



DEPARTMENT OF
ECOLOGY
State of Washington

Final Cost-Benefit and Least Burdensome Alternative Analyses

*Chapter 173-18, 20, 22, 26 and 27 WAC
Shoreline Management Act*

February 2011
Publication no. 11-06-003

Publication and Contact Information

This report is available on the Department of Ecology's website at www.ecy.wa.gov/biblio/1106003.html.

For more information contact:

Shorelands and Environmental Assistance
P.O. Box 47600
Olympia, WA 98504-7600

Phone: 360-407-6600

Washington State Department of Ecology - www.ecy.wa.gov

Headquarters, Olympia	360-407-6000
Northwest Regional Office, Bellevue	425-649-7000
Southwest Regional Office, Olympia	360-407-6300
Central Regional Office, Yakima	509-575-2490
Eastern Regional Office, Spokane	509-329-3400

To ask about the availability of this document in a format for the visually impaired, call the Shorelands and Environmental Assistance Program at 360-407-6600. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

Final Cost-Benefit and Least Burdensome Alternative Analyses

**Chapter 173-18, 20, 22, 26 and 27 WAC
Shoreline Management Act**

Prepared by

Shon Kraley, Ph.D.

for

Shorelands and Environmental Assistance
Washington State Department of Ecology
Olympia, Washington

Table of Contents

EXECUTIVE SUMMARY	1
SECTION 1: BACKGROUND AND SCOPE.....	2
BACKGROUND	2
REASON FOR THESE RULE AMENDMENTS	4
<i>Commercial geoduck aquaculture</i>	4
<i>Amending local Shoreline Master Programs (SMPs)</i>	4
<i>Housekeeping amendments</i>	5
SCOPE OF ANALYSIS.....	5
SECTION 2: BASELINE FOR ANALYSIS	5
BASELINE	5
<i>Existing rule requirements</i>	5
CHANGES UNDER ECOLOGY’S AMENDED RULES	6
ANALYTIC APPROACH.....	7
<i>Commercial geoduck aquaculture</i>	8
<i>Limited amendments to local Shoreline Master Programs (SMPs)</i>	8
<i>Housekeeping amendments</i>	8
SECTION 3: COSTS OF THE RULE AMENDMENTS.....	9
QUANTIFIED COSTS OF ECOLOGY’S RULE AMENDMENTS	9
<i>Commercial geoduck aquaculture</i>	9
<i>Limited amendments to Local Shoreline Master Programs (SMPs)</i>	10
TOTAL COSTS.....	10
SECTION 4: BENEFITS OF THE RULE AMENDMENTS	11
COMMERCIAL GEODUCK AQUACULTURE	13
LIMITED AMENDMENTS TO LOCAL SHORELINE MASTER PROGRAMS (SMPs).....	14
TOTAL BENEFITS.....	14
SECTION 5: CONCLUSION.....	15
SECTION 6: LEAST BURDENSOME ALTERNATIVE ANALYSIS	15
INTRODUCTION	15
DETERMINATION	16
GENERAL GOALS AND SPECIFIC OBJECTIVES OF THE AUTHORIZING STATUTES	16
ALTERNATIVE RULE CONTENT CONSIDERED	16
<i>Alternative A: No action - continued implementation of existing rules</i>	16
<i>Alternative B: Prescriptive standards</i>	16
<i>Anticipated impacts from Alternative B: Prescriptive standards</i>	17
<i>Alternative C: Preferred alternative</i>	17
<i>Anticipated impacts from Alternative C: Preferred alternative</i>	18
REFERENCES	19

List of Tables

Table 1: Total costs 11
Table 2: Estimated benefits..... 15
Table 3: Net benefits of rule changes 15

Executive Summary

The Washington State Department of Ecology (Ecology) is amending the following Shoreline Management Act rules:

- Chapter 173-18 Washington Administrative Code (WAC) - Shoreline management act — streams and rivers constituting shorelines of the state
- Chapter 173-20 WAC - Shoreline management act — lakes constituting shorelines of the state
- Chapter 173-22 WAC - Adoption of designations of shorelands and wetlands associated with shorelines of the state
- Chapter 173-26 WAC - State master program approval/amendment procedures and master program guidelines
- Chapter 173-27 WAC - Shoreline management permit and enforcement procedures

The Administrative Procedures Act (RCW 34.05.328(d)(e)) requires two types of analyses before adopting a significant legislative rule – a cost-benefit analysis and a least burdensome alternative analysis. This report provides the results of these analyses and shows the potential impacts associated with the new rule amendments.

Ecology concludes that the probable benefits exceed the probable costs.

The Shoreline Management Act (SMA, Chapter 90.58 RCW) charges Ecology with periodically reviewing and amending guidelines for implementing the SMA (RCW 90.58.060). There are three groups of amendments:

1. Changes to Shoreline Master Program Guidelines to address commercial geoduck aquaculture siting and operations as instructed by Second Substitute House Bill (SSHB) 2220 (RCW 43.21A.681).
2. Changes to WAC 173-26-201(1) as to when and why limited (non-comprehensive) amendments to local shoreline programs will be allowed.
3. Housekeeping amendments to better align the rules with changes to state statutes.

Quantifiable costs are limited to permit fees and baseline ecological surveys associated with the new conditional use permit (CUP) requirement in WAC 173-26-241(3)(b) for new commercial geoduck projects. These costs aggregate to nearly \$1.5 million over the 15-year span of the analysis. Though costs may accrue to Ecology due to an increase in the number of limited amendments to local shoreline programs, these costs vary depending on the specific amendment and determining the frequency and amount of amendments submitted is impossible. The housekeeping amendments create neither costs nor benefits.

The quantitative benefits consist of two parts:

- Part one is derived from a survey conducted by the social and economic science research center of Washington State University for Ecology in 1996, which includes the benefits from improved habitat for fish and wildlife, improved water quality, reduced flooding, and recreational benefits.
- Part two is the reasonable assumption that people want to pay a fixed portion of their income instead of a fixed amount of money for environment protection. A total willingness to pay for environmental protection for Washington households over the 15-year period of this analysis is estimated to be \$126.2 billion. However, the rule amendments do not represent significant impacts on the overall quantity or quality of these environmental protections. Instead, they represent marginal changes. For this reason, we used marginal changes to estimate a range of benefits from the rule amendments. Therefore, Ecology estimates that benefits range from \$1.3 million to \$12.6 million.

The rule amendments represent a net benefit given reasonable assumptions when estimating the quantifiable costs and benefits of the changes. Non-quantifiable costs and benefits exist, but are outside the scope of this analysis. It is assumed that both non-quantifiable costs and benefits will occur generally at the same rate, with the ratio of costs to benefits dependent on the market, technological advances, and many other factors outside the scope of the SMA or rules. The rule amendments are written to provide local government flexibility in interpreting and applying the rules to their local situation. This inherent flexibility for local governments is part of the shoreline master program framework and consistent with the SMA. Ecology's intent is for local governments to enhance the non-quantifiable benefits while reducing associated costs to commercial geoduck businesses and the community at large, when they adopt local geoduck aquaculture policies and regulations as part of their SMPs.

In the Least Burdensome Analysis, Ecology concluded there is sufficient evidence Chapter 173-26 WAC is the least burdensome version for those required to comply. Ecology considered three main alternatives for Chapter 173-26 WAC:

1. No action; continued implementation of existing rules.
2. Prescriptive standards.
3. Preferred choice.

Based on those alternatives, Ecology concluded the current amendments to Chapter 173-26 WAC are the least burdensome.

Section 1: Background and Scope

Background

Ecology is amending the following Shoreline Management Act rules:

- Chapter 173-18 Washington Administrative Code (WAC) - Shoreline management act — streams and rivers constituting shorelines of the state

- Chapter 173-20 WAC - Shoreline management act — lakes constituting shorelines of the state
- Chapter 173-22 WAC - Adoption of designations of shorelands and wetlands associated with shorelines of the state
- Chapter 173-26 WAC - State master program approval/amendment procedures and master program guidelines
- Chapter 173-27 WAC - Shoreline management permit and enforcement procedures

The Shoreline Management Act (SMA, Chapter 90.58 RCW) charges Ecology with periodically reviewing and amending guidelines for implementing the SMA (RCW 90.58.060). Therefore, as part of the rule making, Ecology is amending Part III of WAC 173-26.

Washington’s Shoreline Management Act (SMA) was passed by the State Legislature in 1971 and adopted by voters in 1972. The overarching goal of the SMA is “to prevent the inherent harm in an uncoordinated and piecemeal development of the state’s shorelines.” The SMA applies to all 39 counties and more than 200 towns and cities that have “shorelines of the state” (RCW 90.58.030(2)) within their boundaries.

There are three basic policy areas to the SMA:

- Shoreline use
- Environmental protection
- Public access

Under the SMA, each city and county with shorelines of the state must prepare and adopt a Shoreline Master Program (SMP) that is based on state laws and rules but is tailored to the specific geographic, economic and environmental needs of the community. The local SMP is essentially a shoreline-specific combined comprehensive plan, zoning ordinance and development permit system. Most shoreline programs were originally written between 1974 and 1978. Ecology’s update of the SMP Guidelines (Chapter 173-26 WAC, Part III) began a new era of shoreline planning in Washington. Between now and 2014, about 260 towns, cities and counties with shorelines of the state must “comprehensively update” their local shoreline master programs. The changes to WAC 173-26-201 and many of the housekeeping amendments that are part of this rule making were included based on Ecology’s and local government experiences with these updates.

The SMA establishes a balance of authority and partnership between local and state government. Towns, cities, and counties are the primary regulators. Ecology acts primarily in a support and review capacity. Ecology provides technical assistance to local governments and funding in the form of grants. Ecology is also required to take final action on certain kinds of permits and on locally-adopted shoreline master programs, to ensure they comply with the law and agency rules.

The most recent version of the SMP Guidelines (Chapter 173-26 WAC, Part III) was the result of a negotiated settlement agreement between Ecology and interested parties such as cities and

counties, business associations, environmental organizations, and individuals. The outcome was the 2004 version of the guidelines.

It should be noted, as a result of comments received related to the preliminary Cost - Benefit and Least Burdensome Alternative Analysis (Ecology publication 10-06-020) and Small Business Economic Impact Statement (Ecology publication 10-06-019), Ecology changed the rule language. These changes resulted in changes to the costs attributable to the rule amendments.

Reason for these rule amendments

There are three groups of rule amendments:

1. Changes to SMP Guidelines to address commercial geoduck agriculture siting and operations as instructed by SSHB 2220 (RCW 43.21A.681).
2. Changes to WAC 173-26-201(1) as to when and why limited (non-comprehensive) amendments to local SMPs will be allowed.
3. Housekeeping amendments to better align the rules with changes in statute.

Commercial geoduck aquaculture

The 2007 Legislature directed Ecology to help address siting and operation conflicts surrounding Washington's expanding intertidal geoduck aquaculture by developing "guidelines" to be included in any master program. Ecology interpreted "guidelines" to mean Chapter 173-26 WAC, Part III – commonly referred to as the shoreline master program "Guidelines". The Guidelines provide direction for local governments to update their SMPs to avoid the environmental harm inherent in piecemeal and uncoordinated shoreline development.

Lawmakers also directed Ecology to create a special Shellfish Aquaculture Regulatory Committee (SARC) to recommend rule amendments and accomplish other tasks (see www.ecy.wa.gov/programs/sea/shellfishcommittee/index.html). The SARC is made up of representatives from:

- Large and small aquaculture operations
- Environmental interests
- Shoreline property owners
- Tribal, state and local governments

SARC's recommendations were included in a January 2009 report to the Legislature. Ecology's rule amendments reflect SARC's recommendations and individual perspectives offered by SARC members. Aquaculture businesses, tribes, and local governments across the state also reviewed and helped shape the proposed and final rule geoduck aquaculture amendments.

Amending local Shoreline Master Programs (SMPs)

The amendments in WAC 173-26-201(1) focus on criteria for submitting a limited amendment for Ecology approval. The amended rule removes outdated criteria in the existing rule that restricts limited amendments and pushed comprehensive updates (comprehensive updates will be accomplished per statutory schedule and agreement to provide state grant funding.)

Housekeeping amendments

“Housekeeping” amendments are defined as changes that are not determined to be legislatively significant, as determined by RCW 34.05.328(5)(b). These types of amendments are necessary over time to align rules with any changes that have occurred to statute.

Scope of analysis

Ecology’s analysis is presented in this document using the following section structure:

- **Section 2: Baseline for analysis**
This section explains the baseline concepts to which Ecology’s rule amendments were compared, as well as how impacts of the rule amendments were analyzed.
- **Section 3: Costs of the rule Amendments**
This section explains the costs.
- **Section 4: Benefits of the Rule Amendments**
This section explains the benefits.
- **Section 5: Conclusions**
This section summarizes Ecology’s results and includes comments on the analysis.
- **Section 6: Least Burdensome Alternative Analysis**
This section explains Ecology’s determination on whether the rule amendments place the least burden possible on those required to comply with them, while fulfilling the goals and objectives of the authorizing legislation.

Section 2: Baseline for Analysis

Baseline

The baseline for this analysis is the existing rules in place. Ecology analyzed the difference between what the world looks like today with the current rules, compared to how it will change with the amendments.

Existing rule requirements

The criteria for limited amendments contained in the current WAC 173-26-201(1), has overly restricted local governments from pursuing limited amendments, even when they aren’t comprehensively updating their SMPs.

Also under the current Chapter 173-26-241(3)(b), commercial geoduck aquaculture is not addressed. Because of this, jurisdictions have little guidance on how to:

- Plan for the siting of commercial geoduck aquaculture.
- Address use conflicts
- Avoid or mitigate for environmental impacts that can occur.

Accordingly, there is currently a wide range of treatment across jurisdictions. This includes requiring a conditional use permit (CUP) in some jurisdictions, substantial development permits

in others, and no permit in even other jurisdictions. The specific requirements for CUPs also differ across jurisdictions.

Changes under Ecology's amended rules

Rule amendments related to general aquaculture and commercial geoduck aquaculture include:

- WAC 173-26-020: “Aquaculture” definition added.
- WAC 173-26-201: Improved language related to protecting ecologically intact shoreline areas and water quality related to aquaculture.
- WAC 173-26-211: Clarified language to support Attorney General Opinion 2007 No. 1; reserving areas for protection and restoration before reserving areas for shoreline uses; and ensuring adequate space for water-dependent shoreline uses.
- WAC 173-26-241: Aquaculture use provisions are revised to require a conditional use permit (CUP) for new commercial geoduck aquaculture. Applications for a CUP must include a baseline ecological survey. Other provisions with non-quantifiable costs are added.

Rule changes related to limited amendments of local shoreline programs include:

- WAC 173-26-201(1): New provisions for limited (non-comprehensive) SMP amendments are added.

‘Housekeeping’ changes are defined as changes that are not determined to be legislatively significant rules, as determined by RCW 34.05.328(5)(b). The housekeeping amendments include:

- WAC 173-18: Lists of shoreline streams are removed for cities and counties where SMP comprehensive updates have been approved. Applies to Section 130 and Section 430.
- WAC 173-20: Lists of shoreline lakes are removed for cities and counties where SMP comprehensive updates have been approved. Applies to Section 200, Section 210, Section 800, and Section 810.
- WAC 173-22-030: Definitions no longer needed are removed.
- WAC 173-22-035: Reference to wetland delineation method is deleted; reference to current version of wetland delineation manual adopted by Ecology is added.
- WAC 173-22: Reference to wetland maps maintained by Ecology is removed for cities and counties where SMP comprehensive updates have been approved. Applies to Section 618, Section 674, and Section 678.
- WAC 173-22-080: Entire outdated section deleted.
- WAC 173-26-020: Definitions for “floodway” and “master programs” are added consistent with legislative changes to the SMA.
- WAC 173-26-060: Record retention requirements for adopted SMPs are revised.
- WAC 173-26-080: List of jurisdictions required to adopt a SMP is updated.

- WAC 173-26-110: Requirements for SMP submittals is updated.
- WAC 173-26-130: SMP appeals process is updated per HB 2395 (2010).
- WAC 173-26-150: Pre-designation of future annexation areas authorized for non-Growth Management Act (GMA) cities is added.
- WAC 173-26-190: Acknowledgement of exemptions from SMA; “project of statewide significance” revised per SSB 5473 (2009).
- WAC 173-26-221: “Critical areas” section is updated to conform to HB 1635 (2010); added “lakes” in critical freshwater habitat discussion to correct previous oversight.
- WAC 173-26-360: Ecology address and citation in Ocean Management discussion corrected.

Analytic approach

The analytic approach will focus on three distinct areas as discussed above:

1. Commercial geoduck aquaculture
2. Limited amendments to local Shoreline Master Programs (SMPs)
3. Housekeeping amendments

While there are five rules that have been amended (Chapter 173-18, 20, 22, 26, and 27 WAC), Ecology is only analyzing Chapter 173-26 WAC, State master program approval/amendment procedures, as it is the only rule creating new costs and benefits. Chapters 173-18, 20, 22 and 27 only contain housekeeping amendments, which are not required to be part of this analysis because they create neither costs nor benefits.

Uncertainty limits this analysis. It is impossible to know with certainty how a particular local government will interpret the rule amendments within their own local shoreline programs, or how it will play out in their specific community. Consistent with the SMA, local governments are given considerable flexibility in defining and administering their local shoreline policies and regulations. Therefore, this analysis presents an estimate of the environmental benefits and costs based on available data, and hypothetical “scenarios”. Moreover, even if the effects could be predicted, the lack of any available data on the linkage between the requirements in the rule amendments and direct benefits or costs produces uncertainty regarding the magnitude of the benefits and costs¹.

Long-run forecasts are difficult to do. Most long-run forecasts are based on historical data which do not consider changes in preference, economic structure and technology. This analysis is also subject to the same limitations. Most of the ‘future data’ used is linearly derived from historical data – which is incomplete. On the other hand, because the full impacts of a rule amendment

¹ Approximately 36 local governments will have adopted comprehensively updated SMPs by the time rule amendments become effective, and they will not have to respond to the rule amendments until they do their next update. For example, Whatcom County will not have to respond to the new rule language and change their local policies and regulations until 2018. Others will update over time – creating a staggered implementation over approximately the next 10 years

may take years to realize, a long-run analysis is better than a short-run analysis. So in this cost benefit analysis, a 15-year horizon is used to balance the benefits and limitations of using either a short-run or long-run analysis in isolation. The initial period is assumed to be 2011, and the end of the 15-year period is assumed to be 2026.

The discount rate used in this analysis reflects the time value of money. Benefits and costs are worth more if they are experienced sooner. All future benefits and costs, including non-monetary benefits and costs, should be discounted. The higher the discount rate, the lower is the present value of future cash flows. The discount rate used in this analysis is 1.68 percent.

Commercial geoduck aquaculture

It is important to note the rule amendments in Chapter 173-26-241(3)(b)(i)-(iv) apply to commercial geoduck aquaculture and do not apply to all aquaculture. This analysis will focus on the provision to require a CUP for new commercial geoduck aquaculture and the baseline ecological survey required as part of the CUP application.

Existing shoreline uses – such as existing commercial geoduck aquaculture – are ‘grandfathered’. Currently 210 aquaculture sites will be ‘grandfathered’ under the federal Section 404 Permit for geoduck aquaculture and are not subject to acquiring a new CUP under the new rule language

Because commercial geoduck aquaculture permit, siting and operational requirements do and will continue to differ across jurisdictions, a range of impacts is considered.

In the last year, ten new individual Section 404 Permit applications for commercial geoduck aquaculture in Washington State have been received at Ecology for associated 401 Water Quality Certification permits. Future applications are assumed to average ten per year. There is speculation that growers are currently applying at a relatively slow rate to work through application information needs, questions, and concerns associated with new federal and state regulatory requirements. It is impossible to forecast how application rates may change in the future because of unforeseen market and other factors.

Limited amendments to local Shoreline Master Programs (SMPs)

A comparison is made between the former criteria for limited amendments and the new provisions. The key differences are increased clarity and flexibility and avoiding expensive comprehensive amendments. Due to the uncertainty involved with predicting future submissions of limited amendments, it’s difficult to determine the cost difference and this analysis is focused on qualitative issues.

Housekeeping amendments

For this analysis, Ecology assumes there are no quantifiable costs or benefits due to the housekeeping amendments.

Section 3: Costs of the Rule Amendments

Quantified costs of Ecology's rule amendments

Commercial geoduck aquaculture

The costs of acquiring a CUP vary across jurisdictions. Some jurisdictions require additional permitting for some projects, including, but not limited to, SEPA, variances, and shoreline substantial development permits. These costs can range up to \$10,000, but average roughly \$3,500.²

Additionally, the new CUP application requires a baseline ecological survey of the proposed site. Survey costs vary significantly based on several factors related to:

- Level of agency involvement.
- Site differences (presence of critical saltwater habitats, intertidal versus subtidal, slope and substrate).
- Site access that may make logistics more or less challenging.³

Costs were determined by using actual survey costs of recently completed surveys as reported by the Pacific Coast Shellfish Growers Association. These costs averaged roughly \$5,000 - \$7,500. For the current analysis, the conservative estimate (\$7,500) was used.

The amended rules require local governments to consider, at a minimum a certain list of issues when writing CUPs – but local governments may consider other issues to ensure they ‘avoid or mitigate’ impacts from commercial geoduck aquaculture and achieve no net loss of ecological functions. Ecology has also added provisions about:

- Application materials.
- Reporting and monitoring.
- Other topics that affect local governments and the commercial geoduck businesses.

Because local governments are given varying degrees of discretion for interpreting the provisions – depending on the provisions – the actual costs will be determined from actions at the local level, and are outside of this analysis.

Number of growers affected

If the number of new applications remains constant at a rate of 10 per year, this will result in an estimated 150 times that growers will be affected by the rule over the 15-year period of analysis. Because growers sometimes partner on projects and often submit more than one project application, the actual number of growers affected is uncertain. To be conservative, it was assumed that each application will be submitted by one new grower in every instance.

² In Pierce County, \$3,510 is charged for a shoreline conditional use permit with an additional \$3,750 fee if a variance is needed and an additional \$3,380 (for project costs up to \$10,000) to \$4,710 (for project costs up to \$1 million) fee if a shoreline substantial development permit is needed.

³ Barrette, 2011.

Limited amendments to Local Shoreline Master Programs (SMPs)

Since the 2004 effective date of the existing SMP Guidelines rule, Ecology has processed fifty four (54) limited amendments from local governments. The costs of processing limited amendments are borne by local government and Ecology. Both are required to provide for public review and comment. This includes all or some of the following:

- Public workshops
- Public hearings
- Preparing staff reports
- Responding to comments
- Securing official approval

Depending on the type of limited amendment, the staff time required by Ecology to process them varies.

If a private party requests the amendment, in most cases they must apply to the local planning department and pay an application fee. If the local government requests the limited amendment, it would incur the costs of processing the amendment. Ecology does not require a processing fee.

The existing rule does not allow limited amendments to SMPs and essentially forces over 240 local governments into waiting until they have comprehensive updates to their SMPs before they can make any type of change to their shoreline policies or regulations. This creates inconsistent statutes and regulations and leads to confusion and delays in processing SMP amendments. Local governments need to ability to reasonably update their SMPs when there is annexation, a change in local land use comprehensive plans or critical area ordinances, or other limited changes.

Currently, few applications for limited amendments are being submitted. This is due to jurisdictions working on comprehensive updates of their SMPs as mandated by the Legislature. However, under the amended rule and as comprehensive updates are completed, the number of limited amendment requests and associated costs will likely increase.

Due to the variable nature of the potential impacts and the uncertain timing of future requests, it is impossible to predict the increased governmental costs that may accrue. However, similar to geoduck aquaculture CUPs, the costs vary greatly for Ecology depending on the complexity and location of the limited amendment. It takes about 60 hours of Ecology staff time to process a limited amendment. In addition Ecology spends significant time and funds on public notice and comments and overhead such as legal advice, records retention, budgeting, and other support services.

Total costs

Quantifiable costs are limited to the impacts of the CUP requirement for commercial geoduck aquaculture. These costs include the initial application fee and the cost of a baseline ecological survey, appropriately discounted. It's important to note local governments set their permit fees to recoup costs. Thus, the average permit fees are considered fairly accurate of the true costs

incurred by local governments. The survey costs do not include all costs to businesses to complete the application. Table 1 displays these costs.

Table 1: Total costs

Average cost of CUP application	\$3,500
Conservative average cost of survey	\$7,500
Estimated total cost per application	\$11,000
Estimated numbers of applications per year	10
Number of years used in this analysis	15
Discount rate used	1.68%
Estimated aggregate costs	\$1.5 million

Over the 15-year period used in this analysis, Ecology estimates the total costs to be \$1.5 million. This represents a conservative estimate and actual costs may be lower if local jurisdictions currently require a CUP and/or baseline survey for commercial geoduck aquaculture. Costs will also vary depending on the actual scope of the survey and other application requirements. The rule amendments encourage local governments to develop CUP applications that mirror federal and state permits, and minimize redundancy in permit applications as one way to reduce the costs to applicants.

Section 4: Benefits of the Rule Amendments

Measuring the benefits associated with an amended rule is easier if the resource in question is a marketed commodity and information on prices and quantities consumed are available. This information can be used to define a demand curve and can be used to quantify the benefits.

Unfortunately, most of the benefits generated from the rule amendments to the shoreline Guidelines are from “commodities” that are not associated with a market, and no market prices exist. Moreover, we do not know the quantity of these beneficial “commodities” produced by the amendments, because each project proposal will be unique and the cause and effect relationship is not linear or predictable. Although it is impossible to assess these benefits directly, alternative methods have been developed in economics to analyze broad policy shifts that may have a wide range of beneficial impacts.

One of the most frequently used methods is the contingent valuation (CV) method which uses survey techniques to indirectly derive people’s willingness to pay for the “commodities” and therefore derive the benefits. Even so, not all benefits are assessed in this analysis due to the lack of knowledge and data.

The quantitative benefits consist of two parts:

- Part one is derived from a survey conducted by the social and economic science research center of Washington State University (WSU) for Ecology in 1996, which includes the

benefits from improved habitat and wildlife, improved water quality, reduced flooding, and recreational benefits.⁴

- Part two is the reasonable assumption that people want to pay a fixed portion of their income instead of fixed amount of money for environment protection. A total willingness to pay for these commodities for Washington households over the 15-year period of analysis is estimated to be \$126.2 billion. However, the rule amendments only represent marginal changes. For this reason, we used marginal changes to estimate the benefits. Therefore, Ecology estimates that benefits range from \$1.3 million to \$12.6 million.

CV surveys generate data based on hypothetical scenarios. Given this, the survey data has been handled conservatively in that assumptions were chosen that would be biased against the rule amendments. The 1996 WSU survey suggests that, in general, people thought the shoreline is over-developed. When asked about their preferred shoreline uses, people tended to choose wildlife habitat, public parks and fishing as higher priorities. Conversely, they chose low or no priority for marinas, industry, shops or restaurants, office buildings, apartments and condominiums.

Questions that help determine the value residents place on shoreline management were also asked. From the answers to those questions the distribution of willingness to pay (WTP) of each Washington household for shoreline improvements in 1996 can be derived.

The mean and median of WTP for each Washington State household in 1996 were calculated based on the distribution. The mean is \$373.19 per household per year and the median is \$248.47 per household per year. Only the median is used in this benefits analysis.⁵ Once these have been adjusted for inflation, the median WTP is \$510.50 and mean is \$339.92 respectively.⁶

It is reasonable to assume that people want to pay a fixed portion of their income instead of fixed amount of money for environment protection. However, this analysis only assumes the households just want to pay a fixed amount of money and this conservative arrangement will result in significantly reduced benefits of about 50 percent.

To calculate the total social benefit, the total number of households needs to be determined by using data on population and household size. The population trend⁷ and the household size trend⁸ were decided by the data obtained from the Office of Financial Management (OFM)⁹. Because

⁴ Question 121 to Question 137 in 1996 survey. 'Reduced litter' is included in the total benefits, but we assume it is not significantly large.

⁵ The Mean is sensitive to outlying values. The median was deemed to be a more appropriate measure.

⁶ It should be noted that the survey represents respondents statewide. Respondents were also identified by their geographic region (East and West). Western respondents indicated a higher WTP than eastern respondents. Using the statewide median therefore represents a conservative estimate. Though it is true that the benefits and costs of these amendments may fall disproportionately on the western side of the state, one can value shoreline amenities even if they will never personally experience them.

⁷ Washington State Office of Financial Management. FORECAST OF THE STATE POPULATION BY AGE AND SEX: 1990 TO 2030 NOVEMBER 2002 FORECAST.

⁸ Washington State Office of Financial Management. Illustrative Household and Persons per Household Projections.

⁹ Office of Financial Management, Washington State

the household size is relatively stable, Ecology chose 2.468 persons per household¹⁰ as the average household size.

After calculating the households in Washington State each year from 2011 to 2026, Ecology can calculate the WTP¹¹ for shoreline improvement each year from 2011 to 2026. Adding up the figures over the 15-year period of this analysis and discounting appropriately, the result is an overall WTP of \$126.2 billion. It must be noted this total represents the total value Washington State households are placing on shoreline improvements. The rule amendments represent marginal changes in these commodities. Therefore, when estimating the benefits we present a range of impacts and show the value households would place on such an impact.

Commercial geoduck aquaculture

To retain the ability of local governments to protect shellfish beds from water pollution, Ecology added rule language to ensure local governments consider the following in their inventory and characterization:

- Sediment contamination
- Intertidal property ownership
- Existing aquaculture operations, shellfish beds, and shellfish protection districts
- Areas that meet department of health shellfish water quality certification requirements

This lays the foundation for siting in-water uses such as commercial geoduck aquaculture. Specific language is also added that reflects the importance of water quality to shellfish, and minimizing impacts to existing shellfish beds when siting upland uses.

The rule amendments will have environmental and various social benefits including the following:

- **Water quality** – The amended rules will enhance water quality protections for commercial geoduck aquaculture and the environment in general through limiting and conditioning commercial geoduck aquaculture, and by requiring local governments to reduce upland impacts to existing aquaculture. This also reduces the potential human health threat from water pollution.

By requiring a CUP, the amended rules will avoid or limit the environmental impacts of commercial geoduck aquaculture. Under the CUP, monitoring and reporting is required. Local governments may use this to assess water quality impacts from sediment suspension and/or cumulative environmental impacts.

A more thorough inventory and characterization of shorelines and proper siting actions should result in avoiding siting commercial geoduck aquaculture in areas with contaminated sediments.

- **Property values** – Property owners who lease land to commercial geoduck farmers may benefit, but neighbors may not. While lease values would improve over time as the price

¹⁰ Forecasting data in year 2010

¹¹ With income growth

of the geoduck increases (as it is forecasted to do), this would only be a benefit increase if the rule amendments lead to more new commercial geoduck aquaculture.

Limited amendments to local Shoreline Master Programs (SMPs)

The existing requirements in WAC 173-26-201(1), essentially force local governments into waiting until their next comprehensive SMP amendment before they can make any type of change to their shoreline policies or regulations. The existing rule language is ambiguous, leading to confusion and delays in processing SMP amendments.

The primary benefit of the amended rules is more clarity on when a limited amendment will be an option for local jurisdictions and avoidance of more expensive comprehensive shoreline program amendments in many cases. This may allow them to implement economically beneficial land use projects that would have been viewed as infeasible under the previous rule language. The specific benefits of such projects could vary significantly across projects and are impossible to predict.

Total benefits

When adding up the benefits of the amended rules, the uncertainty involved with valuing non-market commodities like environmental amenities (which represent the vast majority of the estimated benefits), as well as the impact of changes on those commodities, requires the use of ranges based on different levels of impact.

In this analysis, Ecology estimated a total WTP for these commodities for Washington households over the 15-year period of study to be \$126.2 billion. However, the amended rules do not represent significant impacts on the overall quantity or quality of these amenities. Instead, they represent marginal changes. For this reason, we used small changes to estimate the benefits of the amended rules. Table 2 shows the estimated benefits to the changes for several levels of improvement to these amenities.¹² The impact percentages listed in Table 2 represent improvements in environmental amenities including:

- Enhanced public access to public waters
- Shoreline and submerged vegetation protection
- Water quality protection
- Protection of critical saltwater habitats such as eelgrass and forage fish spawning grounds
- Reduction of non-point pollution including litter
- Improved aesthetics

A 0.001 percent improvement represents an improvement of 1/1,000 of one percent.

¹² An improvement can also be thought of as a foregone decrease in the quantity or quality of the amenity.

Table 2: Estimated benefits

Impact on Amenities	Estimated Benefits
0.001%	\$1,262,161.07
0.005%	\$6,310,805.33
0.01%	\$12,621,610.65

Additionally, non-quantifiable benefits may add up due to the increased potential for stability and certainty for communities and the geoduck market, and the better ability to incorporate current science into permitting processes and assess cumulative impacts on the part of local jurisdictions and Ecology.

Section 5: Conclusion

As noted before, Ecology based this cost-benefit analysis on the best available information. The scenarios and hypothetical constructs used to illustrate potential benefits and costs are intended to be reasonable.¹³ Moreover, because shoreline areas are one of the most heavily regulated and most highly valued areas by society, many of these benefits and costs are directly affected by other laws, rules and programs, and it is difficult to distinguish between their impacts and those impacts that are a result of the amended rules. Further, the actual impact will critically depend on the number and scope of geoduck projects, and interpretation of the amended rules at the local level.

The amended rules represent a net benefit given reasonable assumptions when estimating the costs and benefits. Further, non-quantifiable benefits will likely increase the net benefit. Table 3 shows the net benefit under each scenario.

Table 3: Net benefits of rule changes

Impact on Amenities	Benefit	Cost	Net Benefit
0.001%	\$1,262,161.07	\$ 1,472,175.89	(\$210,014.82)
0.005%	\$6,310,805.33	\$ 1,472,175.89	\$4,838,629.44
0.010%	\$12,621,610.65	\$ 1,472,175.89	\$11,149,434.76

Section 6: Least Burdensome Alternative Analysis

Introduction

RCW 34.05.328(1)(e) requires Ecology to “determine, after considering alternative versions of the rule and the analysis required under (b), (c), and (d) of this subsection, that the rule being adopted is the least burdensome alternative for those required to comply with it that will achieve the general goals and specific objectives stated under (a) of this subsection.”

¹³ Conservative assumptions (reflecting higher costs/lower benefits) were used whenever possible.

Determination

Based on research and analysis required by RCW 34.05.328(1)(e) the Department of Ecology determines:

There is sufficient evidence the rule is the least burdensome version of the rule for those who are required to comply, given the goals and objectives of the law, for Ecology to propose the rule.

General goals and specific objectives of the authorizing statutes

The overarching goal of the Shoreline Management Act is “to prevent the inherent harm in an uncoordinated and piecemeal development of the state’s shorelines.”

Alternative Rule Content Considered

Ecology considered the following alternatives.

Alternative A: No action - continued implementation of existing rules

No Action means the continued implementation of the existing rules.

For purposes of this analysis, continuing to use the existing rules was considered the “no action alternative.” Previous environmental impact statements, and the 2003 Supplemental Final Environmental Impact Statement, have analyzed the continued use of the existing rules.

Continued use of the existing rules would have been a violation of state law, given Ecology would not fulfill the requirements established by SSHB 2220 (see RCW 42.21A.681) to address commercial geoduck aquaculture in the SMP Guidelines. To comply with RCW 42.21A.681, Ecology must reject the “no action” alternative. Regardless, lack of sufficient guidance in the existing rules creates relatively inconsistent regulations from county-to-county for aquacultural businesses and the public. It also makes it difficult for local governments to protect critical saltwater habitats and achieve no net loss of ecological functions. Ecology expects the amended rules will increase regulatory consistency and increase consideration of the built and natural environments.

The existing rules also contain information that is out of date or not in alignment with the SMA or other existing laws. The “no action” alternative does not provide for an opportunity to bring the rules into alignment with existing statute.

Also, continued use of the existing rules would not have clarified the process for review and approval of limited amendments. The existing rule has proven to be too restrictive, leading to uneven application across jurisdictions. Under the “no action” alternative, less-than-comprehensive amendments would have continued to be restricted and would have resulted in inconsistent policies and regulations, legal challenges and time consuming and costly delays.

Alternative B: Prescriptive standards

Prescriptive standards would result in a rule with specific numerical standards, effective state-wide, which set minimum requirements for local governments to achieve through their local SMPs for the full range of shoreline uses.

Alternative B would include the specific limits and conditions on commercial geoduck aquaculture for local governments to include in their SMPs. Existing federal, state, and local regulations would continue to protect water quality, reduce and mitigate habitat degradation, and help maintain ecological functions.

Ecology and SARC considered updating Chapter 173-26 WAC to reflect specific prescriptive standards for commercial geoduck aquaculture operations. If selected, this would have resulted in a rule with specific numerical standards for commercial geoduck aquaculture. Criteria for limited amendments need to be descriptive, and don't lend themselves to specific numerical standards.

Anticipated impacts from Alternative B: Prescriptive standards

Habitat, plants, and animals

Research on intertidal commercial geoduck impacts is currently under way as part of Sea Grant's geoduck research program and is scheduled to be completed 2013 (Washington Sea Grant, 2009). However, without proper site specific baseline information, such as an ecological survey, it is difficult to evaluate the impacts of individual geoduck projects.

The practice of placing pools, tanks or other impervious materials, site alterations, and equipment use can be detrimental to the intertidal ecology. More information on the biological effects of commercial geoduck aquaculture is needed to understand the ecological interactions, seasonal flux of species, as well as planting and harvest effects on the landscape (Washington Sea Grant, 2009). Future research findings may support a change in the permit requirement and more or less restrictive limits and conditions to avoid or mitigate impacts in the intertidal system.

Navigation, transportation, and recreation

To reduce the impact of commercial geoduck aquaculture on boat navigation and recreation, the amended rules require local governments to consider:

- Placing property corner markers that are visible at low tide.
- Limit the number of barges or vessels moored or beached at the site.

Local governments may also include in each CUP:

- Measures to minimize impacts to recreational uses of the water over the site at high tide.
- A debris removal schedules.
- Restricted use of predator exclusion devices.

While the impacts discussed above would result from prescriptive standards, those standards may not be necessary in all circumstances. Prescriptive standards would prevent local governments from using their discretion when deciding when to apply such standards and when they are unnecessary or even counterproductive.

Alternative C: Preferred alternative

Standards, such as those being implemented, result in a rule with general guidance for local governments while leaving the specific details to local discretion.

Alternative C provides minimum standards that allow local governments to determine the specific requirements that best protect the intertidal habitat and meet the future shoreline use and development needs of the community. As opposed to prescriptive standards, allowing local jurisdictions discretion in meeting minimum standards is consistent with the local-state roles and partnership described in the SMA and rules. Other existing federal, state, and local regulations will also continue to protect water quality, reduce and mitigate habitat degradation, and contribute to no net loss of ecological functions.

Anticipated impacts from Alternative C: Preferred alternative

The preferred alternative allows local governments the ability to comply with the rule while considering community level shoreline uses and priorities, and the site specific characteristics of any new commercial geoduck aquaculture project. This alternative allows local governments the ability to consider the costs and benefits specific to their community and individual geoduck projects – providing an opportunity to maximize the benefits while reducing the costs.

The impacts on habitats, plants, animals, navigation, transportation, and recreation discussed under Alternative B, above, would still occur under Alternative C, however local governments would have discretion on what specific requirements to apply in each specific case. This allows the positive aspects of prescriptive standards to accrue without the negative aspect of using a “one-size-fits-all” approach.

Limited amendments to Local Shoreline Master Programs (SMPs)

The amendments to WAC 173-26-201(1) includes entirely new provisions for limited amendments to local SMPs. The rule amendments include criteria for review and approval of limited amendments that affect both local government and Ecology. The existing rule restricts limited amendments and favors comprehensive updates. With the new rules in place, comprehensive updates will continue to be accomplished per statutory schedule and with state funding. Local governments will also have the ability to periodically update their SMPs through limited amendments when annexations or other situations warrant a change to maintain regulatory consistency and avoid lawsuits.

References

- Bafus, W. 2002. Evaluation of Probable Benefit and Costs: Amended Shoreline Master Program Guidelines (Chapter 173-26 WAC). Washington Department of Ecology.
- Barrette, Margaret, Pacific Coast Shellfish Growers Association, Email correspondence 1/18/2011.
- Bin, O., and Polasky, S., 2005. Evidence on the Amenity Value of Wetlands: In a Rural Setting. *Journal of Agricultural and Applied Economics* 37.3 (December 2005):589-602.
- Brennan, J. S. 2007. *Marine Riparian Vegetation Communities of Puget Sound*. Puget Sound Nearshore Partnership Report No. 2007-02. Published by Seattle District, U.S. Army Corps of Engineers, Seattle, Washington.
- Brown, G. M, and Pollakowski, H. O. 1975. The Economic Value of Undeveloped Shoreline. Project Completion Report. Department of Economics, University of Washington.
- Brown, G. M, and Pollakowski, H. O. 1977. Economic Value of Shoreline. *The review of Economics and Statistics*, 59(3), 1977, 272-278.
- Davis, J.P. 2004. *Geoduck culture on intertidal beaches: procedures, expenses, and anticipated income for an intermediate-size farm*. Baywater, Inc.
- Dethier, M. 2006. *Native Shellfish in Nearshore Ecosystems of Puget Sound*. Puget Sound Nearshore Partnership Report No. 2006-04. Published by Seattle District, U.S. Army Corps of Engineers, Seattle, Washington.
- Dumbauld, B. R., Ruesink, J. L., & Rumrill, S. S. 2009. The ecological role of bivalve shellfish aquaculture in the estuarine environment: A review with application to oyster and clam culture in West Coast (USA) estuaries. *Aquaculture*, 290, 196-223.
- Ebasco Environmental. 1992. *The Transport and Fate of Suspended Sediment Plumes Associated with Commercial Geoduck Harvesting*. Bellevue, Washington. Prepared for Washington Department of Natural Resources.
- Fresh, K. L. 2006. *Juvenile Pacific Salmon in Puget Sound*. Puget Sound Nearshore Partnership Report No. 2006-06. Published by Seattle District, U.S. Army Corps of Engineers, Seattle, Washington.
- Goodwin, C.L., and B. Pease. 1989. *Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (Pacific Northwest)—Pacific geoduck clam*. U.S. Fish. Wildl. Serv. Biol. Rep. 82(11.120). U.S. Army Corps of Engineers, TR EL-82-4.

Johnson, A. 2010. Potential for Chemical Impacts from the Use of PVC Pipe in the Marine Environment—Literature Search. Environmental Assessment Program, Washington Department of Ecology, Olympia.

Lucas, John, & Southgate, Paul. 2000. *Aquaculture*. Wiley-Blackwell.

Mumford, T. F. 2007. *Kelp and Eelgrass in Puget Sound*. Puget Sound Nearshore Partnership Report No. 2007-05. Published by Seattle District, U.S. Army Corps of Engineers, Seattle, Washington.

National Marine Fisheries Service Northwest Region. 2009. *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 48 Washington*. Seattle, Washington.

Pacific Shellfish Growers Association. *Geoduck Environmental Code of Practice*.

Penttila, D. 2007. *Marine Forage Fishes in Puget Sound*. Puget Sound Nearshore Partnership Report No. 2007-03. Published by Seattle District, U.S. Army Corps of Engineers, Seattle, Washington.

Shorelands and Environmental Assistance Program. 2003. *Proposed Shoreline Master Program Guidelines Rule Amendment (WAC 173-26, Sections 171 to 251): Supplemental Final Environmental Impact Statement*. (Publication 03-06-006) Shorelands and Environmental Assistance Program, Washington Department of Ecology, Olympia.

Shorelands and Environmental Assistance Program. 2009. *Shellfish Aquaculture Regulatory Committee: Recommendations on Guidelines for Geoduck Aquaculture Operations*. (Publication 09-06-001) Shorelands and Environmental Assistance Program, Washington Department of Ecology, Olympia.

Washington Sea Grant. 2008. *Effects of Geoduck Aquaculture on the Environment: A Synthesis of Current Knowledge*. (WSG-TR 08-01) School of Aquatic and Fishery Sciences, University of Washington, Seattle.

Washington Sea Grant. 2009. *Geoduck Aquaculture Research Program: Interim Progress Report*. (WSG-TR 09-02) School of Aquatic and Fishery Sciences, University of Washington, Seattle.