

SUMMARY OF RECOMMENDATIONS FOR THE OREGON SHELLFISH INITIATIVE

OVERVIEW:

Molluscan shellfish, including oysters and clams, have played an important role in the history and culture of the Oregon coast. They also represent a critical component of Oregon’s marine ecosystem and provide important commercial, recreational and ecological benefits and services to Oregonians. Farmed oysters cultivated in Oregon bays and estuaries (mariculture) are a prized delicacy, and clam diggers are rewarded for their effort by delicious and nutritious food that adds value to a coastal outdoor experience. Commercial mariculture of oysters is estimated to have an annual, direct economic value of about \$10.6 million in Oregon¹, and commercial clambers generate about \$507,500 annually from the harvest of bay clams and razor clams from Oregon waters. In addition, recreational harvest of clams and crab has been responsible for \$38 million in annual, direct and indirect expenditures on the Oregon coast². Oregon is recognized as a leader in producing oyster seed and advancements in shellfish science and technology. Like our neighboring states to the north and south, Oregon is proposing a collaborative shellfish initiative designed to enhance the production of cultivated shellfish, increase economic benefits to coastal communities, increase the opportunities for sport harvests, and conserve, protect and enhance our valuable wild stocks of shellfish resources.



PATHWAY TO AN OREGON SHELLFISH INITIATIVE:

In 2015, the Oregon Legislative Assembly passed House Bill 2209 which established the state’s policy to:

- *Enhance and expand cultivated shellfish production;*
- *Conserve, protect and restore wild populations of native shellfish; and*
- *Improve water quality and the health of aquatic and marine habitats.*

The Joint Interim Task Force on Oregon Shellfish (the Oregon Shellfish Task Force) was created to advance this policy by developing the framework and recommendations for an Oregon Shellfish Initiative. The Oregon Shellfish Task Force was composed of representative members with broad interests including shellfish mariculture, commercial and sport harvests, seafood safety, tribal perspectives, resource conservation and public education.

¹ United States Department of Agriculture (USDA), National Agricultural Statistics Service (NASS), *Census of Aquaculture (2013)* (2014), Volume 3, Special Studies, Part 2 AC-12-SS-2.

² Dean Runyan Associates, *Fishing, Hunting, Wildlife Viewing, and Shellfishing in Oregon: 2008 State and County Expenditure Estimates* (2009).



The Oregon Shellfish Task Force held seven meetings from November 2015 through September 2016. The meetings were open and collaborative, with members and interested stakeholders working together to identify and prioritize strategies to achieve the protection of native shellfish and enhancement of shellfish production. It is the intent of the Oregon Shellfish Task Force that its recommendations be used to develop an Oregon Shellfish Initiative that will focus valuable resources on critical actions and immediate priorities, as well as help guide future policy choices and long-term management decisions.

A PUBLIC / PRIVATE PARTNERSHIP FOR OREGON SHELLFISH:

The Oregon Shellfish Initiative is envisioned as a multi-year, collaborative and cooperative effort that focuses the activities of state and federal agencies, coastal tribes, local governments, private shellfish growers, academia, non-governmental organizations and public stakeholders to achieve mutual benefits with regard to shellfish resources. The collaborative partnership will continue to bring together elected officials, industry operators, agency resource managers, scientists, restoration practitioners, school groups and other participants in an integrated enterprise designed to advance management oversight, enhance production, conduct critical research, improve water quality, assess wild shellfish stocks and conserve and restore Oregon's diverse shellfish resources.



SUMMARY OF TASK FORCE RECOMMENDATIONS:

The Oregon Shellfish Task Force developed a set of specific recommendations for each of the following areas:

- A) encourage collaboration and state agency leadership;
- B) enhance shellfish production;
- C) develop best management practices;
- D) understand the impacts of ocean conditions;
- E) evaluate socioeconomic costs and benefits;
- F) increase public education, outreach and enhance recreational opportunities;
- G) assess wild shellfish stocks; and

H) restore native shellfish.

A total of 32 recommendations were offered, discussed and evaluated with regard to priority, implementation timeline, cost and responsible entity. A discussion and ranking of all of the high-priority recommendations appears in Appendix A; a list of all the recommendations appears in Appendix B; a table showing the complete description, cost and responsible entities for all 32 of the recommendations appears in Appendix C; and a list of the Oregon Shellfish Task Force members and meeting agendas appears in Appendix D.

CALL TO ACTION FOR THE 2017 LEGISLATIVE SESSION:

The Oregon Shellfish Task Force identified the critical actions listed below to be addressed in the 2017 legislative session. Other actions recommended by the Task Force should be implemented over the next five to eight years:

- Recommend executive action or seek legislation to be drafted formalizing the Oregon Shellfish Initiative as a collaborative public/private partnership and state-wide coalition;
- Designate representatives to serve as members of the Oregon Shellfish Initiative – Oversight Committee, coordinated jointly by the Oregon Department of Agriculture and the Oregon Department of Fish and Wildlife;
- Garner support for approximately \$2.9 million in additional funds, outside agency budgets, in support of the Oregon Shellfish Initiative and tap certain existing resources and relationships in support of 2017 legislative action;
- Convene the Oregon Shellfish Initiative – Oversight Committee to consider what has been implemented in the 2017 session, and adopt the priority goals and recommendations offered by the Oregon Shellfish Task Force for future consideration; and
- The Oregon Shellfish Task Force recommends that the Oregon Shellfish Initiative – Oversight Committee work to ensure clean water to protect and restore shellfish growing areas as well as encouraging efforts to monitor ocean acidification and hypoxic waters in the nearshore zone and in bays and estuaries.

SEEK LEGISLATION TO BE INTRODUCED IN 2017 TO:

- Direct the Oregon Department of Agriculture (ODA) Food Safety Program to serve as the lead state agency to coordinate permitting and management of commercial shellfish mariculture in Oregon waters and ensure enforcement of existing regulations, including compliance with the “use it or lose it” statute;
- Investigate development of an interagency memorandum of understanding between ODA and the Department of State Lands (DSL) regarding a Removal-Fill Permit related to mariculture;
- Direct the Department of Land Conservation and Development (DLCD) to work with other agencies to consolidate information critical to shellfish mariculture and support the development of a state-wide, digital GIS database;
- Direct ODA to transfer existing resources from the Tillamook Bay Water Quality Pilot Program (House Bill 2209, 2015) to expand monitoring in other shellfish-growing areas;
- Provide support for the Oregon State University Molluscan Broodstock Program;
- Continue oversight on the import, harvest and cultivation of controlled species;



- Identify potential impacts of ocean acidification on native and cultivated shellfish by supporting programs like those at Whiskey Creek Shellfish Hatchery;
- Reestablish an Oregon Harmful Algal Bloom monitoring program;
- Conduct a baseline economic survey and analysis of Oregon shellfish harvests;
- Conduct an aquaculture and commercial clam shellfish marketing study;
- Document the economic costs of ocean acidification and benefits of ocean acidification research;
- Increase public education, outreach and cultural appreciation about the importance of shellfish by providing support for a dedicated staff person at the Oregon Department of Fish and Wildlife (ODFW) for outreach and education;
- Enhance the enforcement of existing commercial and recreational catch regulations for shellfish by encouraging collaboration with coastal tribes and appropriating additional resources;
- Improve public access along the shoreline to enhance sport harvest of shellfish;
- Appropriate funds to design and install education and outreach signs at key access points;



- Increase frequency of shellfish stock assessment surveys and conduct stock assessment surveys in subtidal zone;
- Involve the public in shellfish surveys and collection of fisheries data;
- Hire fisheries scientists with expertise on clams and other shellfish, and analysis of impacts to intertidal and subtidal habitats; and
- Conserve and protect the three known populations of Olympia oysters in Oregon bays and estuaries.



APPENDIX A

The following items have been identified by the Oregon Shellfish Task Force as being a high priority for either immediate or long-term implementation:

ENCOURAGE COLLABORATION AND STATE AGENCY LEADERSHIP

Develop a strategy for supporting and encouraging collaboration – facilitated by extension activities – between commercial and recreational shellfish industries, state and federal agencies, and academia to address shellfish production issues in the state. Designate a state agency as the lead agency for addressing and regulating shellfish production in Oregon in order to insure an efficient and collaborative management process. These objectives should be accomplished as follows:

IMMEDIATE IMPLEMENTATION

- The Oregon Department of Agriculture (ODA) Food Safety Program should serve as the lead state agency for commercial mariculture of shellfish in Oregon waters. Its role as coordinator and convener should include:
 - Holding pre-application meetings among applicants and agencies to discuss any new shellfish lease applications submitted to ODA and to make sure that permit conditions will be met. Additional resources should be appropriated to ODA to hire an additional staff person to facilitate the program; and
 - Use existing annual production data to generate revenue data from all growers.
- The Oregon Department of Agriculture (ODA) Food Safety Program staff should conduct routine field visits to commercial mariculture lease areas to ensure productivity and compliance with lease conditions in order to increase available areas for commercial shellfish mariculture by the active enforcement of the existing “use it or lose it” requirements (ORS 622.280) rather than opening new areas for commercial leases.

LONG-TERM IMPLEMENTATION

- The Department of Land Conservation and Development (DLCD) should consolidate information available in other agencies and develop a state-wide digital GIS database to:
 - Assist those counties that are updating estuary management plans;
 - Consolidate and make available technical information about estuarine habitats native shellfish beds, commercial mariculture plats, fish and wildlife use, and current recreational and commercial uses;
 - Provide available information that identifies the ownership of tidelands;
 - Outline an inventory of existing encumbrances on state-owned tidelands; and
 - Make updating land use plans and zoning for Oregon estuaries easier with a focus on estuaries with existing potential for aquaculture operations.
- If a memorandum of understanding to create a removal-fill statutory exemption is not reached, the Department of State Lands should explore the creation of a new removal-fill general permit for shellfish cultivation on non-state-owned lands. A general permit could provide an expedited processing timeline (40 days rather than 120 days for the individual permit) and provide cultivators with greater certainty regarding the “permitability” of their proposals and conditions that might be imposed. Such a general permit should be developed to align with federal

Nationwide Permit 48 to provide a better integrated state/federal regulatory review and approval process.

ENHANCE SHELLFISH PRODUCTION

Identify opportunities to enhance shellfish production through site suitability research and prioritizing pilot projects that will initially focus on enhancing existing certified areas and that have a basis in enhancing resource protection and restoration, mariculture production potential and economic potential. This objective should be accomplished as follows:

IMMEDIATE IMPLEMENTATION

- Use existing resources from the Tillamook Bay Pilot Program (House Bill 2209, 2015) to expand the program to other areas such as Coos Bay and the South Slough to increase water quality monitoring related to the closure and opening of shellfish harvesting in order to enhance commercial shellfish production in existing certified areas.
- Oregon State University's Molluscan Broodstock program is critical to support the restoration and conservation of native species as well as to support commercial shellfish production. The Legislative Assembly should appropriate \$570,000 biennially to conduct necessary breeding research to ensure the development of shellfish broodstock and shellfish varieties that are profitable and sustainable, especially given changes in ocean and estuarine conditions including ocean acidification.

LONG-TERM IMPLEMENTATION

- ODFW should continue to prohibit the intentional and deliberate introduction of non-native species into Oregon bays and estuaries. However, ODFW should investigate the effects of removing additional species, like Manila clams, from the list of controlled, non-native, restricted species to allow the transport or movement of clam seed.

UNDERSTAND THE IMPACTS OF OCEAN CONDITIONS

Examine the impacts of ocean acidification on wild shellfish stocks and cultivated shellfish. This objective should be accomplished as follows:

IMMEDIATE IMPLEMENTATION

- The state should conduct scientific research on the potential impacts of ocean acidification and hypoxia on cultivated and wild stocks of Olympia oysters, bay clams, razor clams, and other shellfish, including the breeding of acidification-resistant shellfish. This research can be advanced by appropriating \$280,000 biennially to maintain the existing monitoring efforts currently conducted at the Whiskey Creek Shellfish Hatchery, with additional funding to:
 - Help support work to gain a greater understanding of the timing and extent of the effects of acidification and other stressors on larvae; and
 - Continue the development of an automated buffering system.
- Oregon is the only state on the West Coast that no longer has a Harmful Algal Blooms (HAB) monitoring program. This lack of data puts the state at a disadvantage when anticipating biotoxin issues that may arise. A HAB monitoring program should be reestablished to track potential bloom events in the nearshore marine waters, in the surf zone, and in the

bays/estuaries and provide essential information to commercial and recreational harvesters. This would require a \$350,000 appropriation. A policy option package is currently under consideration through ODFW's agency proposed budget.

EVALUATE SOCIOECONOMIC COSTS AND BENEFITS

Identify research needs to fully understand the socioeconomic and social vulnerability impacts and issues of shellfish production, including the economic costs and benefits of shellfish mariculture and recreational shellfish harvest. Evaluate the impacts to coastal communities and make sure that research results are disseminated so they are accessible to the general public. These objectives should be accomplished as follows:

IMMEDIATE IMPLEMENTATION

- A baseline survey and economic analysis of the Oregon molluscan shellfish industry (mariculture and commercial shellfish clam harvesters) should be conducted that includes information on operating and investment costs, facilities, fisheries management, production, sales, challenges and opportunities. This type of survey would cost approximately \$80,000 and should be updated every five years.
- Support an aquaculture and commercial shellfish marketing study to evaluate marketing and sales opportunities to improve industry success and economic opportunities.

LONG-TERM IMPLEMENTATION

- A study should be conducted that would document the costs to the aquaculture oyster industry due to ocean acidification and the benefits resulting from research and outreach.

INCREASE PUBLIC EDUCATION AND OUTREACH, ENHANCE RECREATIONAL OPPORTUNITIES

It is critical that the state promote education about the responsible harvest of Oregon shellfish as well as awareness and appreciation of the ecosystem to promote healthy shellfish populations. These objectives should be accomplished as follows:

IMMEDIATE IMPLEMENTATION

- Appropriate \$150,000 - \$160,000 biennially to ODFW to add a dedicated staff person for outreach and education. This person's role would be to provide improved guidance, instruction and additional opportunities for recreational harvest of Oregon's shellfish by making information readily available to schools and the public via digital media (websites, social media, instructional videos), regulation signs, printed materials (brochures, maps, fact sheets, identification guides), workshops and clinics, and during special outreach events.
- The Oregon State Police (OSP) should work to enhance the enforcement of existing commercial and recreational catch regulations for shellfish, including consulting with coastal tribes to find opportunities to share regulatory enforcement. Appropriating \$150,000 - \$160,000 biennially to OSP would provide additional support to increase enforcement.
- Direct ODFW to work actively with the Oregon Department of Transportation (ODOT), Oregon Parks and Recreation Department and Port Districts to increase opportunities for recreational harvest of shellfish by improving parking areas, regulation signage, access trails and walkways,

stairs, and other infrastructure enhancements. Broaden the allowable use of ODFW Restoration and Enhancement funds to be used to improve access to recreational clamming opportunities.

LONG-TERM IMPLEMENTATION

- Direct ODFW to work with schools and port districts to develop outreach and educational signs informing the public about shellfish at key access locations. A one-time expenditure of \$50,000-\$60,000 would be sufficient to provide signs for five bays.

ASSESS WILD SHELLFISH STOCKS

In order to have accurate harvest levels and baseline information, it is critical that accurate assessments be done on a regular basis. These objectives should be accomplished as follows:

IMMEDIATE IMPLEMENTATION

- The ODFW shellfish stock assessment team currently returns to specific estuaries once every 8-10 years. An additional \$360,000 per biennium should be appropriated to increase personnel capacity in order to allow the team to complete the stock assessment surveys more rapidly. A shorter amount of time between stock assessment surveys and habitat characterizations would provide the coastal resource agencies with more accurate information to address permitting decisions, resource-use issues and other rapid-response topics. In addition, \$60,000 should be appropriated every biennium to ODFW to contract with scuba divers to conduct shellfish stock assessment surveys in the sub-tidal zones of major bays and estuaries.
- ODFW should actively work to identify opportunities for meaningful involvement by the public and in consultation with coastal tribes, in the shellfish stock assessments, characterization of estuarine habitats, collection of fisheries data and outreach activities. Appropriating an additional \$50,000 every biennium would help to provide the necessary staff time to develop a robust public monitoring program.

LONG-TERM IMPLEMENTATION

- A fisheries scientist should be hired by ODFW with expertise on clams, other shellfish, and analysis of impacts to intertidal and subtidal habitats. Appropriating \$160,000 every biennium would allow ODFW to hire a fisheries statistician to monitor, analyze and manage clam fisheries to adjust harvest levels in a timely fashion, providing a benefit to both recreation and commercial harvesters. ODFW should determine whether there are efficiencies to be gained by partnering with academia and staff at the Hatfield Marine Science Center. A review and analysis of permits and actions that impact intertidal and subtidal habitats in Oregon bays and estuaries should be conducted. This would improve the ability to incorporate new information and historical data into future permit reviews and considerations for complex resource decisions in bays and estuaries.

RESTORE NATIVE SHELLFISH

It is important to place particular focus on opportunities to enhance and restore degraded shellfish populations including, but not limited to, native Olympia oysters. These objectives should be accomplished as follows:

IMMEDIATE IMPLEMENTATION

- Direct ODFW to continue efforts to protect and conserve the three known populations of Olympia oysters in Oregon bays and estuaries. This should be accomplished by building partnerships with Tribes and non-governmental entities.

Appendix B

LIST OF ALL TASK FORCE RECOMMENDATIONS

This list contains all 32 of the recommendations made by the Oregon Shellfish Task Force. A table providing more detail on each item appears in Appendix C.

A. ENCOURAGE COLLABORATION AND STATE AGENCY LEADERSHIP

1. Clarify ODA's role as the lead state agency for commercial mariculture
2. Enforce existing "use it or lose it" requirements
3. Investigate the development of interagency a MOU regarding Removal-Fill Permit related to mariculture
4. Consolidate information critical to shellfish mariculture and support the development of a state-wide, digital GIS database
5. Explore the extension of ODA administration of shellfish mariculture to non-state lands

B. ENHANCE SHELLFISH PRODUCTION

6. Transfer existing resources to expand monitoring in other shellfish-growing areas
7. Provide support for the OSU Molluscan Broodstock Program
8. Determine maximum capacity and cumulative impacts of shellfish operations
9. Investigate mariculture operations in the Oregon Territorial Sea
10. Continue oversight on the import, harvest and cultivation of controlled species

C. DEVELOP BEST MANAGEMENT PRACTICES

11. Determine impacts of commercial mariculture to eelgrass beds
12. Address displacement of sport clammers from mariculture plats
13. Summarize best management practices for commercial shellfish mariculture operations in Oregon waters

D. IMPACTS OF OCEAN CONDITIONS

14. Identify potential impacts of ocean acidification on native and cultivated shellfish
15. Reestablish an Oregon Harmful Algal Blooms monitoring program

E. SOCIOECONOMIC COSTS AND BENEFITS

16. Conduct baseline economic survey and analysis of Oregon shellfish harvests
17. Document the economic costs of ocean acidification and benefits of ocean acidification research
18. Conduct an aquaculture and commercial clam shellfish marketing study
19. Conduct a preference survey and economic evaluation of the recreational molluscan shellfish industry in Oregon
20. Create a valuation report identifying the cost and benefits associated with shellfish in the ecosystem

F. INCREASE PUBLIC EDUCATION, OUTREACH AND ENHANCE RECREATIONAL OPPORTUNITIES

21. Increase public education, outreach and cultural appreciation about the importance of shellfish

22. Enhance the enforcement of existing commercial and recreational catch regulations for shellfish
23. Improve public access along the shoreline to enhance sport harvest of shellfish
24. Design and install education and outreach signs at key access points

G. ASSESS WILD SHELLFISH STOCKS

25. Increase frequency of shellfish stock assessment surveys and conduct stock assessment surveys in subtidal zone
26. Increase fundamental understanding about shellfish populations and recruitment dynamics
27. Involve the public in shellfish surveys and collection of fisheries data
28. Increase monitoring of recreational and commercial shellfish harvests
29. Hire fisheries scientists with expertise on clams and other shellfish, and analysis of impacts to intertidal and subtidal habitats

H. RESTORE NATIVE SHELLFISH

30. Conserve and protect native Olympia oysters
31. Restore and enhance native shellfish stocks
32. Investigate the impacts of purple varnish clams, naturalized softshell clams and Manila clams on wild shellfish stocks

Appendix C - Oregon Shellfish Task Force Recommendation

New Code #	Category	Recommendation	Description of Recommendation and Discussion	Rank by ORSTF	Timeline	Approximate Cost Per Biennium	Responsible Entity
1	Collaboration and Agency Leadership	Clarify ODA's role as the lead state agency for commercial mariculture	Oregon Department of Agriculture (ODA) Food Safety Program should continue as the lead state agency for commercial mariculture of shellfish in Oregon waters. Its role as coordinator and convener should include holding pre-application meetings among applicants and agencies to discuss any new shellfish lease applications submitted to ODA, to make sure that permit conditions will be met and use existing annual production data to generate revenue data. Additional resources should be appropriated to ODA to hire an additional staff person to facilitate the program	High Priority	Immediate	\$200,000 (NRS-3/1.0FTE)	ODA
2	Collaboration and Agency Leadership	Enforce existing "use it or lose it" requirements	ODA should be conducting routine field visits to commercial mariculture lease areas to ensure productivity and compliance with lease conditions in order to increase available areas for commercial shellfish mariculture by the active enforcement of the existing "use it or lose it" requirements (ORS 622.280) rather than opening new areas for commercial leases.	High Priority	Immediate	N.A.	ODA
3	Collaboration and Agency Leadership	Investigate the development of interagency MOU regarding a Removal-Fill Permit related to mariculture	ODA and the Department of State Lands (DSL) should enter into a memorandum of understanding to create a removal-fill statutory exemption that would still allow DSL a meaningful opportunity to review proposed plats for shellfish cultivation on state owned lands administered by ODA but would eliminate redundancies between the regulatory and leasing programs. Such an exemption would: confirm state-ownership and ensure that any existing proprietary authorizations issued by DSL would not be adversely affected and provide DSL with an opportunity to offer recommendations or conditions with the expectation that they would be incorporated into any ODA final order approving a plat. If a memorandum of understanding to create a removal-fill statutory exemption is not reached, DSL should explore the creation of a new removal-fill general permit for shellfish cultivation on non-state-owned lands. A general permit would provide an expedited processing timeline (40 days rather than 120 days for the individual permit) and provide cultivators with greater certainty regarding the "permitability" of their proposals and conditions that might be imposed. A general permit should be developed to align with federal Nationwide Permit 48 to provide a better integrated state/federal regulatory review and approval process.	High Priority	Long-term	N.A.	DSL
4	Collaboration and Agency Leadership	Consolidate information critical to shellfish mariculture and support the development of a state-wide, digital GIS database	The Department of Land Conservation and Development (DLCD) should consolidate information available in other agencies and develop a state-wide digital GIS database that would: assist those counties that are updating estuary management plans; consolidate and make available technical information about estuarine habitats, native shellfish beds, commercial plats fish and wildlife use, and current recreational and commercial uses; provide available information that identifies the ownership of tidelands; outline an inventory of existing encumbrances on state-owned tidelands; and make updating land use plans and zoning for Oregon estuaries easier with a focus on estuaries with existing potential for aquaculture operations.	High Priority	Long-term	\$200,000 (NRS-3/1.0FTE)	DLCD

5	Collaboration and Agency Leadership	Explore the extension of ODA administration of shellfish mariculture to non-state lands	The permitting of tidelands owned by Oregon ports and counties for commercial mariculture of shellfish should be administered by ODA in order to ensure that proper guidelines and applicable standards are applied uniformly.	<u>Moderate Priority</u>	<u>Long-term</u>	\$90,000 (NRS-2/0.5FTE)	ODA
6	Enhance Shellfish Production	Transfer existing resources to expand monitoring in other shellfish-growing areas	Use existing resources from the Tillamook Bay Pilot Program (House Bill 2209, 2015) and new resources to expand the program to other areas such as Coos Bay and the South Slough to increase water quality monitoring related to the closure and opening of shellfish harvesting in order to enhance commercial shellfish production in existing certified areas. Appropriate additional funds to ODA to certify additional Oregon estuary lands for water quality/food safety purposes. Prior to using funds, ODA should consult with stakeholders to make sure there is a demand for the estuary lands being considered and other agencies to see if there is any shared sampling to make the process more economical. Focus on new areas in bays that are currently certified by ODA and the Department of Environmental Quality rather than bays where commercial mariculture is prohibited.	<u>High Priority</u>	<u>Immediate</u>	\$50,000	ODA
7	Enhance Shellfish Production	Provide support for OSU Molluscan Broodstock Program	Oregon State University's Molluscan Broodstock Program is critical to support the development of commercial species adaptive to environmental change and resistant to disease as well as restoration and conservation of native species. The Legislative Assembly should appropriate \$570,000 biennially to conduct necessary breeding research to ensure the development of shellfish broodstock and shellfish varieties that are profitable and sustainable, especially given changes in in ocean and estuarine conditions including ocean acidification.	<u>High Priority</u>	<u>Immediate</u>	\$570 K per biennium for critical infrastructure	Shellfish industry / academia
8	Enhance Shellfish Production	Determine maximum capacity and cumulative impacts of shellfish operations	ODFW should conduct ecosystem modeling to investigate the cumulative impacts and maximum capacities of bays and estuaries in Oregon to support commercial shellfish mariculture operations. Other areas have done similar research, like Humboldt Bay and Drake's Bay in California, but Oregon has no original research to provide guidance on an area's capacity. This would require a one-time appropriation of \$130,000-170,000 to ODFW to work with ODA, industry and academia to conduct this research.	<u>Lower Priority</u>	<u>Long-term</u>	\$130-\$170 K per biennium	ODFW / ODA / Shellfish industry / academia
9	Enhance Shellfish Production	Investigate mariculture operations in Oregon Territorial Sea	DLCD should clarify in the Territorial Sea Plan that a mariculture pilot or research project is allowed if it is viable.	<u>Lower Priority</u>	<u>Long-term</u>	N.A.	DLCD
10	Enhance shellfish Production	Continue oversight on the import, harvest and cultivation of controlled species	Continue to prohibit the intentional and deliberate introduction of non-native species into Oregon bays and estuaries. ODFW should investigate the effects of removing additional species, like Manila clams, from the list of controlled, non-native, restricted species to allow the transport or movement of clam seed.	<u>High Priority</u>	<u>Long-term</u>	N.A.	ODFW / OISC / ODA / ODEQ
11	Develop Best Management Practices	Determine impacts of commercial mariculture to eelgrass beds	ODFW should work with regional partners to convene an eelgrass summit to develop and distribute a synthesis of existing information. The purpose of the summit would be to achieve greater understanding or identification of any research gaps looking at: the effects of native shellfish on eelgrass in Oregon bays and estuaries, the implications of aquaculture development and the protection of eelgrass and other important natural resources aimed at developing situations, and best management practices related to co-existence.	<u>Moderate Priority</u>	<u>Immediate</u>	\$25,000	ODA & ODFW

12	Develop Best Management Practices	Address displacement of sport clammers from mariculture plats	ODFW should develop an educational process to assess and address the displacement of sport clam harvesters from commercial shellfish mariculture lease plats.	Moderate Priority	Mid-term	\$30,000(EBA survey & DOJ review)	ODFW, ODA, DOJ, OSP
13	Develop Best Management Practices	Summarize best management practices for commercial shellfish mariculture operations in Oregon waters	ODFW should conduct cooperative research to develop and document best management practices for commercial mariculture of oysters and clams in Oregon bays and estuaries to serve as a general guide for site-specific management directives. This would require a one-time appropriation to ODFW of \$150,000.	Lower Priority	Long-term	\$150 K per biennium	ODA / ODFW / ODLCD / ODEQ/ PCSGA / coastal tribes / academia
14	Impacts of Ocean Conditions	Identify potential impacts of ocean acidification on native and cultivated shellfish	The state should conduct scientific research on the potential impacts of ocean acidification and hypoxia on cultivated and wild stocks of Olympia oysters, bay clams, razor clams and other shellfish, including the breeding of acidification-resistant shellfish. This research can be advanced by appropriating \$280,000 biennially to maintain the existing monitoring efforts currently conducted at the Whiskey Creek Shellfish Hatchery, with additional funding to: help support work which will help gain a better understanding of the timing and extent of the effects of acidification and other stressors on larvae; and continue the development of automated buffering systems.	High Priority	Immediate	\$280 K per biennium	ODFW / Commercial shellfish industry / academia
15	Impacts of Ocean Conditions	Reestablish an Oregon Harmful Algal Blooms monitoring program	Oregon is the only state on the West Coast without a Harmful Algal Blooms (HAB) monitoring program. This lack of data puts the state at a disadvantage when anticipating contamination issues that may arise. A HAB monitoring program should be developed to track potential contaminants in the nearshore marine waters, in the surfzone, and in the bays/estuaries and provide essential information to commercial and recreational harvesters. This would require a \$350,000 appropriation.	High Priority	Immediate	\$350,000 (note: ODFW has included HAB monitoring program as a Policy Option Package for 2017-2019)	ODFW / ODA / NOAA
16	Socioeconomic Costs and Benefits	Conduct baseline economic survey and analysis of Oregon shellfish harvests	Conduct a baseline survey and economic analysis of the Oregon molluscan shellfish industry (mariculture and commercial shellfish clam harvesters) that includes information on operating and investment costs, facilities, fisheries management, production, sales, and challenges and opportunities. Update the survey every five years.	High Priority	Immediate	\$80,000	shellfish industry / academia / ODFW
17	Evaluate Socioeconomic Costs and Benefits	Document the economic costs of ocean acidification and benefits of ocean acidification research.	Document the costs to the aquaculture oyster industry due to ocean acidification and the benefits resulting from research and outreach to help industry address ocean acidification.	High Priority	Long-Term	\$30,000	ODA, shellfish industry / academia
18	Evaluate Socioeconomic Costs and Benefits	Conduct an aquaculture and commercial clam shellfish marketing study	Support an aquaculture and commercial shellfish marketing study to evaluate marketing and sales opportunities to improve industry success and economic opportunities.	High Priority	Immediate	\$50,000	ODA, shellfish industry / academia

19	Evaluate Socioeconomic Costs and Benefits	Conduct a preference survey and economic evaluation of the recreational molluscan shellfish industry in Oregon	Conduct a preference survey for recreational shellfish harvesters to determine the needs, values, demographics, and behavior of recreational harvesters. Use this information to evaluate economic impacts and analyze management alternatives to improve policies for managing recreational shellfish resources.	Moderate Priority	Long-Term	\$80,000	ODFW, shellfish industry / academia
20	Evaluate Socioeconomic Costs and Benefits	Create a valuation report identifying the cost and benefits of shellfish in the ecosystem	Conduct economic research on the value of the ecosystem services provided by Oregon's estuarine shellfish resources. Summarize in a report to improve stakeholder education and public awareness.	Moderate Priority	Long-Term	\$60,000	ODFW, ODA, shellfish industry / academia
21	Increase Public Education, Outreach and Enhance Recreational Opportunities	Increase public education, outreach and cultural appreciation about the importance of shellfish	Appropriate \$150,000-\$160,000 biennially to ODFW to add a dedicated staff person for outreach and education. This person's role would be to provide improved guidance, instruction and opportunities for recreational harvest of Oregon's shellfish by making information readily available to schools and the public via digital media (websites, social media, instructional videos), regulation signs, printed materials (brochures, maps, fact sheets, identification guides), workshops and clinics, and during special outreach events.	High Priority	Immediate	\$150-160 K per biennium	ODFW
22	Increase Public Education, Outreach and Enhance Recreational Opportunities	Enhance the enforcement of existing commercial and recreational catch regulations for shellfish	Enhance enforcement of existing commercial and recreational catch regulations for shellfish, including collaborating with coastal tribes to find opportunities to share regulatory enforcement.	High Priority	Long-term	\$150-160 K per biennium	OSP / Coastal Tribes / ODFW
23	Increase Public Education, Outreach and Enhance Recreational Opportunities	Improve public access along the shoreline to enhance sport harvest of shellfish	Direct ODFW to work actively with the Oregon Department of Transportation (ODOT), Oregon Parks and Recreation Department (OPRD) and Port Districts to increase opportunities for recreational harvest of shellfish by improving parking areas, regulation signage, access trails and walkways, stairs, and other infrastructure enhancements. Broaden the allowable use of Restoration and Enhancement funds to be used to improve access to recreational clamming opportunities.	High Priority	Immediate	\$ 120 K per biennium	ODFW / ODOT / County Road Depts / Port Districts / etc.
24	Increase Public Education, Outreach and Enhance Recreational Opportunities	Design and install education and outreach signs at key access points	Direct ODFW to work with schools and port districts to develop outreach and educational signs informing the public about shellfish at key access locations. A one-time expenditure of \$50,000-\$60,000 would be sufficient to provide signs for five bays.	High Priority	Long-term	\$10k for 10 signs per bay – Total of \$50-60k for signs on 5 bays	Ports / ODFW / OPRD / Tribes / Educational Institution
25	Assess Wild Shellfish Stocks	Increase frequency of shellfish stock assessment surveys and conduct stock assessment surveys in subtidal zone	The ODFW shellfish stock assessment team currently returns to specific estuaries about every 8-10 years. An additional \$120,000 per biennium should be appropriated to increase personnel capacity in order to allow the team to complete the stock assessment surveys more rapidly. A shorter amount of time between stock assessment surveys and habitat characterizations would provide the coastal resource agencies with more accurate information to address permitting decisions, resource-use issues, and other rapid-response topics. Conduct shellfish stock assessment surveys in the subtidal zones of major bays and estuaries. ODFW should contract with commercial SCUBA divers to conduct the subtidal surveys.	High Priority	Immediate	add 3 staff at \$120 K per biennium (-\$360 K per biennium) \$60 K per biennium for subtidal surveys	ODFW / commercial divers

26	Assess Wild Shellfish Stocks	Increase fundamental understanding about shellfish populations and recruitment dynamics	Conduct research to document fundamental processes of population connectivity and recruitment to improve the implications of current ODFW harvest regulations for bay clams in bays and estuaries. ODFW, in collaboration with academia, should identify grant funding to conduct research to: increase our understanding of important aspects of shellfish life histories including reproduction, recruitment, location of source populations, and connectivity; and document the cumulative impacts of recreational and commercial shellfish harvest activities on wild stock populations of shellfish.	Moderate Priority	Long-term	\$100k per biennium for a graduate student, should be funded through grant funding, plus \$200-400 K one time cost for directed research	ODFW / academia commercial industry
27	Assess Wild Shellfish Stocks	Involve the public in shellfish surveys and collection of fisheries data	Identify opportunities for meaningful involvement by the public and in collaboration with coastal tribes in the shellfish stock assessments, characterization of estuarine habitats, collection of fisheries data, and outreach activities. Appropriating an additional \$50,000 every biennium would help to provide the necessary staff time to develop a collaborative public monitoring program.	High Priority	Immediate	\$50 K per biennium	ODFW / Coastal Tribes / Public Schools / Citizen Groups
28	Assess Wild Shellfish Stocks	Increased monitoring of recreational and commercial shellfish harvests	Monitoring of sport harvest activities is currently limited to the major beaches and bays. Appropriating an additional \$180,000 biennially would provide ODFW an opportunity to conduct creel surveys and fishery-dependent monitoring of recreational and commercial harvest activities for bay clams and razor clams in additional areas, like the Tillamook area, central coast and south coast.	Moderate Priority	NO TIME FRAME LISTED	\$180 K per biennium	ODFW
29	Assess Wild Shellfish Stocks	Hire fisheries scientists with expertise on clams and other shellfish, and analysis of impacts to intertidal and subtidal habitats	In order to ensure that management of shellfish resources focuses on the principles of protection, restoration and sustainable harvest, it is important to appropriate \$160,000 biennially to hire a staff person that is dedicated to monitoring, analyzing and managing of clam fisheries. Fisheries analysis is critical to establishing appropriate bay and razor clam harvest levels. Appropriating \$160,000 every biennium would allow ODFW to hire a fisheries statistician to monitor, analyze and manage clam fisheries to adjust harvest levels in a timely fashion providing a benefit to both recreation and commercial harvesters. ODFW should determine whether there are efficiencies to be gained by partnering with academia staff at the Hatfield Marine Science Center rather than hiring a new person. Conduct a review and analysis of permits and actions that impact intertidal and subtidal habitats in Oregon bays and estuaries. This would improve the ability to incorporate new information and historical data into future permit reviews and considerations for complex resource decisions in bays and estuaries.	High Priority	Long-term	Fisheries scientist: \$160 K per biennium, Impact Analyst: \$60-80 K per biennium	ODFW / academia/ODSL / ODLCD
30	Restore Native Shellfish	Conserve and protect native Olympia oysters	Direct ODFW to continue efforts to protect and conserve the three known populations of Olympia oysters in Oregon bays and estuaries. This should be accomplished by building partnerships with Tribes and non-governmental entities.	High Priority	Immediate	\$50 K per biennium	Tribe / ODFW / TNC / shellfish industry

31	Restore Native Shellfish	Restore and enhance native shellfish stocks	Encourage ODA, ODFW, stakeholders and academia to conduct collaborative work to restore viable populations of native shellfish (<i>i.e.</i> , Olympia oysters, Native Littleneck clams, red abalone, flat abalone, Pinto abalone) and protect the restoration/enhancement sites for sufficient time to allow the species to recover. -Olympia oysters: enhance populations at multiple sites, restore sites and promote commercial cultivation in order to eventually achieve a viable self-supporting population. - Abalone: explore the need and opportunities to enhance populations of red abalone, flat abalone, and pinto abalone at select sites in shallow rocky sub-tidal habitats along the Oregon coast. -Native littleneck clams: explore the need and opportunities to enhance populations of native littleneck clams at appropriate sites within estuarine tide flats and sub-tidal channels.	Moderate Priority	Long-term	\$ 600,000 (note: abalone restoration: \$250 K; littleneck clam enhancement: \$180 K; Olympia oyster restoration \$170 K)	ODFW / ODA / Shellfish Industry / academia
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32	Restore Native Shellfish	Investigate impacts of purple varnish clams, naturalized softshell clams and Manila clams on wild shellfish stocks	Conduct cooperative research on the impacts of non-native species to wild stocks of native shellfish and within commercial mariculture operations. Conduct surveys to monitor the spread and ecological impact of naturalizing invasive clams and oysters, and determine the implications for populations of native shellfish. This type of research project would cost \$200,000 over three to four years.	Moderate Priority	Long-term	\$100 K per biennium for 3-4 years	ODA / ODFW / Commercial Industry / Oregon Invasive Species Council / academia
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Appendix D

MEMBERSHIP

Representative Caddy McKeown

Coos Bay, OR
Role: State Representative

Steven Rumrill, PhD

Newport, OR
Role: Department of Fish and Wildlife

Senator Betsy Johnson

Scapoose, OR
Role: State Senator

Frank Barcellos

Salem, OR
Role: Department of Agriculture

Chief Don Ivy

Coos Bay, OR
Role: Oregon Indian tribes

Mike Saindon

Garibaldi, OR
Role: Port districts

Dick Vander Schaaf

Portland, OR
Role: Conservation Organization

Clair Thomas

Tilamook, OR
Role: Recreational shellfish harvesters

Svein R Wiese-Hansen

Bay City, OR
Role: Commercial Shellfish Grower

Gil Sylvia, PhD

Newport, OR
Role: OSU Research Representative

Jess Hampel

North Bend, OR
Role: Commercial Shellfish Grower

MEETING DATES AND AGENDA TOPICS

November 23, 2015 – Oregon Capitol

- Oregon Shellfish Initiative Background
- Shellfish Harvest and Bay Certification, Current Status and Issues
- ODA Shellfish Program
- Discussion of Task Force Objectives, Work Plan and Goals

January 20, 2016 – Newport, OR

- Discussion of Task Force Objectives and Strategy
- Shellfish Science and Research
- Discussion of Shellfish Growers' Needs
- Group Tour of Hatfield Marine Science Center Facilities

March 17, 2016 – Oregon Capitol

- Overview of Commercial Shellfish Mariculture Management
- Federal and State Shellfish Initiatives
- Recreational and Conservation Perspectives

- Task Force Discussion Topics
 - Current Status of Management and Permitting
 - Areas for Policy and Regulatory Improvements
 - Steps to Increase Collaboration
 - Next Steps for Task Force Subgroups

April 25, 2016 – Netarts, OR

- Overview of Best Management Practices for Shellfish Mariculture
- Commercial Oyster Growing Operations in Tillamook Bay and Coos Bay
- Draft Best Management Practices for Pacific Seafood Mariculture Operations
- Oyster Culture and Eelgrass Beds in PNW Estuaries
- Task Force Discussion about Best Management Practices
- Task Force Discussion of Possible Recommendations
- Tour of Netarts Bay Outreach Signs and the Whiskey Creek Shellfish Hatchery

May 31, 2016 – Coos Bay, OR

- Tour of the Charleston Marine Life Center at Oregon Institute of Marine Biology
- Water Quality and Monitoring Related to Mariculture Certification
- Monitoring of Shellfish for Biotoxins and Fecal Indicator Bacteria
- Harmful Algal Blooms Along the Oregon Coast
- Task Force Discussion about Water Quality Certification and Biotxin Monitoring
- Assessment of Wild Shellfish Stocks in Oregon Bays and Estuaries
- Commercial and Recreational Harvest of Wild Shellfish Stocks
- Opportunities for Enhancement of Recreational Harvest Opportunities
- Restoration and Enhancement of Native Olympia Oysters
- Task Force Discussion about Wild Shellfish Stocks, Restoration, and Recreational Harvests
- Summary of Recommendations regarding Management of Shellfish Mariculture
- Tour of the Coos Bay Oyster Company

July 21, 2016 – Oregon Capitol

- Socioeconomic Value of Shellfish in Oregon
- Resilience and Social Vulnerability
- Importance of Shellfish Agreements to Tribal Communities
- Task Force Discussion and Ranking of Work Group Recommendations

September 8, 2016 – Oregon Capitol

- Committee Discussion of Draft Shellfish Initiative
- Public Comment Opportunity
- Consideration of Task Force Recommendations