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The Legal and Environmental Implications of the Washington Shellfish Initiative: Is it Sustainable?

Lindsey Ward[†]

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I. INTRODUCTION

“Shellfish have always been an essential part of who we are as Washingtonians.”¹ Indeed, former Governor Christine Gregoire captured the idea best: Washington’s shellfish have always provided both sustenance and prosperity for the individuals inhabiting the state’s coastline.² In December of 2011, the office of the governor launched the Washington Shellfish Initiative (Initiative), an executive order purporting to protect and enhance an industry that is important for jobs, citizens, and tribes. The State implemented the Initiative in response to the National Oceanic and Atmospheric Administration’s (NOAA) National Shellfish Initiative and was spurred, in part, by the desire to promote an industry that is critical to both the environment and business interests alike.³

The Washington Shellfish Initiative is the first local effort under the National Shellfish Initiative, a project that aims to close a nine billion dollar domestic trade deficit in Seafood.⁴ The text of the local Initiative states a goal of bringing together expertise from local regulatory authorities and governing bodies, the scientific community, Washington Indian tribes, and private shellfish farmers to design a plan that promotes an increased shellfish population by creating healthy marine waters, improving the shellfish harvesting permitting system, reintroducing native shellfish species, and generally creating a “dig-able” Puget Sound by 2020.⁵

The economic importance of shellfish to Washington’s economy, both as a source of revenue and job creation, is evident. What is less clear, however, is the Initiative’s ability to successfully carry out its objectives while following the legal mandates proscribed by Washington’s Shoreline Management Act (SMA), as well as other legal doctrines. While the Washington Shellfish Initiative bills itself as promoting a sustainable clean water industry, its directives fall far from the Initiative’s claim of enhancing and protecting this valuable resource in a sustainable manner. Where this endeavor may destroy our pristine coastal environments forever, an assessment of both legal mandates

1. Gov. Gregoire Announces New Initiative to Create Jobs, Restore Puget Sound, WASH. DEP’T OF ECOLOGY (Dec. 11, 2011), http://www.ecy.wa.gov/news/2011/gov_20111209.html.

2. *Id.*

3. STATE OF WASH., WASHINGTON SHELLFISH INITIATIVE 1 (2011) available at <http://pcsga.org/wprs/wp-content/uploads/2013/04/Washington-Shellfish-Initiative.pdf>.

4. Currently, NOAA estimates that about 84 percent of seafood consumed in the U.S. is imported, and half of that comes from fish farms. Phoung Le, *Initiative to boost shellfish farms in Wash*, KITSAP SUN (Dec. 11, 2011), <http://www.kitsapsun.com/news/2011/dec/09/initiative-to-boost-shellfish-farming-in-wash/?print=1>.

5. STATE OF WASH., *supra* note 3, at 1.

surrounding shellfish aquaculture as well as the environmental ramifications of improper shellfish aquaculture growth is necessary to ensure that Washington's coastlines and encompassing habitat are protected from destruction.

Primarily, the environmental consequences of implementing the Initiative pose massive and irreparable consequences for the environment. Specifically, by streamlining the permitting process for commercial shellfish aquaculture, encouraging noncompliant updates of local shoreline regulations, allowing further introduction and cultivation of nonnative species, increasing shellfish density, and failing to adequately address pollution, the Initiative may ultimately cause a loss of many of its native plant and animal species as well as the unique functions they serve.⁶ The initiative also seeks a net increase of 10,800 harvestable shellfish acres by 2020, including seven thousand acres that are currently restricted from shellfish harvesting for environmental reasons.

Furthermore, the Initiative is not in compliance with important federal and state legislation. Most notably, the expansion of commercial aquaculture must comply with the Shoreline Management Act of 1971 (SMA), which provides:

Permitted uses in the shorelines of the state shall be designed and conducted in a manner to minimize, insofar as practical, any resultant damage to the ecology and environment of the shoreline area and any interference with the public's use of the water.⁷

Additionally, the Initiative must take into account the directives of other laws, such as Washington's Water Pollution Control statute and the Endangered Species Act. Where the Initiative is clearly driven by economic incentives at the expense of the environment and in opposition to environmental legislation already in place, the Initiative must be revised in order to remain legally compliant and to ensure the protection of Washington's pristine coastal environment.

This article will discuss the history of shellfish aquaculture and the current aquaculture climate in Washington as a backdrop to explain the Initiative and its three major goals: developing a public-private partnership, promoting native shellfish restoration and recreational shellfish harvest, and ensuring clean water to protect and enhance

6. *This Isn't Your Grandfather's Oyster Farm*, COAL. TO PROTECT PUGET SOUND HABITAT 10 (2013), <http://coalitiontoprotectpugetsoundhabitat.org/wp-content/uploads/2013/02/not-your-grandfathers-oyster-farm.pdf>.

7. WASH. REV. CODE § 90.58.020 (2009).

shellfish beds. The article will discuss both the legal and environmental flaws embedded in each major goal of the Initiative and suggest that a more sustainable model of shellfish aquaculture in Washington be based on a system which integrates scientific knowledge of environmental effects with social, legal, and economical aspects of shellfish aquaculture.

II. HISTORY OF SHELLFISH IMPORTANCE IN WASHINGTON

Historically, the abundance of local shellfish populations, particularly the Olympia oyster, made shellfish a valuable commodity not only for the indigenous coastal tribes such as the Puyallup, Muckleshoot, Tulalip, and Nooksack, but also for American citizens who inhabited the coastal tideland zones. Due to the shellfish's value, the harvesting of shellfish has long been an issue of contention for groups that seek the resource as both a food source as well as an economic industry.

Initially, contention over harvesting rights arose between American settlers to the West Coast and local Indian tribes. The Stevens Treaties of 1855, while promoting settlement of the West Coast, also included provisions claiming to preserve off-reservation shellfish harvesting and fishing rights for Native American tribes who relied on the practice in order to meet all their ceremonial and subsistence needs.⁸ However, the Act was not all it appeared to be. Over the next 150 years, the tribes of the Washington coast were increasingly restricted from harvesting shellfish due to a provision that limited their harvesting on private lands.⁹ In a series of litigation brought by eighteen indigenous tribes in 1994, several provisions within the treaty were challenged. Particularly, the tribes sought to expand the interpretation of harvestable shellfish populations. Ultimately, while the court held that the eighteen indigenous coastal tribes had the right to harvest 50 percent of the available shellfish from private lands, including those employing commercial aquaculture, the decision stood for the larger principle that shellfish as both an industry and means of sustenance was a highly desirable commodity in need of greater regulation, intergovernmental cooperation, and environmental planning.¹⁰

8. *United States v. Washington*, 157 F.3d 630, 638 (9th Cir. 1998); *See Washington v. Wash. State Commercial Passenger Fishing Vessel Ass'n*, 443 U.S. 658, 664 (1979).

9. *United States v. Washington*, 873 F. Supp. 1422, 1430 (W.D. Wash. 1994).

10. *Washington*, 157 F.3d at 638.

III. AQUACULTURE IN WASHINGTON

Shellfish aquaculture, the shorthand term for the artificial cultivation of shellfish in coastal tidal waters, has steadily become one of Washington's main industries—the state leads the country in farmed clams, mussels, oysters valued at approximately \$107 million annually.¹¹ More specifically, Washington State is one of the nation's largest commercial geoduck farming locations. This bi-valve is incredibly profitable—often selling for \$100 to \$150 per pound in seafood restaurants across China. Tribal geoduck farmers can take home more in one day than the average Washington resident takes home in one month.¹² While shellfish farming, particularly for the geoduck, is big business in Washington, the long-term effects of farming remain largely unstudied.

Currently, research is being done on environmental and ecological impacts in order to enhance current aquaculture practices and new technologies are being developed; however, some of the research has been inconclusive. For instance, some studies suggest that high densities of shellfish in a certain marine habitat clean the water, while other research suggests more adverse effects. Most notably, a study from 2008 suggests that high densities of geoduck populations may decrease the amount of phytoplankton in the water due to the rapidity with which geoducks recycle organic matter in the water.¹³ Additionally, mechanical harvest of geoducks can cause disruptions in the number of other mollusk species present at the harvest site.¹⁴

The real challenge lies in determining where the line exists between benign and harmful commercial shellfish cultivation because the density at which bivalves cause adverse effects on the surrounding environment, known as carrying capacity, is difficult to determine.¹⁵ Therefore, in the interest of increasing profitability by increasing the amount of shellfish in one particular growing location, commercial shellfish farms,

11. STATE OF WASH., *supra* note 3. It is important to note that aquaculture projects in Washington include more than just the cultivation of shellfish. Other projects include raising fish eggs and growing fish and shellfish to maturity for both commercial and scientific use. See *Shoreline Master Program Updates: Interim Aquaculture Guidance*, WASH. DEPT. OF ECOLOGY 7, 26 (2012), http://www.ecy.wa.gov/programs/sea/shorelines/smp/handbook/aquaculture_guidance.pdf.

12. Craig Welch, *China's Demand for Geoducks sends profits, prices soaring in NW*, SEATTLE TIMES (Apr. 21, 2012), http://seattletimes.com/html/localnews/2018041537_geoduck22m.html.

13. KRISTINA M. STRAUSS ET AL., WASH. SEA GRANT, EFFECTS OF GEODUCK AQUACULTURE ON THE ENVIRONMENT: A SYNTHESIS OF CURRENT KNOWLEDGE 21 (2009), available at http://www.wsg.washington.edu/research/geoduck/Geoduck_LiteratureReview.pdf.

14. See *id.* at 26.

15. See *id.* at 28.

especially those which cultivate geoducks, may ultimately overload the carrying capacity of the water. This increase in cultivation in turn reduces the vital phytoplankton concentrations and disrupts the ecological stability of the marine environment.

The risk and reward of commercial shellfish harvesting is compounded by the fact that “Washington state is the nation's leading producer of farmed shellfish”—contributing about \$107 million in annual sales, employing about 3,200 people, and adding approximately \$270 million to the state economy.¹⁶ However, shellfish are also a critical part of our state’s coastal habitat, well-being, and history. Table 1 below represents the major shellfish farming sites in Washington State and provides the current total number of acres covered by permits issued to commercial shellfishing interests:¹⁷

Table 1

Shellfish Farm Sites	Farm Acres	Acres of Tidelands	Percentage
Willapa Bay	25,562	45,000	56.8%
Grays Harbor	3,995	34,460	11.5%
South Sound	4,718	27,520	17.3%
Hood Canal	1,677	unknown	
North	2,345	unknown	
Total:	38,327		

Given the extraordinary value of shellfish resources to Washington’s residents, the State’s economy, native tribes, and the local environment, former Governor Chris Gregoire partnered with the National Oceanic and Atmospheric Administration’s (NOAA) National Shellfish Initiative in 2011 to design a plan to protect and enhance Washington’s shellfish resources.¹⁸

16. Le, *supra* note 4.

17. NAT’L MARINE FISHERIES SERV., U.S. DEPT. OF COM., NMFS 2008/04151, ENDANGERED SPECIES ACT - SECTION 7 PROGRAMMATIC CONSULTATION BIOLOGICAL AND CONFERENCE OPINION AND MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT CONSULTATION: NATIONWIDE PERMIT WASHINGTON 49, 30, 148 (2009).

18. WASH. DEP’T OF ECOLOGY, *supra* note 1.

IV. THE NATIONAL SHELLFISH INITIATIVE

In order to understand the Washington Shellfish Initiative, it is first important to understand the Initiative's beginnings. In 2010, President Obama instituted a National Ocean Policy. The policy emphasizes the protection, maintenance, and restoration of healthy and diverse ecosystems while developing sustainable uses for the ocean supported by scientific understanding.¹⁹ From this policy, both the National Oceanic Atmospheric Administration (NOAA) and the Department of Commerce (DOC) established objective mandates in order to implement the directives of the National Ocean's Policy with regards to aquaculture.

The DOC policy acknowledges the potential for U.S. aquaculture to "make major contributions to the local, regional, and national economies by providing employment and diverse business opportunities from coastal communities to the agricultural heartland."²⁰ By contrast, NOAA's policy reflects its broad oceans mandate by "reaffirming that aquaculture is an important component of NOAA's efforts to maintain healthy and productive marine and coastal ecosystems, protect special marine areas, rebuild wild stocks, restore endangered species, support marine and coastal habitat, create employment in coastal communities, and enable the production of safe and sustainable seafood."²¹

Despite their conflicting economic and environmental objectives, the DOC and NOAA partnered to support the development of the aquaculture industry through The National Shellfish Initiative to increase commercial shellfish production, create jobs, and provide more locally produced food for coastal communities. While the plan appears viable in theory, the environmental policy of NOAA will likely be subverted to the economic goal of the DOC in practice due to the inherent conflict presented in attempting to pair an aggressive economic agenda with environmental sustainability. Even if the initiative does earnestly attempt to achieve both goals, the desire to increase production capacity and expand commercial shellfishing interests will inherently conflict with protecting species, restoring habitat, and developing a moderate and sustainable approach to shellfish harvesting.

With the objectives of the DOC as the driving policy behind the National Shellfish Initiative, subsequent state initiatives passed in accordance with the national effort will inevitably be written with a similar eye toward economic development of the shellfish aquaculture

19. Exec. Order. No.13547, 75 Fed. Reg. 43021 (2010), *available at* <https://federalregister.gov/a/2010-18169>.

20. U.S. DEPT. OF COM., NATIONAL AQUACULTURE POLICY (2011).

21. *Id.*

industry. Where the Washington Shellfish Initiative is passed under this national policy, it is hardly surprising that the Initiative's central tenants are inherently economic rather than environmental.

V. THE ORIGINS OF THE WASHINGTON SHELLFISH INITIATIVE

While the National Shellfish Initiative provided context for Washington to develop its own state specific initiative, the real catalyst for the Initiative's development was spurred when lobbyists for the shellfish industry advocated for a change to Washington's commercial shellfish aquaculture permitting system. This lobbying led to the creation of Nationwide Permit 48 Washington.

In 2007, the National Marine Fisheries Service (NMFS) and the U.S. Forest and Wildlife Service (USFWS) issued biological opinions on the effects of Nationwide Permit 48 Washington (NWP 48) on certain mollusk species listed in the Endangered Species Act. "The NWP 48 authorizes the installation of buoys, floats, racks, trays, nets, lines, tubes, containers, and other structures necessary for the continued operation of existing commercial aquaculture activity."²² If granted, the NWP 48 authorizes the continuance of ongoing existing shellfish operations according to certain environmental limitations.²³ An "ongoing existing operation is one that has been granted a permit, license, or lease from a state or local agency specifically authorizing commercial aquaculture and which has undertaken such activities prior to the date of issuance of the proposed NWP 48."²⁴ Thus, the USFWS policy closely restricted the amount of commercial shellfish harvesting along Washington's coastline and kept a tight leash on any expansion of the industry.

The NMFS elaborated on the USFWS policy in its biological opinion noting that the continuance of existing shellfish operations according to the minimal requirements set forth in NWP 48 were "likely to adversely affect CH (critical habitat) designated for PS (Puget Sound) Chinook salmon and Hood Canal summer-run Chum salmon."²⁵ Furthermore, NMFS stated that "consultation revealed divergent findings on many relevant issues such that there remains some uncertainty

22. U.S. DEPT. OF THE INTERIOR, FISH AND WILDLIFE SERV., 13410-2008-F-0461, BIOLOGICAL OPINION: NATIONWIDE PERMIT #48 FOR SHELLFISH AQUACULTURE STATE OF WASH. 2 (2009).

23. U.S. DEPT. OF COM. NAT'L OCEANIC AND ATMOSPHERIC ADMIN., NAT'L MARINE FISHERIES SERV., ENDANGERED SPECIES ACT - SECTION 7 PROGRAMMATIC CONSULTATION BIOLOGICAL AND CONFERENCE OPINION AND MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT CONSULTATION: NATIONWIDE PERMIT WASHINGTON 49, 30, 148 (2009).

24. *Id.* at 2.

25. *Id.* at 25.

regarding the likelihood of the effects of these activities on the environment.”²⁶

When the NMFS found that NWP 48 authorized continuing shellfish operations which pose an environmental risk, and USFWS stated that NWP 48 pertains only to already existing commercial harvesting activities, the two biological opinions thus acknowledged that further approval of these permits might result in cumulative adverse impacts to endangered salmon and a loss of critical shoreline habitat. According to the opinions, the threat posed by already existing commercial shellfish harvesting would only be exaggerated with the addition of new commercial shellfishing activity permits.

In April of 2011, Bill Dewey, the chief lobbyist for Taylor Shellfish Farms wrote a letter to NOAA. In his letter, Dewey expressed concerns about the difficulties involved in obtaining commercial shellfish harvesting permits in Washington. Dewey argued that consultations by the NMFS and the USFWS on the NWP 48 were preventing any new commercial shellfish permits from being issued during the four years previous to 2011. Furthermore, Dewey suggested that the shellfish industry collaborate with NOAA to devise a plan that would facilitate greater commercial shellfishing interests.

Subsequent to Dewey’s letter, NMFS relaxed its position on NWP 48, reissuing a new biological opinion and amending its previous stance. In an April 2011 letter from NMFS to the Army Corp of Engineers, the agency under which NWP 48 is issued, NMFS stated that “[NWP 48] may, but is not likely to adversely affect” the salmon species listed under the Endangered Species Act.²⁷ This position was a direct reversal of NMFS’s findings just four years previously. Furthermore, NMFS added a geoduck addendum, which stated that commercial geoduck aquaculture sanctioned under NWP 48 would not adversely affect the surrounding environment.²⁸

In addition to the more lenient biological opinions by the NWFS and the USFWS, Dewey’s letter formed the roots for the Washington Shellfish Initiative as a means of promulgating the industry’s interests. Together with the help of NOAA, Dewey and the office of the governor designed the Initiative and released it to the public in December of 2011.

26. *Id.* at 72.

27. *Id.*

28. *See id.*

VI. THE GOALS OF THE WASHINGTON SHELLFISH INITIATIVE

The Washington Shellfish initiative is not a legally binding mandate on state regulatory authorities or governmental agencies. Rather, it provides a series of recommendations, suggesting to regulatory authorities how business interests might be better served by the revising and updating of current laws and policies already in place. The initiative also includes plans for continued scientific analysis, research, funding, and collaborative strategy. The initiative promotes three broad goals: (1) create a public-private partnership for shellfish aquaculture; (2) promote native shellfish restoration and recreational shellfish harvest; and (3) ensure clean water to protect and promote shellfish beds.²⁹

A. Goal #1: The Public-Private Partnership

The first goal of the initiative seeks to create a public-private partnership for shellfish aquaculture. Under this public-private partnership, both public and private entities such as natural resource agencies, tribes, and local governments work in unison to implement the Initiative's directives. The public-private partnership goal encompasses five sub-objectives: improve the model permitting program, continue vital shellfish aquaculture research, improve guidance for local shoreline master programs, implement pilots, and review the effectiveness of bivalves to clean the water and reduce nitrogen columns.³⁰ In assessing the effectiveness of the first goal, this section will discuss the first three sub-objectives: the model permitting program, the shoreline master program guidance and its relation to the Shoreline Management Act and shoreline master program guidelines, and the continuance of vital shellfish aquaculture research.

1. The Model Permitting Program

The first sub-goal of the public-private partnership seeks to create a model-permitting program which facilitates the ease with which commercial shellfish operations can expand into public waters.³¹ By designing a system that encourages collaboration between natural resource agencies, tribes, and local governments, the model-permitting program endeavors to increase the timeliness for issuing permits, thereby

29. STATE OF WASH., *supra* note 3, at 1.

30. *Id.*

31. Cameron Woodworth & Eli Penberthy, *Washington shellfish initiative: Is it sustainable?*, SOUND CONSUMER (Apr. 2012), available at http://www.pccnaturamarkets.com/sc/1204/shellfish_initiative.html.

creating a more streamlined and efficient system for issuing commercial shellfish aquaculture permits.³²

The first group involved in the issuance of commercial shellfish aquaculture permits is the Army Corps of Engineers (Corps); the public entity which controls the issuance of NWP 48 for ongoing commercial activities. In March of 2012, the Corps updated the NWP 48, substantially relaxing the parameters of the permit to authorize expansion of existing operations. At this time, the Corps also removed the reporting requirement for certain ongoing commercial shellfishing activities.³³ In its official decision document, the Corps stated that the updates to NWP48 “authorizes commercial shellfish aquaculture activities in *new project areas*, provided the project proponent has obtained a valid authorization, such as a lease or permit issued by an appropriate state or local government agency, and those activities do not directly affect more than 112-acre of submerged aquatic vegetation beds.”³⁴ Additionally, grantees are required to submit a pre-construction notice to the Corps containing “(1) a map showing the boundaries of the project area, with latitude and longitude coordinates for each corner of the project area; (2) the name(s) of the cultivated species; and (3) whether canopy predator nets are being used.”³⁵ Furthermore, because NWP 48 permits must subscribe to the requirements of Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and Section 404 of the Clean Water Act (33 U.S.C. 1344), the permit only authorizes activities that have minimal individual and cumulative adverse effects on the aquatic environment.³⁶

With the changes made by the Corps, the updated NWP 48 will allow new shellfish aquaculture cultivation activities in addition to those that are already ongoing for the first time since its creation. This expansion of new commercial shellfish aquaculture interests along Washington’s coastlines is in direct contrast to one of the other main requirements of the NWP 48, requiring that commercial shellfish aquaculture activities have minimal adverse effects on the surrounding aquatic environment.³⁷ According to the USFWS biological opinion, shellfish aquaculture activities cause increases in turbidity and sediment

32. *Id.*

33. *Questions and Answers: Nationwide Permits Renewal/Revision*, U.S. ARMY CORPS OF ENGR’S (Feb. 16, 2011), http://www.usace.army.mil/Portals/2/docs/civilworks/nwp/NWP_qa_16feb2011.pdf.

34. *Decision Document NWP 48*, U.S. ARMY CORPS OF ENGR’S 4 (Feb. 13, 2012), http://www.usace.army.mil/Portals/2/docs/civilworks/nwp/2012/NWP_48_2012.pdf.

35. *Id.* at 2.

36. *Id.*

37. U.S. ARMY CORPS OF ENGR’S, *supra* note 34.

within the water where they are cultivated.³⁸ Similarly, the NMFS biological opinion notes that “activities that generate sediment may cause turbid water to drift outside of the footprint of the active plot, expanding the affected area by as much as five percent.”³⁹ Where turbid water migrates outside the area where the shellfish are cultivated, water quality in the surrounding area may deteriorate, thereby causing an ecological impact with adverse effects to the surrounding environment against the requirement of the permit, as well as the two important federal statutes.

Where NWP 48 will expand commercial shellfish aquaculture activities, and such activities already damage the water quality of the surrounding area, the new permitting program may only make it easier for commercial shellfishing interests to upset the delicate ecosystems of Washington’s coastal shorelines. Compounding this potential for environmental damage is the Shellfish Initiative’s aim to make available seven thousand previously protected acres for commercial shellfish farming and expose these sensitive habitats to potentially irreparable harm.

2. Shoreline Master Program Guidance

Another sub-goal of the Initiative seeks to provide guidance for local Shoreline Master Programs (SMPs). The Initiative states that it will accomplish this goal by increasing local government and public understanding of the application of the new shellfish provisions within the State Shoreline Guidelines promulgated in the Washington Administrative Code (WAC 173-26). However, like the model permitting program, the guidance provided by the Initiative on the SMPs is more economic than environmentally friendly. Specifically, the Initiative’s Shoreline Master Program guidance fails to adequately consider the regulations imposed by Washington’s Shoreline Uses Statute and Washington’s Shoreline Management Act (RCW 90.58.020).

a) The Underlying Legal Framework

Before discussing the flaws embedded in the Initiative’s SMP guidance, it is important to first understand the existing legal framework which protects Washington’s unique and fragile coastal habitat. Washington’s Shoreline Management Act (SMA) and Washington’s

38. U.S. FISH & WILDLIFE SERV., BIOLOGICAL OPINION OF THE NATIONWIDE PERMIT 48, 134 (Mar. 24, 2009) available at http://www.fws.gov/wafwo/publications/biological_opinions/2008_f_0461_bo.pdf.

39. U.S. DEPT. OF COM. NAT’L OCEANIC AND ATMOSPHERIC ADMIN. *supra* note 23.

Shoreline Uses Statutes are the main overarching legal devices used to regulate acceptable uses of Washington's coastline. The SMP translates the SMA policies to create a set of standards to manage shoreline use and protect natural coastal resources for future generations. In this way, SMA guidelines are implemented by community created SMPs that must follow the guidelines of the SMA.

In order to better understand how guidance provided within an SMP can change, it is first important to understand the SMA's stance on commercial aquaculture. Washington's Shoreline Management Act states that aquaculture is a statewide interest that is a "preferred use" of the water area as long as it is consistent with the control of pollution and prevention of damage to the environment.⁴⁰ Additionally, Washington's Shoreline Uses Statute articulates a more specific rule on when aquaculture is permitted:

Aquaculture should not be permitted in areas where it would result in a net loss of ecological functions, adversely impact eelgrass and macroalgae, or significantly conflict with navigation and other water-dependent uses. Aquacultural facilities should be designed and located so as not to spread disease to native aquatic life, establish new nonnative species that cause significant ecological impacts, or significantly impact the aesthetic qualities of the shoreline. Impacts to ecological functions shall be mitigated.⁴¹

The positions of Washington's SMA and Shoreline Uses Statute take a clear and cohesive position on commercial aquaculture. While aquaculture is a preferred use of the water area, it is not permitted where it would impair ecological functions or affect the aesthetic beauty of the shoreline area. Furthermore, aquaculture may not conflict with other uses of the shoreline. Because local SMPs must follow the policies of the SMA, SMPs must incorporate into their guidance the position that commercial aquaculture is permitted only where it does not impact the delicate ecology or aesthetic beauty of the surrounding environment.

In addition to following the policies of the SMA, SMPs must follow other state statutory regulations. Specifically, RCW 90.58.100 provides general guidelines for designing local SMPs. The local SMPs contain the regulations governing acceptable usages of the state's coastal shorelines. The statute provides that when designing a Master Program, the local government responsible for its development should use an interdisciplinary approach: consulting with other federal, state, or local

40. WASH. ADMIN. CODE § 173-26-241 (3)(b)(i)(A) (2004).

41. WASH. ADMIN. CODE § 173-26-241 (3)(b)(i)(C) (2004).

agencies who have special expertise; considering pre-existing scientific research; endeavoring to conduct more research and studies where necessary; and utilizing all available information and scientific data to ensure that the required components of the master program meet the policy considerations behind the statute.⁴²

Furthermore, RCW 90.58.100 provides that SMPs should include, where feasible, the following elements: economic development, public access, recreational, circulation, use, conservation, historical/cultural, minimization of flood damage, as well as any other element deemed appropriate or necessary. However, implementation of these elements, along with any sanctioned variances, should not cause unnecessary hardships or thwart the policy considerations discussed in RCW 90.58.020.⁴³

In the policy enunciation of RCW 90.58.100, codified as RCW 90.58.020, the state legislature explains that, because Washington's shorelines are amongst the most valuable and fragile of the state's natural resources, the protection and preservation of the shorelines in the interests of the people should remain paramount to all other proposed usages.⁴⁴ Protection of the shoreline is especially critical in light of ever-increasing pressures from lobbyists of additional usages such as commercial shellfishing. Furthermore, the policy of RCW 90.58.100 articulates a hierarchy of preferences for how SMPs should prioritize various shoreline usages. The legislature found that the public's ability to enjoy the physical and aesthetic qualities of the shoreline should be preserved to the greatest extent possible, and uses which minimize pollution and protect the natural environment should be prioritized above all others.⁴⁵ Specifically, the policy enunciation provides the hierarchy of usage as follows:

- (1) Recognize and protect the statewide interest over local interest;
- (2) Preserve the natural character of the shoreline;
- (3) Result in long term over short term benefit;
- (4) Protect the resources and ecology of the shoreline;
- (5) Increase public access to publicly owned areas of the shorelines;
- (6) Increase recreational opportunities for the public in the shoreline;
- (7) Provide for any other element as defined in RCW 90.58.100 deemed appropriate or necessary.⁴⁶

42. WASH. REV. CODE §§ 90.58.100(1)(a)-(f) (2009).

43. WASH. REV. CODE §§ 90.58.100(2)(a)-(i) (2009).

44. WASH. REV. CODE § 90.58.020 (2009).

45. WASH. REV. CODE § 90.58.020 (2009).

46. WASH. REV. CODE § 90.58.020 (2009).

While aquaculture is considered a statewide interest, so is preserving the public's ability to enjoy the physical and aesthetic qualities of the shoreline. Furthermore, because preserving the natural character of the shoreline is a top priority, and because the ecology of the shoreline must be protected, SMPs must limit or even prohibit any aquaculture activity that is divergent from these requirements.

b) Updates to the Shoreline Master Program and the Aquaculture Handbook

In March of 2011, the Washington Department of Ecology amended the aquaculture provisions of the SMP guidelines within Washington's SMA. The amendments addressed changes in shellfish aquaculture and targeted specifically an expansion of geoduck aquaculture.⁴⁷ In particular, the amendments underscore existing requirements for local governments to have shoreline master program policies, regulations, and standards that address and provide for aquaculture. Additionally, the amendments create a more structured process for obtaining commercial geoduck harvesting permits by creating a conditional use permit for commercial geoduck aquaculture and framing requirements for local commercial geoduck aquaculture project applications.⁴⁸ However, the amendments fail to adequately address the guidelines established in Washington's Shoreline Uses statute, failing to elaborate on how local communities may be required in their SMP to prohibit or limit the expansion of aquaculture per the requirements of RCW 90.58.020.

In June of 2012, per the advice of the Washington Shellfish Initiative, the Department of Ecology published a handbook providing interim guidelines on the SMP updates to help local governments understand how to update their SMPs to more easily facilitate the Department of Ecology's amendments to the Washington SMA in 2011. In particular, the handbook explains how local governments can revise their SMPs to more easily allow for increased shellfish aquaculture, particularly commercial geoduck harvesting.

While stipulating that local governments consider some important environmental concerns involved with aquaculture in accordance with the directives of Washington's SMA, the Aquaculture guidance handbook created by the Department of Ecology largely diverges from the policy articulated in RCW 90.58.020. Furthermore, the handbook

47. WASH. DEPT. OF ECOLOGY, *supra* note 11, at 2, 26.

48. WASH. DEPT. OF ECOLOGY, SHORELINE MANAGEMENT ACT: RULEMAKING 2010-11 (2011).

fails to adequately explain the importance of complying with the following requirements of the SMA: aquaculture facilities should not cultivate nonnative species which cause significant ecological impacts, aquaculture facilities should not locate themselves in environmentally sensitive areas, and aquaculture facilities should not engage in activities that significantly impact the aesthetic qualities of the shoreline.⁴⁹ The handbook also includes several areas of guidance that are not in accordance with RCW 90.58.100 directives (2), (3), and (4) on how local governments should design their SMPS. Directives (2), (3), and (4) provide accordingly that preserving the natural character of the shoreline, considering long term over short-term benefit, and protecting the resources and ecology of the shoreline, are paramount to other uses.⁵⁰

Specifically, when answering the question of whether a local government may prohibit in its SMP aquaculture along its shorelines, the handbook states that, “A local government generally must allow for water-dependent uses that will not result in net loss to the ecological functions of the shoreline. There may be some limited circumstances in which a jurisdiction-wide prohibition on aquaculture may be appropriate, but this would be unusual.”⁵¹ This basic tenant of the handbook is fundamentally flawed in its oversight of the possibility that commercial aquaculture poorly managed could, in fact, result in a net loss of critical ecological functions of the shoreline. By making a blanket assumption that a jurisdiction-wide aquaculture prohibition on these grounds would be unusual, the aquaculture handbook effectively discounts the need for local governments to carefully consider the effects of aquaculture on the environment within their SMPs. In fact, the handbook goes so far as to state that, absent a clear showing of ecological concerns, aquaculture is generally allowable.

By setting a low bar for the allowance of commercial aquaculture, the handbook takes the position that prohibition on aquaculture is only appropriate in limited and unusual circumstances, thereby recommending that local governments give wide latitude to commercial shellfish aquaculture operations potentially at the expense of the natural character of the shoreline. Any long-term ecological effects which could create latent and on-going environmental damage is not easily documented until the effects are irreversible. Where the effects of commercial shellfishing operations have even the possibility of damaging an already fragile environment, it is important that our shellfish aquaculture laws, policies,

49. WASH. REV. CODE § 173-26-241 (3)(b)(i)(C) (2004).

50. WASH. REV. CODE § 90.58.020 (2009).

51. WASH. DEPT. OF ECOLOGY, *supra* note 11, at 2, 26.

and guidelines take a hardline approach to intelligent limitations on shellfish aquaculture. SMPs accurately following the SMA will place environmental considerations over economic considerations and actively tailor their policies to limit shellfish aquaculture activities that could disrupt the delicate ecological balance of our state's shorelines and alter its natural character and beauty.

Agency guidelines, such as those created by the Department of Ecology should articulate a bright-line rule against aquaculture that involves any kind of disruption or pollution potential. In contrast to current guidelines, the Department of Ecology should update its advice to address the policy articulated in RCW 90.58.020 and the Shoreline Uses provision of the SMA (WAC 176-26). Correctly followed, local laws and policy should direct shellfish aquaculture toward research, restoration, sustainability, and environmental preservation rather than providing broad latitude for commercial shellfish farmers whose objectives are monetary more than environmental.

3. Continuance of Shellfish Aquaculture Research

In addition to updates in the permitting process and updating guidance for SMPs, the first goal of the Washington Shellfish Initiative provides a sub-goal of continuing shellfish aquaculture research. Under this goal, numerous agencies will conduct research on regulatory components for shellfish beds, impact studies on neighboring ecosystems, and impact on geoduck farming and net pen farming.⁵² While some evidence suggests that aquaculture could relieve pressure on wild fish and shellfish populations, research has shown that the practice of aquaculture can actually harm such populations by contributing to marine habitat loss.⁵³ Continued research as well as the implementation of research already in existence is therefore paramount to ensure that economic interests do not destroy efforts at long-term preservation of irreplaceable natural environment and the plants and animals that live there.

While more research on the environmental effects of shellfish aquaculture is necessary, several studies on commercial shellfish aquaculture have provided important early indications. Most prevalently, the United States Geological Survey (USGS) prepared a technical report entitled, "COASTAL HABITATS IN PUGET SOUND: A Research Plan

52. STATE OF WASH., *supra* note 3, at 1.

53. Erin Engelbrecht, *Can Aquaculture continue to circumvent the regulatory net of the Magnuson Stevens Fishery Conservation and Management Act?*, 51 EMORY L.J. 1187, 1188 (2002).

in Support of the Puget Sound Nearshore Partnership” (Coastal Habitats Report). This report is aimed at better understanding the effects of human activities on the nearshore of Puget Sound. According to the report, “Puget Sound nearshore ecosystems encompass the bluffs, beaches, tide flats, estuaries, rocky shores, lagoons, salt marshes, and other shoreline features and shallow water habitats of the marine and estuarine areas of Washington State east of Cape Flattery and north to the Canadian border.”⁵⁴ Puget Sound is also the nation’s second largest estuary, encompassing tremendous biological richness including “more than 200 species of fish, 100 species of birds, 26 different marine mammals, and perhaps 7,000 species of marine invertebrates, including the world’s largest octopuses and more than 70 kinds of sea stars.”⁵⁵ This diverse and unique environment has been continually threatened by increased human commercial activity. In fact, nine out of ten Puget Sound species identified as threatened according to the Endangered Species Act list live in the nearshore environment.⁵⁶

The USGS report prepared a list of twenty-five environmental stressors that effect nearshore ecosystem processes and cause harm to the environment. Aquaculture activities include eighteen out of twenty-five of these stressors on the nearshore environment.⁵⁷ Furthermore, because USGS hypothesizes both direct and indirect links between environmental stressors and the presence of valued ecosystem components (VECs),⁵⁸ aquaculture may have a severe impact on the presence of VECs within the nearshore environment.⁵⁹

The USGS Coastal Habitats Report is not alone in its findings that shellfish aquaculture may have grievous effects on the nearshore habitat. The USFWS biological report on NWP 48 finds that carrying capacity, or the ability of a particular ecosystem to sustainably support all the plants and animals that live there, may be affected by large quantities of shellfish in the water:

54. U.S. GEOLOGICAL SURVEY, COASTAL HABITATS IN PUGET SOUND: A RESEARCH PLAN IN SUPPORT OF THE PUGET SOUND NEARSHORE PARTNERSHIP 2 (2006).

55. *Id.* at 1.

56. *Id.* at 3.

57. *The Social and Environmental Impacts of Industrial Aquaculture in Washington State*, COAL. TO PROTECT PUGET SOUND HABITAT 8 (Oct. 9, 2009), http://coalitiontoprotectpugetsoundhabitat.org/wp-content/uploads/2013/03/Aqua_Sum-10-19-09-R06.pdf.

58. Valued Ecosystem components include: salmon, forage fish, native shellfish, eelgrass and kelp, coastal forests, beaches and bluffs, Orcas, and marine and shore birds. U.S. GEOLOGICAL SURVEY, *supra* note 54.

59. *Id.*

Large shellfish operations growing large numbers of shellfish may cause a shift in the food web through reducing prey for primary consumers at the base of the food web. This is more likely to occur in sheltered embayments where flushing rates are low and foraging habitat for juvenile fish is limited or discontinuous. If shellfish are present at 'natural' levels, their filtering activities would not upset the balance of the intertidal food web. However, aquaculture species are mostly non- native, planted at high densities, and filter larger quantities of water (phytoplankton) than the native oysters. Therefore, they may have a competitive advantage and reduce available food for other planktivores.⁶⁰

According to the report, it is important for any operation seeking to begin commercial aquaculture to first assess the carrying capacity of the area.⁶¹ Assessments of carrying capacity are necessary to avoid any ecological impacts and ensure adequate food supply for the area in question.⁶² Another report by the Coalition to Protect Puget Sound elaborates on the dangers associated with carrying capacity. Currently, there are no restrictions or tests on the effects of shellfish density feedlots associated with commercial harvesting practices in Washington. Despite scientific warnings on the dangers of ecological carrying capacity, these shellfish consume vast quantities of phytoplankton and zooplankton also consumed by native species.⁶³ In this way, commercial shellfishing industry practices may disrupt the delicate food web⁶⁴ and eliminate natural organisms in the nearshore.

60. U.S. FISH & WILDLIFE SERV., *supra* note 38, at 2.

61. J.G. Ferreira et al., *Integrated assessment of ecosystem-scale carrying capacity in shellfish growing areas*, 275 AQUACULTURE 138, 140 (2000) (discussing the idea that the concept of carrying capacity of an ecosystem for natural populations is derived from the logistic growth curve in population ecology, defined as the maximum standing stock that can be supported by a given ecosystem for a given time).

62. *Id.*

63. COAL. TO PROTECT PUGET SOUND HABITAT, *supra* note 57.

64. PACIFIC NORTHWEST NATIONAL LABORATORY, RECONNAISSANCE ASSESSMENT OF THE STATE OF THE NEARSHORE REPORT INCLUDING VASHON AND MAURY ISLANDS (WRIAS 8 AND 9) 6-1 (Jim Brennan ed. 2001) (discussing how a food web is a complex pattern of interlocking food chains in a complex community or between communities, while a food chain is a group of organisms involved in the transfer of energy from its primary source (i.e., sunlight, phytoplankton, zooplankton, larval fish, small fish, big fish, mammals). The types and varieties of food chains are as numerous as the species within them and the habitats that support them. Thus, the food web is analyzed based on knowledge of the food chains that make it up. Four major parts of the food web include: phytoplankton, zooplankton, benthic infauna, and secondary consumers. phytoplankton and zooplankton are known essential components of Puget Sound food chains).

B. GOAL #2: Promote Native Shellfish Restoration and Recreational Shellfish Harvest

The second goal of the Initiative hopes to promote native shellfish restoration and recreational shellfish harvest. This section will discuss the practicality behind restoring native shellfish populations in light of the commercial aquaculture industry's role in promoting the introduction of non-native and invasive species into the environment.

The initiative specifically names two species of native shellfish populations for restoration: the Olympia oyster and the pinto abalone. Under the initiative, NOAA awarded a \$560,000 federal grant to the Washington Department of Fish and Wildlife. This grant aims to increase the number of pinto abalone in tidal regions in the Puget Sound by re-establishing a self-sustaining population of the species absent ESA protections.⁶⁵ Similarly, a \$200,000 grant seeks to protect the Olympia oyster. NOAA is also planning a hatchery-breeding program for native oysters in order to increase production and meet specific conservation guidelines.⁶⁶ However, while the restoration of native populations is generally considered less invasive to the aquatic environment, this component of the initiative also is driven by economic incentives as the Olympia oyster and pinto abalone can generate substantial profits for the shellfish industry. Most importantly, this portion of the initiative fails to address the reality that commercial aquaculture inherently causes the introduction of non-native and invasive species into the ecosystem to detrimental ends.

Invasive and non-native species can displace native species of an ecosystem, thereby altering the food web and changing fundamental ecosystem processes, such as nutrient cycling and sedimentation.⁶⁷ In one study, scientists collected data on numerous marine invasive species and studied each species effects on the environment and its arrival pathways. According to the study, Washington, Oregon, and Vancouver are home to forty-one different invasive species: one of the largest densities of invasive species of any eco-region.⁶⁸ More alarmingly, the study found that commercial aquaculture constitutes the primary pathway of arrival

65. COAL. TO PROTECT PUGET SOUND HABITAT, *supra* note 57.

66. *Id.*

67. Jennifer L. Molnar et al., *Assessing the Global Threat of Invasive Species to Marine Biodiversity*, 6 FRONT ECOL. AND ENVTL. 485, 485 (2008).

68. *Id.* at 490 (discussing how “[t]he number of harmful species in each eco-region provides an indication of the level of degradation from past invasions as well as, perhaps, the pressure from future invasions. This information could help policy makers to understand the trade-offs as they choose how to implement decisions and invest resources”).

for 73% of those invasive species.⁶⁹ The report recommends that in order to limit the harmful effects of species, such as the pacific oyster, "policy makers and conservation practitioners should be working with the aquaculture industry to prevent any future invasions, by improving practices and perhaps limiting new operations."⁷⁰

Another invasive species, the Gallo mussel, received the report's highest ecosystem threat rating.⁷¹ Specifically, the Gallo mussel has a higher survival and growth rate than native mussels, meaning that it may outcompete and cause the endangerment of the native species. Despite its danger, commercial shellfish companies, such as Taylor Shellfish (one of Washington's largest), continue to sell the Gallo mussel at their stores. Furthermore, no current regulations limiting the expansion the aquaculture of the Gallo mussel exist.⁷²

While devoting federal funding toward the restoration of native species, such as the pinto abalone and Olympia oyster, is certainly important, the policy may have little effect if it is not conjoined with efforts to reduce and limit the effects of non-native invasive species. Moreover, additional comprehensive policy will be required to limit the pathways by which non-native and invasive species arrive. Specifically, commercial shellfishing interests, such as Taylor Shellfish, should be bound by regulatory constraints that greatly limit or even prohibit their ability to introduce non-native invasive species and gain economical advantage at the expense of the environment.

C. Goal #3: Ensure Clean Water to Protect and Enhance Shellfish Beds

The third goal of the initiative will direct public funding towards ensuring clean water to protect and promote shellfish beds. Specifically identified are the effectiveness of strategies to clean the water and the effort to address potential pollution impacts.

According to the US Army Corps of Engineers (Corps), shellfish populations supported by commercial harvesting activities under the NWP 48 support the objective of the Clean Water Act because shellfish improve water quality. Through the conversion of nutrients into biomass, i.e., shellfish growth, and the removal of suspended materials through filter feeding,⁷³ the Corps claims that commercial shellfish aquaculture

69. *Id* at 490.

70. *Id*.

71. COAL. TO PROTECT PUGET SOUND HABITAT, *supra* note 57.

72. COAL. TO PROTECT PUGET SOUND HABITAT, *supra* note 57.

73. HOOD CANAL SALMON ENHANCEMENT GROUP, MOLLUSCAN STUDY 2, 14 (2006), available at http://protectourshoreline.org/articles/HoodCanalMolluscan_103006.pdf (discussing

will help meet the third goal of the initiative, ensuring clean water, in its own right.⁷⁴

While shellfish may provide benefits to the overall quality of the water in which they live, the harvesting of shellfish on a commercial level negates this benefit due to the amount of pollution the industry generates. Since the late 1990's, the industry has been introducing large quantities of non-marine grade plastics, such as PVC pipes,⁷⁵ plastic grow bags, and other harmful pollutants in their operations.

These plastic pollutants have often escaped from commercial shellfish farming sites and been released into the natural environment. According to the Sierra Club, "the shellfish industry places over 120,000 pieces of plastic into each acre of geoduck farm as well as using thousands of plastic oyster beds and plastic canopy nets over manila clam beds in Puget Sound intertidal areas."⁷⁶ Compounding these facts, the Department of Ecology states there are 247 intertidal geoduck sites on over 260 acres of tidal lands—the pollutants created by these sites pose a serious risk to critical salmon habitats and other valuable ecosystem components.⁷⁷

According to Charles Moore, a marine plastics pollutant expert:

The introduction of plastics into the marine environment poses hazards of three main types: ingestion, entanglement and the transport of exotic species. PVC is especially toxic and poses hazards to environmental health at every stage of its existence. Other plastics may eliminate some, but not all of these problems, therefore, it does not appear possible to introduce any plastic into the marine environment without harmful consequences.⁷⁸

how some research suggests that filter feeders may clean the water by transferring nutrients from the water column to the sediment as feces. Depending on the characteristics of the sediment, the end result of this process may be the denitrification of the water. Denitrification is a process where harmful nitrogen in the water is converted into gas by the shellfish and subsequently escapes into the atmosphere).

74. U.S. ARMY CORPS OF ENGR'S, DECISION DOCUMENT NWP 48 5 (2012), *available at* http://www.usace.army.mil/Portals/2/docs/civilworks/nwp/2012/NWP_48_2012.pdf.

75. COAL. TO PROTECT PUGET SOUND HABITAT, *supra* note 57 (discussing how geoduck aquaculture often uses a type of PVC known as schedule 40. 100 feet of 6-inch schedule 40 PVC pipe weighs in at 353 pounds.)

76. SIERRA CLUB, INDUSTRIAL SHELLFISH AQUACULTURE ADVERSE IMPACTS NEED TO BE ADDRESSED BY REGULATORS WHEN DETERMINING COMPLIANCE WITH THE CLEAN WATER ACT, MAGNUSON STEVENS ACT, ENDANGERED SPECIES ACT AND SHORELINE MANAGEMENT ACT, PROTECTING AMERICA'S WATER CAMPAIGN 8 (2011) *available at* <http://www.co.thurston.wa.us/permitting/hearing/agenda-staff-report/shellfish-hearing/mdns/32.pdf>.

77. *Id.*

78. COAL. TO PROTECT PUGET SOUND HABITAT, *supra* note 6.

Specifically, PVC and other non-marine grade plastics are harmful because of the types of organic compounds used during manufacturing, which help improve the properties of the resulting products. These chemical additives can penetrate the cells of marine plants and animals, chemically interacting with important biological molecules, potentially disrupting the endocrine system, and altering chemical signals that help animals react to change in their environment.⁷⁹ Thus, any water cleaning benefits created by the presence of shellfish are directly undermined by the conditions under which they are grown.

While the science supports the environmental harm posed by PVC and other non-marine grade plastics, Washington's Water Pollution Control Statute (RCW 90.48.) articulates a further prohibition on these pollutants. Under the policy section of the statute, the legislature articulates that the purpose is to:

[M]aintain the highest possible standards to insure the purity of all waters of the state consistent with public health and public enjoyment thereof, the propagation and protection of wild life, birds, game, fish and other aquatic life . . . and to that end require the use of all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the state of Washington.⁸⁰

The statute further defines pollution as encompassing contamination and "other alteration of the physical, chemical, or biological properties, of any waters of the state . . . as will or is likely to create a nuisance or render such waters harmful, detrimental or injurious to . . . wild animals, birds, fish or other aquatic life".⁸¹ By this definition, PVC meets all the criteria for classification as a pollutant under the Washington Water Pollution Control statute.

Given its severe impact and its classification as a "pollutant" under the Pollution Control Statute, the use of PVC in commercial shellfish aquaculture should accordingly be reduced if not all together eliminated. Under the initiative's directive, more than \$2 million will be allocated to help local governments create sustainable pollution identification and correction programs. Currently, these programs are designed to identify and address pathogen and nutrient pollution from sources, such as sewage systems, farm animals, sewage from boats, and storm run off. If

79. Emma L. Teuten et al., *Transport and Release of Chemicals from Plastics to the Environment and to Wildlife*, 364 PHIL. TRANS. R. SOC. B 2028, 2045 (2009).

80. WASH. REV. CODE § 90.58.020 (2009).

81. WASH. REV. CODE § 90.48.020 (2009).

the initiative is to truly accomplish its goal of cleaning the water and reducing pollution, these programs must consider the harms associated with the extensive presence of PVC piping and other plastic pollutants in commercial shellfish aquaculture.

VII. SUSTAINABLE AQUACULTURE: IS IT POSSIBLE?

In Puget Sound, small and sustainable family-owned shellfish farms have existed for hundreds of years.⁸² However, with economic incentives in mind, large-scale commercial aquaculture ventures have gradually been replacing these small-scale operations, causing pollution, upsetting ecological balance, and creating lasting damage to Washington's shoreline. Thus, when creating a model for shellfish aquaculture that does not harm the environment, it is first important to shift perspectives. Instead of basing principles of shellfish aquaculture management around economic principles, true efforts to achieve sustainable shellfish aquaculture practices should shift to a model of Ecosystem Based Management (EBM).⁸³

In general, EBM is "integrating scientific knowledge of ecological relationships within a complex sociopolitical and values framework toward the general goal of protecting native ecosystem integrity over the long term."⁸⁴ Protecting native ecosystem integrity over the long term includes ongoing collaboration between scientific research, legislative policy, and governmental regulation to protect our marine resources from the ongoing threats faced by human activity. For shellfish aquaculture, this includes several components. Specifically, an EBM model for shellfish aquaculture might include legal provisions requiring appropriately sized harvesting plots, and prohibition on cultivation of native and non-invasive species. In addition, it should include requirements that commercial interests consider a conceptual model of the food web for the ecosystem in which the operation is located and understand the habitat needs for the plants and animals that inhabit the environment. Furthermore, an EBM model would take into account scientific knowledge of environmentally sensitive areas that should remain free from human intervention, as well as create mitigation strategies to combat environmental damage already incurred.

Using an EBM approach to assessing commercial shellfishing activities ideally would result in a reduced number of small-scale

82. COAL. TO PROTECT PUGET SOUND HABITAT, *supra* note 57.

83. R. Edward Grumbine, *What is Ecosystem Management?*, 8 CONSERV. BIO. 1, 31, 34 (2004).

84. *Id.*

shellfish operations. These operations would be required to conduct permanent and on-going environmental assessments of the effects of their activities on the health of the area's ecology. Furthermore, pollution controls, such as mandatory reductions in the use of non-marine grade plastics and a decrease in the use of netting and other materials, would require any commercial shellfish harvesting interests to maintain the aesthetic integrity of the surrounding environment per the requirements of the Shoreline Management Act. Finally, an EBM approach necessitates environmental impact statements for any proposed commercial activity before the approval of an NWP 48 permit. Where the proposed activity is found to harm the environment per the requirements of the Shoreline Management Act, permits should be denied.

VIII. CONCLUSION

According to a 2009 State of the Sound Report, Puget Sound is in danger of losing many of its most valuable plant and animal species and the unique ecological functions they serve during our lifetimes.⁸⁵ Given this risk, protecting our shorelines is of paramount interest to ensure that future generations may enjoy the same natural splendor, abundant resources, and scientific opportunity. The Washington Shellfish Initiative seeks to capitalize economically on an already harmful industry, thereby further jeopardizing delicate ecosystems and making it difficult, if not impossible, for them to ever recover. In order to protect our precious coastal resources, community lawmakers must enforce existing laws: the Shoreline Management Act, Endangered Species Act, the Clean Water Act, and local policies and statutes. While the Washington Shellfish Initiative purports to comply with these critical doctrines, its policies and recommendations actually run counter to them in many areas because the underlying objectives are economical rather than environmental. In order to ensure a sustainable shellfish industry for years to come and preserve our State's unique shoreline habitat, the Washington Shellfish Initiative must be revised so that it complies with federal, state, and local regulations.

85. PUGET SOUND PARTNERSHIP, 2009 STATE OF THE SOUND REPORT, No.PSP0908 24, 85 (2010).