration - National Marine Fisheries Service – West Coast Region
Brian Sheldon	Marilyn Sheldon	Northern Oyster Company
Mike Nordin	Alison Halpern	Pacific and Grays Harbor Conservation Districts; Washington State Conservation Commission
Scott Mazzone	Larry Gilbertson, Joe Schumacker	Quinault Indian Nation
Larissa Pfleeger-Ritzman	Jamie Judkins, Richard Ashley, Donovan Wargo	Shoalwater Bay Tribe
Bill Dewey	Roberto Quintana	Taylor Shellfish
Glynnis Nakai	Ryan McReynolds	U.S. Fish and Wildlife Service - Nisqually National Wildlife Refuge Complex (Grays Harbor National Wildlife Refuge), Consultation & Conservation Planning Division
Jackie Ferrier	Will Ritchie	U.S. Fish and Wildlife Service - Willapa National Wildlife Refuge Complex
James Losee	Zach Forster Larry Phillips	Washington Department of Fish and Wildlife
Tom Gorman	Kristin Swenddal Natalie Sahli	Washington Department of Natural Resources
Laura Butler		Washington State Department of Agriculture
Rich Doenges	Zach Meyer, Heather Patt	Washington State Department of Ecology

Addendum C: Working Group Process (Updated)

Addendum D: Workshop 4 Agenda

Washington Coast Shellfish Aquaculture Study: Workshop #4

August 31 - September 1, 2021

Cranberry Museum

This is the fourth of five workshops in support of the Washington Coast Shellfish Aquaculture Study. The goal of this workshop is to summarize and assess agreement on system-wide understandings about how the social-ecological systems of Willapa Bay and Grays Harbor function. This will help clarify the vision, goals, and remaining information needs for a future ecosystem-based management collaborative.

AGENDA

Day 1: August 31 (10:00 am - 4:30 pm)

10:00	Registration
10:30	Welcome (*Russell Callender, Washington Sea Grant*)
10:45	Workshop overview
11:00	Activity: Science synthesis responses
12:30	*Lunch (catered by Becca's Bistro)*
1:30	Activity: Burrowing shrimp distribution and impacts maps
3:00	*Break*
3:15	Discussion: Personal visions and mindsets
4:30	Adjourn
5:00	*Happy Hour and Dinner (Location TBD)*

Day 2: September 1 (9:00am - 4:00 pm)

9:00	Registration
9:30	Welcome back and recap (*Kate Litle, Washington Sea Grant*)
9:45	Activity: Defining the system
11:00	*Break*
11:15	Activity: Defining the system
12:00	*Lunch (catered by Becca's Bistro)*
1:00	Discussion: Future EBM collaborative goals
2:30	*Break*
2:45	Discussion: Making the EBM collaborative successful
4:15	Workshop feedback
4:30	Closing
4:45	Adjourn

Addendum E: Vision Statement Themes

Addendum F: Science Synthesis

Please follow this link to view the current version of the science synthesis:
https://drive.google.com/file/d/1htdDZ8qxvtFddLuUyHdDXr7_DROWBZSw/view?usp=sharing

Addendum G: Draft EBM Charter

Please follow this link to view the most recent version of the draft EBM charter:
https://drive.google.com/file/d/1UWaGSfpiJiAgC_azJysqB1XuUAHQvBSY/view?usp=sharing