

Environmental Assessment for Watmough Bay Shoreline Stabilization

OR134-2012-0007-EA

Bureau of Land Management
Spokane District
Wenatchee Field Office

April 2013

Table of Contents

1. Introduction.....	2
1.1. Proposed Action Summary.....	2
1.2. Background and Project Location	2
1.3. Purpose and Need	3
1.4. Land Use Plan Conformance Review.....	3
1.5. Applicable Laws, Regulations, and Policies	3
1.6. Summary of Public Involvement and Scoping Activities	4
1.7. Issues Identified.....	4
1.8. Issues Eliminated from Further Analysis	4
2. Alternatives.....	5
2.1. The No Action Alternative	5
2.2. The Proposed Action Alternative	5
2.3. Alternatives Considered but Not Analyzed in Detail	6
3. Affected Environment and Environmental Effects.....	6
3.1. Area of Critical Environmental Concern.....	6
3.2. Vegetation Resources	7
3.3. Wildlife Resources	8
3.4. Cultural Resources, Native American Values, and Paleontological Resources.....	9
3.5. Recreation.....	11
3.6. Visual Resources	12
3.7. Soils	13
4. Consultation and Coordination	14
5. List of Preparers.....	14
References Cited	15
Appendix A: Project Area Map	16
Appendix B: Plans and Specifications for Ballasted Logs	17
Appendix C: Planting Plan.....	28
Appendix D: Sensitive Plants and Effects Determination	32
Appendix E: Impact Analysis for Wildlife Species of Greatest Conservation Concern	36

1. Introduction

In 2004, the Bureau of Land Management (BLM) identified shoreline erosion as an issue in the southeasterly area of Lopez Island in Watmough Bay, San Juan County, Washington. As a response to this issue, the BLM implemented stabilization measures on the shoreline. These measures included the installation of earth filled jute fiber mats and the anchoring of existing cedar logs to reduce erosion and protect sensitive resources at the south end of the beach. Subsequent winter storms and further erosion at the south end of the beach damaged these initial stabilization measures. In 2007, the BLM implemented repairs of the stabilization measures to control loss and degradation of the beach margins and sensitive resources at the site. Severe winter storm events continue to remove beach gravels and sediments along the previously stabilized area. In addition, portions of the northern extent of the beach have started to erode, impacting sensitive resources at the northern beach margin.

1.1. Proposed Action Summary

The BLM is proposing to stabilize portions of the Watmough Bay shoreline with ballasted logs and plantings. Concrete benchmarks will also be installed to facilitate the monitoring of shoreline erosion at the site.

1.2. Background and Project Location

Watmough Bay is located about 9 miles south of Lopez Village, along Watmough Head Road, in the southeasterly area of Lopez Island, within San Juan County. The property is legally described as a portion of Lot 2, Section 21, Township 34 North, Range 1 West, Willamette Meridian (see map, appendix B). The public lands at Watmough Bay are administered by the BLM's Spokane District, Wenatchee Field Office as an Area of Critical Environmental Concern (ACEC) to preserve its natural values. The Federal Land Policy and Management Act of 1976 defines ACECs as "areas within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards" (USDOI BLM 2001).

Watmough Bay came under BLM administration after a series of Land and Water Conservation Fund acquisitions were completed between 1992 and 1999. The BLM acquired the area addressed in this environmental assessment from Stuart and Isle Oles in 1994.

In keeping with the direction to manage acquired lands on Lopez Island as prescribed in the *Final Planning Analysis, Environmental Assessment and Proposal Decision Record for the Proposed Iceberg Point and Point Colville Areas of Critical Environmental Concern, June 1990*, management of the Watmough Bay area has been generally limited to monitoring use, recreational activities, and maintaining the area as an ACEC.

The Watmough Bay ACEC, is one of a few areas on Lopez Island where visitors can access a public beach and walking trails. As a result, the site receives approximately 15,000 visitors a year, including boaters, seasonal visitors, and permanent residents (USDOI BLM 2006).

Additionally, on March 25, 2013, the President proclaimed the San Juan Islands a National

Monument, with a goal of protecting the unique cultural and biological resources on the islands. The proclamation provides that, “protection of these lands in the San Juan Islands will maintain their historical and cultural significance and enhance their unique and varied natural and scientific resources, for the benefit of all Americans”. Prehistoric and historic cultural resources, diverse habitats, and a plethora of wildlife species are present and formed a foundation for the proclamation.

1.3. Purpose and Need

Need: As described above, over the past few years Watmough Bay has experienced significant shoreline erosion events caused by winter storm surges. These events and continued erosion have and will continue to damage and cause loss of cultural and other sensitive resources. The National Historic Preservation Act, and E.O. 11593 provide for protection of cultural resources from natural and human caused deterioration ensuring cultural resources are safe guarded from improper use and maintained for the public interest.

Purpose: To prevent further damage to, and loss of cultural and other sensitive resources from shoreline erosion at Watmough Bay.

1.4. Land Use Plan Conformance Review

There is no land use plan that applies to BLM lands in this area. In accordance with land use planning regulations (43 CFR 1610.8 (b) (1)), when an action is proposed on public lands not covered by an existing land use plan, an environmental assessment, or environmental impact statement if necessary, plus any other data and analysis necessary to make an informed decision will be used to assess the impacts of the proposal and to provide a basis for a decision on the proposal. Designation of an ACEC is a land use plan decision. So, although not a full land use plan, the proposed action complies with the management direction for Lopez Island as set forth in the *Spokane BLM District Final Planning Analysis, Environmental Assessment and Proposed Decision Record for the Proposed Iceberg Point and Point Colville Areas of Critical Environmental Concern*, which became the final decision in June 1990.

1.5. Applicable Laws, Regulations, and Policies

This Environmental Assessment is consistent with and considers the following laws, regulations and policies:

- The National Environmental Policy Act (NEPA) of 1969 as amended (42 U.S. C 4321 et seq.)
- The Federal Land Policy and Management Act of 1976 (43 U.S.C. 1739)
- The Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.)
- BLM 6840 Manual on Special Status Species
- Migratory Bird Treaty Act of 1918, 16 U.S.C. 703-712, 50 C.F.R. 1
- Bald and Golden Eagle Protection Act of 1972, 16 U.S.C. 668

Laws, regulations, and policies protecting cultural resources on public lands:

State

- Revised Code of Washington (RCW) 27-44, 27-53

Federal

- 36 Code of Federal Regulation (CFR) 800

- National Historic Preservation Act (NHPA) (1966), as amended
- Archaeological Resource Protection Act (1979)
- Native American Graves Protection and Repatriation Act (1990)
- American Indian Religious Freedom Act
- Executive order 13007
- Executive Order 11593
- National Environmental Policy Act (NEPA)

Federal laws protecting paleontological resources:

- Paleontological Preservation Act 2009

1.6. Summary of Public Involvement / Scoping Activities

In May 2011 the BLM notified approximately 180 entities representing federal, local and state agencies, non-profit organizations, private companies, and individual stakeholders, of the project via U.S. Mail. Each entity on the mailing list received a scoping information package notifying them of the proposed project. The scoping information package was also posted to the BLM Spokane District website. The scoping information package provided preliminary information on the proposed action, purpose and need for the action, as well as issues identified to date. The public was given approximately one month to respond with comments. The only comments received were requests to review the final plans when available.

1.7. Issues Identified

The following issues or factors have been identified by the project Interdisciplinary Team (ID Team), a team of resource specialists, for further analysis or consideration in the EA.

Cultural Resources

- Would construction and placement of stabilization measures affect cultural resources or Native American interests?

Recreation

- Would the proposed project change recreation patterns of use in the Watmough Bay area?
- Would the proposed project enhance the overall recreational experience in the area?

Visual Resources

- Would post construction activities contrast with the natural surroundings?
- Would post construction activities detract from the overall visual experience for visitors to the area?

Wildlife

- Would impacts to vegetative resources affect wildlife habitat suitability, abundance or distribution within the analysis area?
- Would noise disturbance associated with construction affect locally sensitive species?

1.8. Issues Eliminated from Further Analysis

The following list of issues and concerns were identified by the ID Team but have been eliminated from further consideration for the reasons listed below:

Hazardous Materials

There are no hazardous materials as part of this action.

Climate Change

The Council on Environmental Quality (CEQ) has determined it is important to consider climate change when an analysis of the direct and indirect effect of Green House Gasses (GHG) emissions from proposed actions “may provide meaningful information to decision makers and the public”. The CEQ established, “meaningful information” as carbon emissions from a proposed action emitting over 25,000 metric tons be considered for analysis (Sutley 2010). By comparison “the average American generates [only] 20 tons of carbon dioxide (CO₂) every year, about the same amount as three new cars” (Union of Concerned Scientists 2006).

Overall emissions from the Proposed Action would be negligible compared to these standards.

2. Description of the Alternatives

2.1. Alternative 1 – No Action Alternative

Under this alternative no actions would be taken to stabilize the shoreline at Watmough Bay.

2.2. Alternative 2 - Proposed Action Alternative

The proposed action alternative is to implement beach stabilization measures including a combination of engineered hard and soft barriers on and along the northern beach margin.

The hard barriers would consist of two ballasted logs approximately 30 feet long with a minimum diameter of 30 inches. The ballasted logs would be placed adjacent to and on the seaward side of the drift logs currently located along the beach edge. The ballasted logs would be restrained from movement by four imported boulders, 3’-4’ in diameter. The imported boulders would be unfractured, very angular, and nearly indistinguishable from the existing onsite boulders. The logs would be chained together and chained to the boulders with the chain and attachments located below grade such that the chain and attachments would not be visible. The duration of the work to install the hard barriers is expected to be 2-3 days, but even if unexpected scheduling or construction issues are encountered, the total duration of the work will not exceed 5 days. During this timeframe one or more pieces of heavy equipment, such as a backhoe, excavator, or rough terrain forklift, would be operating on the beach to move and position the hard barriers. While operating, the heavy equipment may generate noise levels of up 85 dB in the immediate vicinity of the operating equipment. All excavation work would be performed by hand and would be monitored by a BLM archeologist.

Soft barriers would include planting of a variety of native vegetation species to increase sediment stability and reduce erosion. Fill material would be brought onto the site to facilitate the establishment of the soft barriers. The duration of the work to install the soft barriers is expected to be less than one day. All excavation work would be performed by hand and would be monitored by a BLM archeologist.

The southern beach stabilization area would be repaired by raking rounded beach gravels over the exposed geo-fabrics to prevent further degradation from sun exposure and recreation until long-term stabilization measures can be designed for this portion of the beach. (Long-term

stabilization measures at the southern end of the beach are not included in this Proposed Action. However, if the proposed stabilization measures at the north end of the beach are successful, similar measures may be considered for implementation at the southern beach margin.) The duration of the work to repair the southern beach stabilization area is expected to be less than one hour.

The Proposed Action also includes the installation of a couple of small concrete monuments. These monuments would be used to periodically monitor and track changes at the northwestern end of the upper beach. The fixed monuments would allow hand measurements to be made from consistent locations to provide basic and repeatable data to assess erosion and accretion trends. The duration of the work to install the monuments is expected to be 2 days. During this timeframe a small truck or similar vehicle would be operating on the beach to transport concrete to the monument locations.

2.3. Alternatives Considered but not Analyzed in Detail

The BLM considered a stabilization alternative similar to the methods used to stabilize the south end of the beach in 2004, which included the installation of earth filled jute fiber mats and the anchoring of existing logs. However, because the 2004 stabilization measures were damaged by subsequent winter storms, those measures were determined to be insufficient to adequately protect the site against winter storm surges. Hence, this alternative would not accomplish the purpose and need, and the BLM eliminated it from detailed analysis.

3. Affected Environment and Environmental Effects

3.1. Area of Critical Environmental Concern, ACEC

3.1.1. Affected Environment

Watmough Bay has been designated an ACEC. Under this designation management of Watmough Bay ACEC emphasizes preservation of the natural values of this site. These values are discussed in the vegetation, wildlife, and visual resources sections. Opportunities for visitor use are provided to the extent they are compatible with the preservation of the natural values. If a choice must be made between preservation of the natural values and allowing visitor use, preservation of the natural values is the primary consideration.

Also, a recent designation of the San Juan Islands as a National Monument, specifically for cultural and biological resources, further highlights the importance of the values described above.

3.1.2. Direct and Indirect Effects from No Action Alternative

The No Action Alternative is expected to have no impact to the ACEC.

3.1.3. Direct and Indirect Effects from Proposed Action Alternative

The design features of the proposed action include natural logs, boulders, and plantings, which are consistent with the ACEC designation of this site. Design features that are not natural, which include chains, attachments, and concrete ballast will not be visible because they would be located below grade. Therefore, the Proposed Action Alternative is expected to have no impact

to the ACEC.

3.2. Vegetation

3.2.1. Affected Environment

Management of Bureau Sensitive species shall follow the Special Status/Sensitive Species policy as identified in BLM Manual 6840 (BLM 2008). This manual directs the BLM to manage special status plants that are listed in the Interagency Special Status/Sensitive Species Plant list (BLM 2011). In addition, the Spokane District also considers the Washington Natural Heritage Program (WNHP) list of sensitive plant species for management decisions. No known special status plants occur in the Watmough Bay beach area. A list of sensitive plants considered for analysis can be found in Appendix D.

Vegetation in the project area consists of dry maritime species such as Nootka rose (*Rosa nootkana*), salmonberry (*Rubus spectabilis*), tall grasses, curly dock (*Rumex crispus*), buffaloberry (*Shepherdia canadensis*) and snowberry (*Symphoricarpos albus*) which are adjacent to the beach. Bull thistle (*Cirsium vulgare*) also occurs in isolated patches behind the beach. Beach habitat includes a series of large logs that have drifted in during winter storms and the gravel/sand beach.

3.2.2. Direct and Indirect Effects from No Action Alternative

Erosion of the beach is expected to continue under the No Action Alternative. This ongoing erosion will result in a reduction of vegetation along the beach margins and a corresponding increase in the area of the beach habitat.

There would be no known effects to special status plants, as none are known to occur in the project area or nearby.

3.2.3. Direct and Indirect Effects from Proposed Action Alternative

The design features of the Proposed Action, including natural logs, boulders, and plantings, are expected to stabilize the shoreline and reduce shoreline erosion. This would have long-term effects of preventing vegetation beyond the beach from being eroded. Additionally, it would increase the amount of the Project Area covered by native vegetation. Equipment used to complete the Proposed Action would use the existing access road to reach the area. Depending upon the height of the equipment, some pruning of overhead vegetation along the road may be needed. This would be a short-term impact to the vegetation, and would not result in mortality of any trees.

Therefore, the Proposed Action Alternative is expected to have a positive protective effect on the plant communities at the site. There would be no known effects to special status plants, as none are known to occur in the project area or nearby. Additionally, the Proposed Action Alternative would not detract from the values that the San Juan National Monument was proclaimed for.

3.2.4. Cumulative Effects

The cumulative effects of the Proposed Action on vegetation includes consideration of the past, present and reasonably foreseeable future actions in the Analysis Area. Past stabilization actions have been described above and present actions include only the Proposed Action. Future actions

could be performed by land managers within the Analysis Area including the BLM, San Juan County Land Bank and San Juan Preservation Trust. At this time, no additional projects are planned for the analysis area.

Current use of the Project Area by recreational visitors includes some minor impacts from occasional trampling of vegetation or introduction of weed propagules behind the beach area. As vegetation recovers and noxious weeds are treated by BLM staff and volunteers, these effects are not considered to be significant in the long term.

3.3. Wildlife

3.3.1. Affected Environment

Watmough Bay is a protected cove tucked between Chadwick Hill and Watmough Head in the southeast portion of Lopez Island. Due to the presence of both terrestrial and marine environments, the area provides habitat for a diverse array of species. For example, waterfowl forage in the calm waters of the bay, peregrine falcons nest and hunt from the steep rocky outcrops of Chadwick Hill, bald eagles utilize the large Douglas fir trees to perch on, and scores of migratory birds nest and forage in the surrounding forests and shrub land.

Given the limited duration (≤ 5 days) and localized scope (site specific action) of the proposed action, the Analysis Area considered for potential effects to wildlife species was defined as a 1 mile buffer from the center of the action area. This area includes the site of the proposed action as well as portions of the terrestrial and marine environments that fall within that extent. This area encompasses approximately 2,010 acres.

An impact analysis for wildlife was conducted for those species that warrant conservation concern as identified by state (WDFW) and/or federal agency (USFWS, BLM, NMFS, NOAA) designations. While many other species that do not have such a designation occur in the area, the effects described are applicable to species utilizing similar habitat. The species included in that analysis was broadly compiled for San Juan County from Washington Department of Fish and Wildlife county lists for Priority Habitats and Species (WDFW 2008), United States Fish and Wildlife Service County list (USFWS 2010), and OR/WA BLM special status species list (BLM 2011). The BLM eliminated no species from consideration if it occurred on those lists. However, the BLM found through further detailed analysis that not all of the species initially included are documented, suspected or otherwise thought to potentially occur in the analysis area. Results of the impact analysis can be found in *Appendix E-Impact Analysis for Species of Greatest Conservation Concern, Watmough Bay*.

3.3.2. Direct and Indirect Effects from No Action Alternative

Under the no action alternative, construction activities would not take place. Therefore, noise disturbance associated with the operation of heavy equipment will not occur to temporarily displace some species for up to 5 days. Erosion of the beach may continue to occur, but this portion is not currently vegetated so no changes to habitat are expected. No impacts to the wildlife values for which the monument was designated were identified from the no action alternative.

3.3.3. Direct and Indirect Effects from Proposed Action Alternative

The impact analysis found in Appendix E was utilized to assess the potential impacts from the proposed action on individual species. Despite the diverse array of species that utilize portions of Watmough Bay to meet various seasonal and/or life cycle requirements, the potential effects to wildlife from the proposed action (see section 2.1) are largely the same. Noise disturbance from construction is the primary impact expected to occur from implementation of the proposed action. This disturbance would be expected to occur for 2-5 days depending on the implementation schedule.

While limited in duration, the noise disturbance associated with construction activities has the potential to disturb and displace wildlife that may be present during construction. This disturbance is unlikely to affect nest or brood success because this project is being proposed for late fall implementation, outside the typical breeding season for most species in the area. The foraging behavior of waterfowl and other birds utilizing the area will likely be altered during construction. Because suitable foraging habitat can be found directly adjacent to the analysis area, this temporary displacement from the area is not expected to be a limiting factor for meeting daily caloric requirements.

Overall, only short-term impacts from noise disturbance were identified during the impact analysis. Based on the short duration of the project and localized scope of the disturbance, none of the impacts expected to occur in association with the proposed project are expected to impact the wildlife values for which the monument was designated or be of significant context or intensity to warrant further analysis

3.3.4. Cumulative Effects

The cumulative effects of the Proposed Action on wildlife includes consideration of the past, present and reasonably foreseeable future actions in the Analysis Area. Past stabilization actions have been described above and present actions include only the Proposed Action. Future actions could be performed by land managers within the Analysis Area including the BLM, San Juan County Land Bank and San Juan Preservation Trust. At this time, no additional projects are planned for the analysis area. Because the direct and indirect effects of the proposed project would not have a negative effect on wildlife, no effects to wildlife are predicted as cumulative effects of this action.

3.4. Cultural Resources, Native American Values, and Paleontological Resources

3.4.1. Affected Environment

The project area is within the traditional homelands of the Central Coast Salish, which includes tribes associated with the Northern Strait language group. Regional histories note these tribes shared similar subsistence patterns characterized by a reliance on fish, game, and edible plants and roots. Village locations would have provided access for resource gathering including fishing and hunting. Salmon, halibut and sturgeon were among the fish predominantly harvested in the region. A variety of sea mammals, waterfowl, and various land mammals were hunted, and roots, berries, bulbs and shell fish were gathered throughout the Central Coast Salish territory. Many traditional fishing stations and hunting and gathering areas continue to be utilized by Native Americans in the region.

Prior to acquisition of the federal parcel at Watmough Bay, a parking area and road was constructed to provide access to the beach and an early twentieth century dwelling located between the beach and wetlands at the Bay. The dwelling was burned and removed from the property prior to acquisition by BLM. The parking area and road were modified and dozed and a metal gate was installed to control vehicle access to the beach by subsequent land owners.

Archival records, Washington Department of Archaeological and Historic Preservation (DAHP) and BLM site databases, and cultural resource inventories of the project area were reviewed. Archaeological site 45SJ280, a property eligible for the National Register of Historic Places, is located partially within the area of potential effect (APE) for the project.

In addition to years of recreational activities, construction of a parking area, access road, and an early 20th century domestic habitation prior to BLM acquisition of the property altered much of the project area. Intensive storm action continues to erode portions of the archaeological site.

Geological and archival records were reviewed for the project area. Scientifically important paleontological resources are not known to occur in the project area.

3.4.2. Direct and Indirect Effects from No Action Alternative

Erosion of the beach is expected to continue under the No Action Alternative. Ongoing erosion will have a negative effect on sensitive cultural resources at the site. Culturally and scientifically important archaeological remains would continue to be impacted by high energy storm events that erode sediments and cultural materials from the site. Adverse impacts to the important cultural resources values for which the monument was designated would be expected from the No Action Alternative.

3.4.3. Direct and Indirect Effects from Proposed Action Alternative

The design features of the Proposed Action, including placement of natural logs, boulders, fill, and plantings, are expected to reduce shoreline erosion and stabilize site conditions thereby protecting important cultural resource values. Additional design features including project monitoring are expected to avoid negative effects from the proposed action. The Proposed Action Alternative is not expected to have adverse impacts to cultural resource values for which the monument was designated.

3.4.4. Cumulative Effects

In consideration of past, present and future actions, no cumulative impacts were identified. Although recreational activity in the project area is expected to increase at Watmough Bay, and the potential for future impacts from winter storms is expected to continue, measures to control erosion and stabilize the beach is expected slow loss of important cultural resources. Future actions could be performed by the BLM, San Juan County Land Bank, or San Juan Preservation Trust, but no additional actions that would deter from the important natural and cultural values of the area are planned for the analysis area at this time.

Past management actions including stabilization of the southern beach and cut bank margins in 2004 and trail construction in 2010 reduced impacts to sensitive resources from both natural and

recreational uses of the area. The proposed alternative is expected to protect sensitive resources by reducing shoreline erosion on the northern portion of the beach and promote stabilization of the vegetation and sediments behind the beach. Because the direct and indirect effects of the proposed project would not have a long- term negative effect on cultural resources, no effects to the important cultural resource values are predicted as cumulative effects of this action.

3.5. Recreation

3.5.1. Affected Environment

Visitor use of Watmough Bay ACEC site is popular and has been recorded as the most heavily used BLM area on Lopez Island. Approximately 15,000 people visit the Watmough Bay ACEC site annually (USDOI BLM 2006). Lopez Island is a ferry served island and visitors are able to drive their vehicles on a San Juan County paved road up to the Watmough Bay access road and trailhead. The majority of the visitors are local residents, regional visitors and boaters. Once visitors arrive to the Watmough Bay trailhead or Watmough Bay the facilities at the site include one vault toilet, one wooden bike rack, one kiosk, a small gravel parking area and access road, an accessible trail, a hiking trail and assorted signage.

The high use season is from May 15 to about September 15. Visitor use occurs throughout the year and consists of kayak launching, picnicking, water play, traditional rock climbing, hiking, boat mooring, wildlife viewing and other beach activities. The site is managed as day use only. Watmough Bay with its picturesque sandy and graveled beach, Chadwick Hill monolith, Rosario Strait, short accessible trail and view of Mt. Baker in the distance make this area a primary destination for many recreationalists.

3.5.2. Direct and Indirect Effects from No Action Alternative

The No Action Alternative is expected to have no effects to recreation. The natural process of beach erosion will not affect recreation in this area due to the nominal elevation change between the access trails and beach area. Natural erosion processes in this area will not affect access to the site for visitors.

3.5.3. Direct and Indirect Effects from Proposed Action Alternative

Construction activities would temporarily disturb the recreating public present at the time of construction. Due to the relative short duration of onsite construction of 2-3 days this effect will be minimal. The recreation site would still be open to the public for visitation with designated areas temporarily closed during construction and placement. The design features of the proposed action include natural logs, boulders, and plantings. These design features would appear to be naturally occurring. Design features that are not natural, which include chains, attachments, and concrete ballast, will be located below grade, so they will not be visible and they will not present a hazard to the visiting public. All items which are not natural to the site will be placed in a manner to minimize their appearance and visibility and would not affect the visitor's experience of a natural setting. Therefore the Proposed Action Alternative is expected to have no long- term effect on the recreational experience of the visiting public.

3.5.4. Cumulative Effects

The cumulative effects of the Proposed Action on recreation resources includes consideration of

the past, present and reasonably foreseeable future actions in the Analysis Area. Past actions are incorporated in the recreational baseline (described above), and present actions include only the Proposed Action. Future actions could be performed by land managers within the Analysis Area including the BLM, San Juan County Land Bank and San Juan Preservation Trust. At this time, no additional projects are planned for the analysis area. Because the direct and indirect effects of the proposed project would not have a long-term negative effect on the overall recreational experience, no effects to the recreation portion of the Human Environment are predicted as cumulative effects of this action.

3.6. Visual

3.6.1. Affected Environment

The analysis area has not yet been determined to have a visual resource management (VRM) objective. A visual resource inventory (VRI) was recently completed in which scenic quality rating units and key observation points were used to assign the analysis area to inventory class II. A class II VRM objective would be to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. New projects can be approved if they blend in with the existing surroundings and do not attract attention (i.e., small scale picnic area or primitive campground in valley shielded from view that blends with natural appearance).

As part of the VRI, scenic quality rating units were established. As part of the overall scenic quality rating for Watmough Bay, the sensitivity of the area rated as high, given that the area is a destination site and highly valued by visitors for viewing and experiencing the unique primitive natural setting. The final scenic quality rating for Watmough Bay was determined to be “A” considering the following high scoring attributes: landform, vegetation, water, color, adjacent scenery, and scarcity.

The trailhead and access road are comprised of a wide variety of green vegetation, including Douglas-firs, cedars, alders, ocean spray and others. The trailhead parking lot and access road surface areas range from dark grays to lighter grays which fluctuate depending on the amount of rainfall, shade and moisture retention. Overall the trailhead, access road, beach, and existing facilities appear primitive. The encroaching trees, tight canopy, and lack of homes present a secluded setting.

3.6.2. Direct and Indirect Effects from No Action Alternative

The No Action Alternative is expected to have no effects to visual resources. The natural beach erosion process will not detract from the overall natural appearing setting.

3.6.3. Direct and Indirect Effects from Proposed Action Alternative

The proposed action would not change the existing color dynamics of the primitive secluded setting in the long term but may have short-term effects during implementation, prior to revegetation. The short-term effects prior to revegetation would be color changes to the immediate surroundings of the disturbed area changing from green leafy vegetation colors to

earthy brown soil colors. This short-term effect would last for less than 30 days. Color schemes and native plant selection for the revegetation would blend with the natural surroundings and not detract from the natural character of the area. Therefore, the Proposed Action Alternative is expected to have no long-term effect on visual resources.

3.6.4. Cumulative Effects

The cumulative effects of the Proposed Action on visual resources includes consideration of the past, present and reasonably foreseeable future actions in the Analysis Area. Past actions are incorporated in the visual resource baseline (described above), and present actions include only the Proposed Action. Future actions could be performed by land managers within the Analysis Area including the BLM, San Juan County Land Bank and San Juan Preservation Trust. At this time, no additional projects are planned for the analysis area. Because the direct and indirect effects of the proposed project would be temporary, approximately 2-3 days, and the short-term effect would be less than 30 days for revegetation there would be no significant negative long-term effect on the overall visual experience or setting. No effects to the visual portion of the Human Environment are predicted as cumulative effects of this action.

3.7. Soils

3.7.1. Affected Environment

The beach sand and gravel soils in the project area are classified by the Natural Resources Conservation Service as 1014 – Beaches-Endoaquents, tidal-Xerorthents association. These soils are subject to erosion from ocean currents and the tides. However, the configuration of Watmough Bay shelters the project area from ocean currents and no soil erosion has been associated with the rise and fall of normal tides. Substantial erosion of the soils in the project area has occurred in the past during severe winter storm events. The storm surges that occur during winter storms, especially storms with winds from the northeast, undermines the stability of the soils and frequently results in extensive erosion of the soils in the project area.

3.7.2. Direct and Indirect Effects from No Action Alternative

The No Action Alternative results in continued erosion from storm surges during severe winter storm events.

3.7.3. Direct and Indirect Effects from Proposed Action Alternative

The design features of the Proposed Action including ballasted logs, boulders and plantings, are expected to protect the soils in the project area from the erosive forces of storm surges during severe winter storm events. Therefore, the Proposed Action Alternative is expected to have a positive protective effect on soils at the site.

3.7.4. Cumulative Effects

The cumulative effects of the Proposed Action on soils includes consideration of the past, present and reasonably foreseeable future actions in the Analysis Area. Past actions include the previous stabilization measures implemented at the southern beach stabilization area. Present actions include only the Proposed Action. If the Proposed Action stabilization measures at the north end of the beach are successful, similar measures may be considered for implementation at the southern beach margin. At this time, no additional projects are planned for the analysis area.

Because the direct and indirect effects of the proposed project would not have a negative effect on soils in the project area, no effects to soils are predicted as cumulative effects of this action.

4. Consultation and Coordination

A copy of this environmental assessment was sent to the Washington Department of Ecology, SEPA Unit, P.O. Box 47703, Olympia, WA 98504-7703. San Juan County commissioners were notified of the availability of the environmental assessment.

Other parties coordinated with on the proposed project include San Juan County and the San Juan County Land Bank.

Consultation regarding the project was initiated in June 2011 and again in March 2012 with the Department of Archaeology and Historic Preservation (DAHP), the Lummi Nation, the Samish Nation, and the Swinomish Indian Tribal Community. The DAHP concurred in April 2012 with a determination of No Adverse Effect to cultural resources.

5. List of Preparers:

BLM - Spokane District

Richard Bailey, District Archaeologist

Alex Kwan, Engineer

Elizabeth Earp, Physical Scientist

Chris Carlton, Planning and Environmental Coordinator

Nick Teague, Outdoor Recreation Planner

Molly Boyter, Botanist

J.A. Vacca, Wildlife Biologist

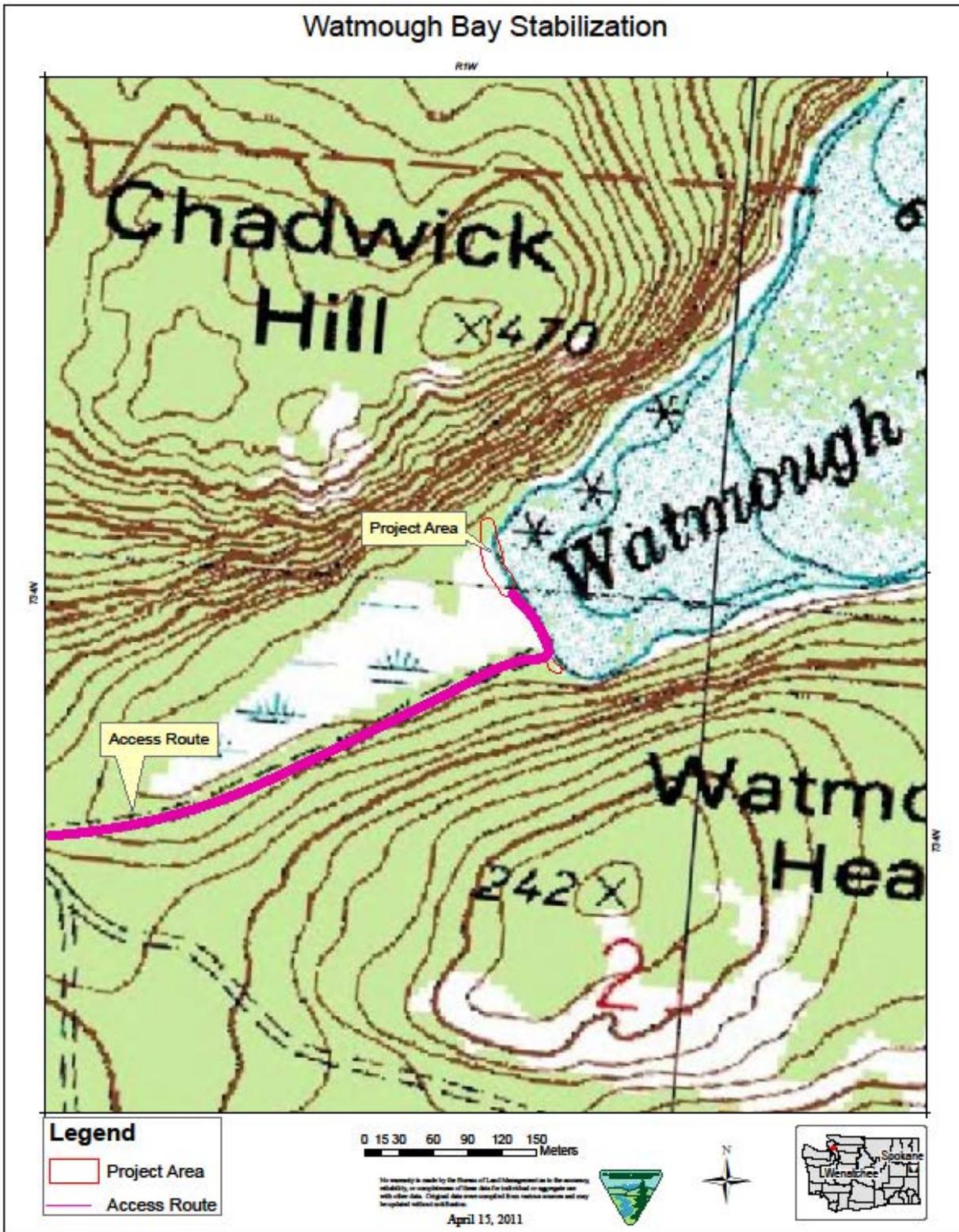
Anjolene Price, Environmental Planning Intern

References Cited

- Bureau of Land Management (BLM).1996. Watmough Bay recreation clearance and plant list. Internal Document. Wenatchee Field Office BLM.
- BLM. 2008. BLM Manual 6840, IM-2009-039.
- BLM. 2011. Oregon/Washington Bureau of Land Management State Director's Special Status Species (SSS) List. IM OR-2012-018. Retrieved from <http://www.fs.fed.us/r6/sfpnw/issssp/agency-policy/>
- Camp, P. and Gamon, J., editors. 2011. Field Guide to the Rare Plants of Washington, 1st ed. University of Washington Press. Seattle, WA.
- Hitchcock and Cronquist. 1973. Flora of the Pacific Northwest, p. 549.
- Washington Natural Heritage Information System (WNHP). 2012. List of Known Occurrences of Rare Plants in Washington, San Juan County. Retrieved from <http://www1.dnr.wa.gov/nhp/refdesk/plants.html>
- WNHP and GeoBOB rare plant GIS layers (proprietary GIS reference, located in BLM Wenatchee Field Office)
- Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 176 pp.
- Washington Native Plant Society. 2008. Vascular Plant List, Lopez Island. Retrieved from http://www.wnps.org/plant_lists/counties/san_juan/san_juan_county.html
- Union of Concerned Scientists. 2006. Greentips: What's Your Carbon Footprint? Retrieved from <http://www.ucsusa.org/publications/greentips/whats-your-carb.html>
- U.S. Department of the Interior. BLM. 2006. Recreation Management Information System (RMIS). Internal Document. Wenatchee Field Office BLM.
- U.S. Department of the Interior, Bureau of Land Management and Office of the Solicitor (editors). (2001) The Federal Land Policy and Management Act, as amended. U.S. Department of the Interior, Bureau of Land Management Office of Public Affairs, Washington, D.C. 69 pp.
- U.S. Fish and Wildlife Service. 2010. Listed and Proposed Endangered and Threatened Species and Critical Habitat; Candidate Species; and Species of Concern in San Juan County

Appendices

Appendix A: Project Area Map

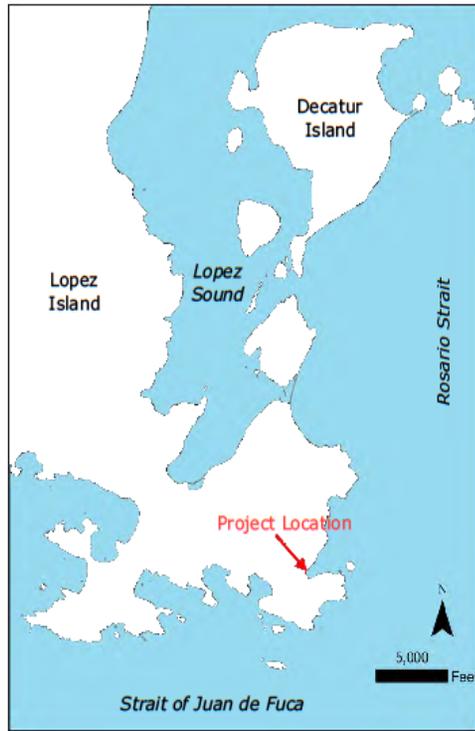


Appendix B: Plans and Specifications for Ballasted Logs



WATMOUGH BAY SHORELINE STABILIZATION

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
LOPEZ ISLAND - WASHINGTON



SHEET INDEX	
SHEET #	SHEET TITLE
1	COVER SHEET
2	SITE PLAN - EXISTING
3	SITE PLAN - PROPOSED
4	CROSS SECTIONS
5	DESIGN LOG PLAN VIEW
6	DETAILS

DIRECTIONS TO PROJECT SITE:
From Lopez Island Ferry, take Ferry Rd to Center Rd.
Slight right onto Mud Bay Rd.
Right onto Aleck Bay Rd.
Continue onto Watumough Head Road
until parking lot near trailhead and Chadwick Rd
Project on shoreline at east end of Trail



REV. NO.	DESCRIPTION	DATE	APPROVED
COVER SHEET - VICINITY MAP			
DRAWN BY: JAS. AOB			
CHECKED BY: JAS.			
APPROVED BY: JAS.			
DRAWN: AOB		SCALE: as noted	
DATE: November 7, 2011		SHEET: 1 OF 1	
DRAWING NO.			

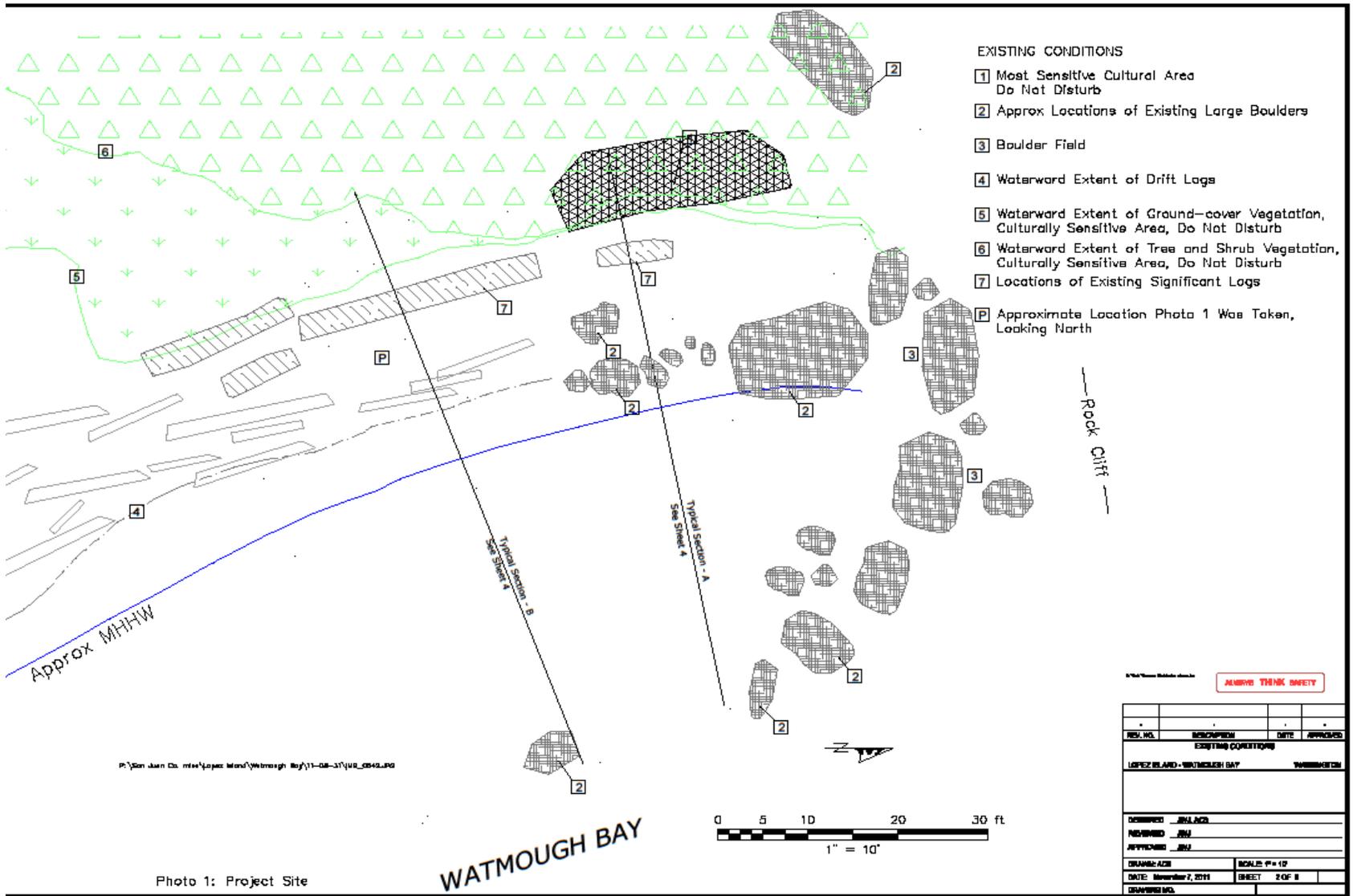
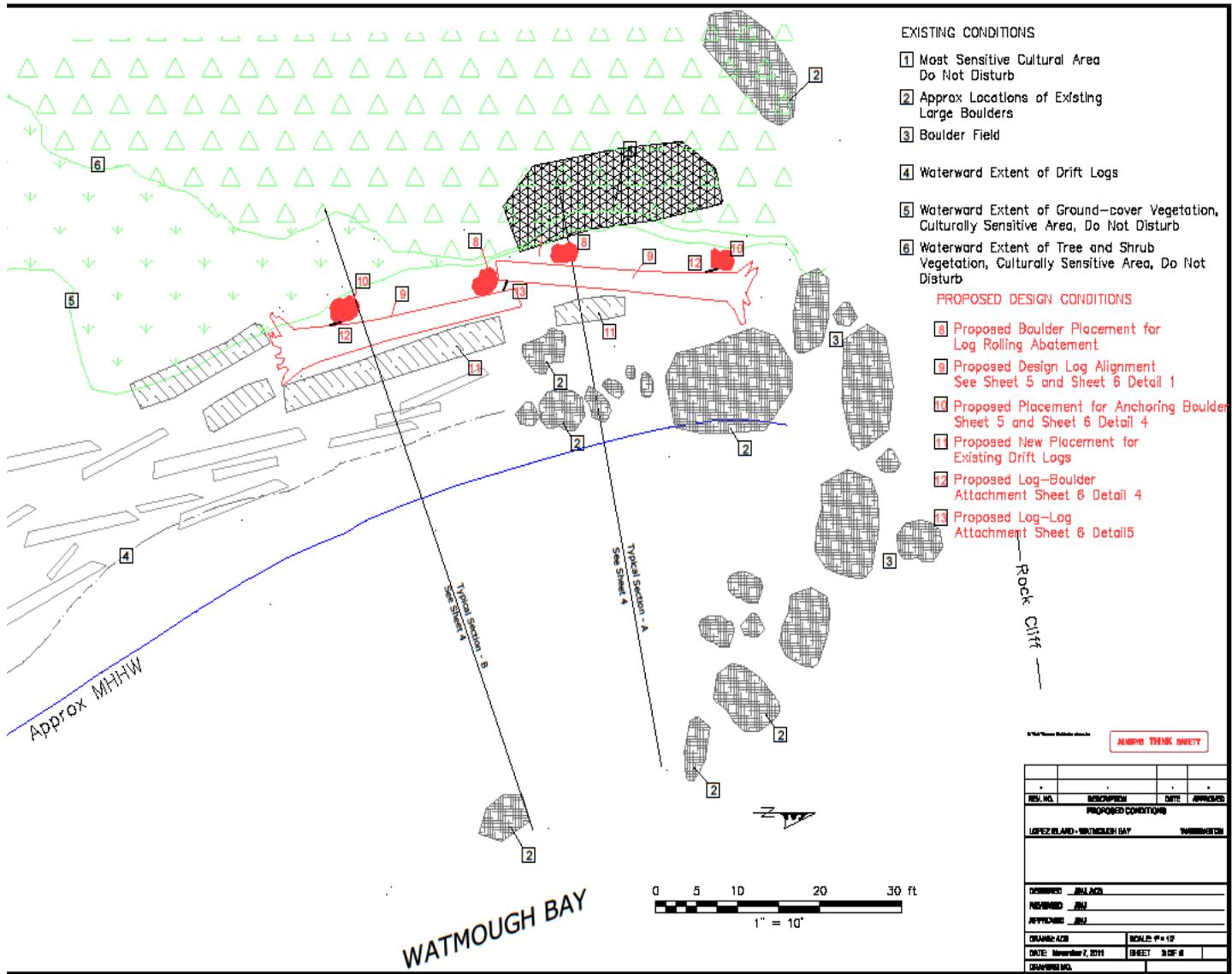


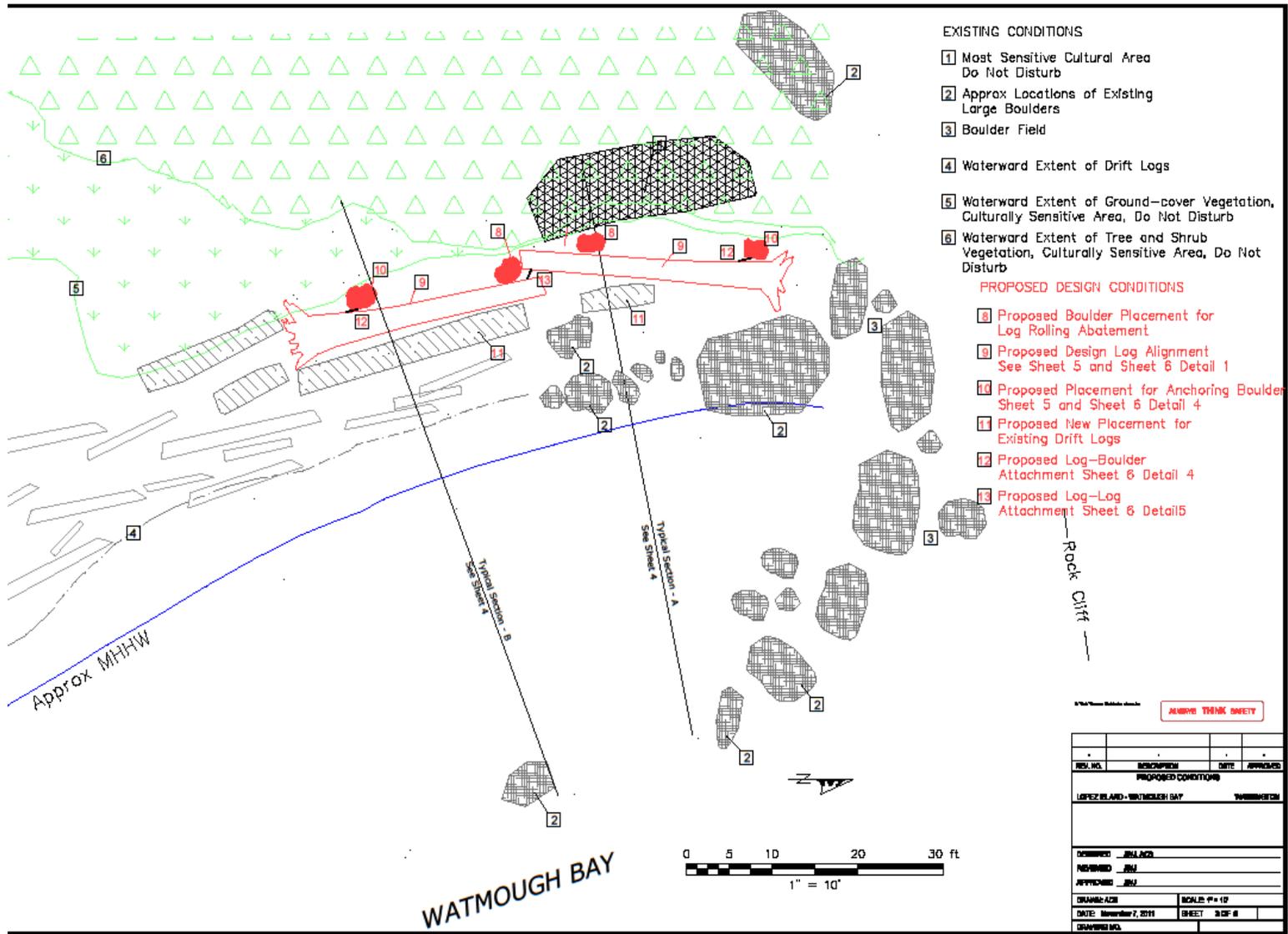
Photo 1: Project Site

WATMOUGH BAY

ALWAYS THINK SAFETY

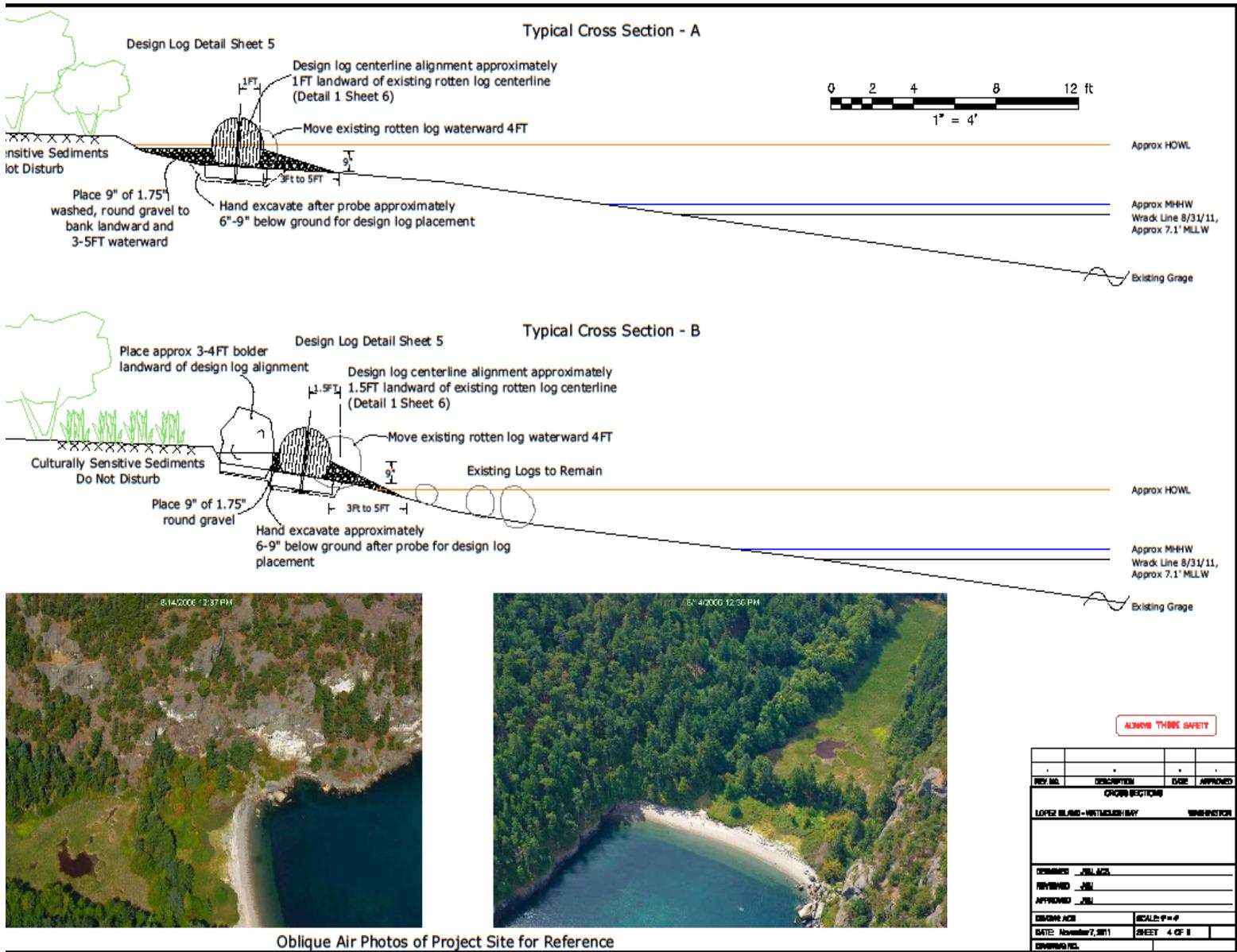
REV. NO.	DESCRIPTION	DATE	APPROVED
EXISTING CONDITIONS			
LOPEZ ISLAND - BRITISH BAY			THUNDERBOLT
DESIGNED	JLL/JCL		
REVISED	JLL		
APPROVED	JLL		
DRAWN/ASD		SCALE: 1" = 10'	
DATE: November 7, 2011		SHEET: 2 OF 2	
DRAWING NO.			



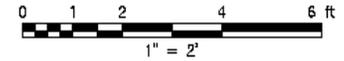
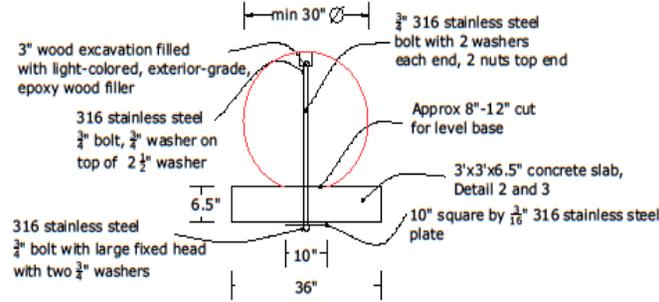


ALWAYS THINK SAFETY

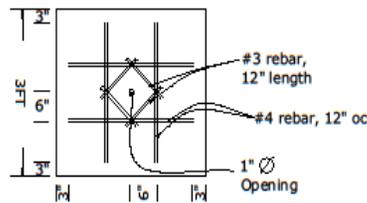
REV. NO.	DESCRIPTION	DATE	APPROVED
PROPOSED CONDITIONS			
LOPEZ ISLAND - WATMOUGH BAY			
DESIGNED: JBL/AGJ			
REVISION: JBL			
APPROVED: JBL			
DRAWN: AGJ		SCALE: P = 10'	
DATE: November 7, 2011		SHEET: 3 OF 8	
DRAWN BY: JBL			



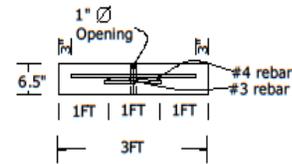
**Detail 1 - Log Design
Cross Section**



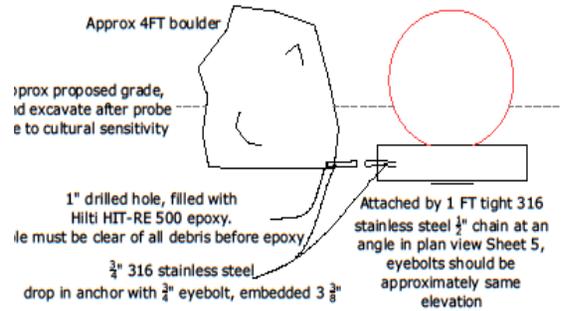
**Detail 2 - Concrete Anchoring Slab
Plan View**



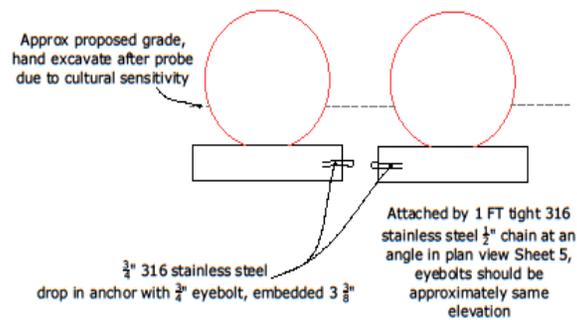
**Detail 3 - Concrete Anchoring Slab
Cross Section**



**Detail 4 - Log-Boulder
Attachment**



**Detail 5 - Log-Log
Attachment**



ALWAYS THINK SAFETY

REV. NO.	DESCRIPTION	DATE	APPROVED
PROPOSED DETAILS			
LOWER BLIND - WATKINSON BAY		WATERPROOFING	
DESIGNED	BY: JAC		
REVIEWED	BY: JAC		
APPROVED	BY: JAC		
TITLE: LOWER BLIND - WATKINSON BAY		SCALE: 1" = 2'	
DATE: December 16, 2011		SHEET: 8 OF 8	
DRAWING NO.:			

Draft Specifications

SHORELINE STABILIZATION, WATMOUGH BAY, LOPEZ ISLAND, WA

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes requirements for shoreline stabilization including: ballast log procurement, design and placement, select gravel import and placement, concrete anchor fabrication and fastening, and boulder import, placement and anchoring.

1.2 DEFINITIONS

- A. Culturally sensitive area: The portion of Watmough Bay that has historic and cultural significance which should not be disturbed.
- B. MHHW: Mean higher high water; The average of the higher high water height of each tidal day observed over the National Tidal Datum Epoch. For stations with shorter series, comparison of simultaneous observations with a control tide station is made in order to derive the equivalent datum of the National Tidal Datum Epoch.
- C. MLLW: Mean lower low water; The average of the lower low water height of each tidal day observed over the National Tidal Datum Epoch. For stations with shorter series, comparison of simultaneous observations with a control tide station is made in order to derive the equivalent datum of the National Tidal Datum Epoch.
- D. HOWL: Highest observed water level; The highest observed water level at a water level (tidal) station during the period of record. Period of record for the Friday Harbor gauge over more than 30 years.
- E. Wrack line: Line of natural marine detritus and detached seaweeds, eelgrass and other material, typically deposited on the upper beach during high water levels.
- F. Vegetation line: Waterward extent of upland or backshore vegetation above a beach.
- G. Log line: Waterward extent of natural drift logs on a beach, typically more than 1-2 feet vertically above MHHW at moderate energy beaches in the northern Puget Sound region.
- H. Boulder: Large, angular rocks located on the beach or in adjacent areas, technically boulder indicates diameter greater than 10.1 in (25.6 cm), although most boulders on site are greater than 3 feet in diameter.

1.3 SUBMITTALS

- A. Site Plan: Show barge staging and access.
- B. Spill Prevention Plan: Actions that will be taken to prevent the release of fuels, oils, and other fluids.
- C. Erosion and Sedimentation Control Plan: Actions and measures that will be taken to ensure control of erosion and sedimentation.
- D. Samples for Verification: For each type of the following:
 - 1. 1.75" washed gravel: 1-quart (1-L) volume of gravel; in sealed plastic bags labeled with composition of materials by percentage of weight and source of gravel.
 - 2. Douglas Fir: source and photos of each Douglas Fir log to be used in project along with dimensions (length, and minimum diameter at each end)
 - 3. Boulder: source, dimensions, angularity, and color of boulders for design log anchoring and log rolling abatement.
 - 4. 316 (marine grade) stainless steel chain: 1 foot of chain with source and manufacturer's specifications.
 - 5. 316 (marine grade) stainless steel shaft, eyebolt and washer: 1 of each with source and manufacturer's specifications.
 - 6. 316 (marine grade) stainless steel drop-in anchor
 - 7. Concrete mix design: Specifications of concrete mix design with a minimum of 3,000 PSI design strength.
 - 8. Wood filler exterior grade epoxy: Type, color and manufacture's specifications.
- E. Material Testing results: Concrete shall be tested for compressive strength in accordance with ASTM C 39.

1.4 QUALITY ASSURANCE

- A. Pre-installation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to, but not limited to, the following:
 - a. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
 - b. Identify culturally sensitive areas and associated requirements
 - c. Archeologist's responsibilities.
 - d. Project Engineer's responsibilities.
 - e. Field quality control.
- B. Cultural resources: Archeologist must be present to monitor culturally sensitive deposits during construction

1.5 REGULATORY REQUIREMENTS

- A. Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including following:
 - 1. Health and safety regulations.
 - 2. Police, fire department, and rescue squad rules.
 - 3. Environmental protection regulations.
 - 4. Prevention and control of air pollution.
 - 5. Prevention and control of water pollution.

1.6 PROJECT CONDITIONS

- A. The following practices are prohibited within culturally sensitive areas:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic unless otherwise indicated.
 - 4. Excavation or other digging, unless otherwise indicated.
 - 5. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Prohibit heat sources, flames, ignition sources, and smoking within or near culturally sensitive areas.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Douglas fir: Two sound and free of rot, 30LF and 2.5FT minimum DBH (diameter at breast height). Log ends that appear natural are preferred over a straight saw cut. One end shall include a root-wad and the other end shall have at least a partially shattered, natural appearing break, such as one would expect from a wind blow event (a portion of the log end may be saw cut, with irregular, roughened faces). The logs shall have 1" drill holes (straight through log) to accommodate shaft for concrete slab anchor attachment. Drill holes should be very close to parallel to allow for consistent anchor placement and attachment.
- B. Concrete slab: 3FTx3FTx6.5IN with 1" diameter hole through the center using formed concrete with reinforcement bar with at least 3IN of concrete cover on all sides of bar. Minimum concrete mix design requirements of 3,000 PSI.
- C. Reinforcement bar: four #4 and four #3 rebar with ties per each concrete slab.

- D. Gravel: 1.75 IN diameter, washed, rounded gravel, typically termed “drain rock”, to be comprised of sound clasts and with a large majority unfractured clasts. Gravel shall be inspected for durability and weeds prior to installation.
- E. Boulder: 3.0 - 4.0 FT or slightly larger sound, unfractured, very angular boulders. The new imported boulders shall be nearly indistinguishable from the existing onsite boulders (angular, dark gray-brown).
- F. Chain: 316 stainless steel 1/2 IN diameter
- G. Shackles: 316 stainless steel shackles 1/2 IN diameter to accommodate attachment of 1/2 IN diameter chain to eyebolt.
- H. Bolts: 316 stainless steel bolts, 3/4 IN diameter, length as needed to secure concrete to logs as well as log-log and log-boulder attachments. Bolt length shall accommodate log and concrete slab height as well as fasteners with fixed head for lower end and threads at top. Bolt length may vary throughout design log due to varying log diameter.
- I. Washers: 316 stainless steel three 3/4 IN and one 2 IN washers for each log-concrete attachment.
- J. Nuts: 3/4 IN 316 stainless steel. Two for each concrete-log attachment on top of each long bolt, countersunk into log.
- K. Anchors: 3/4 IN 316 stainless steel drop-in anchor with 3-3/8 IN embedded distance installed per manufacturers specifications into some of the concrete anchors and boulders as indicated. Installed based on manufacturer's specifications. Before anchor is placed, the drilled hole must be clear of all debris.
- L. Drilled Anchoring Boulder: 1.0 IN diameter drilled hole to accommodate 3/4 IN 316 stainless steel drop-in anchor with 3 3/8 IN embedded distance with 1/8 IN clearance on each side of anchor for epoxy.
- M. Eyebolts: 3/4 IN 316 stainless steel eyebolt to use in drop-in anchors for log-log and log-boulder attachments.
- N. Hilti HIT-RE 500 epoxy: use to manufacturer's specification. Before epoxy is used, the drilled hole must be clear of all debris and dry.
- O. Wood epoxy: light-colored to match Douglas fir, exterior-grade, epoxy wood filler.
- P. Rebar tie wire: 16 gauge annealed wire

PART 3 – EXECUTION

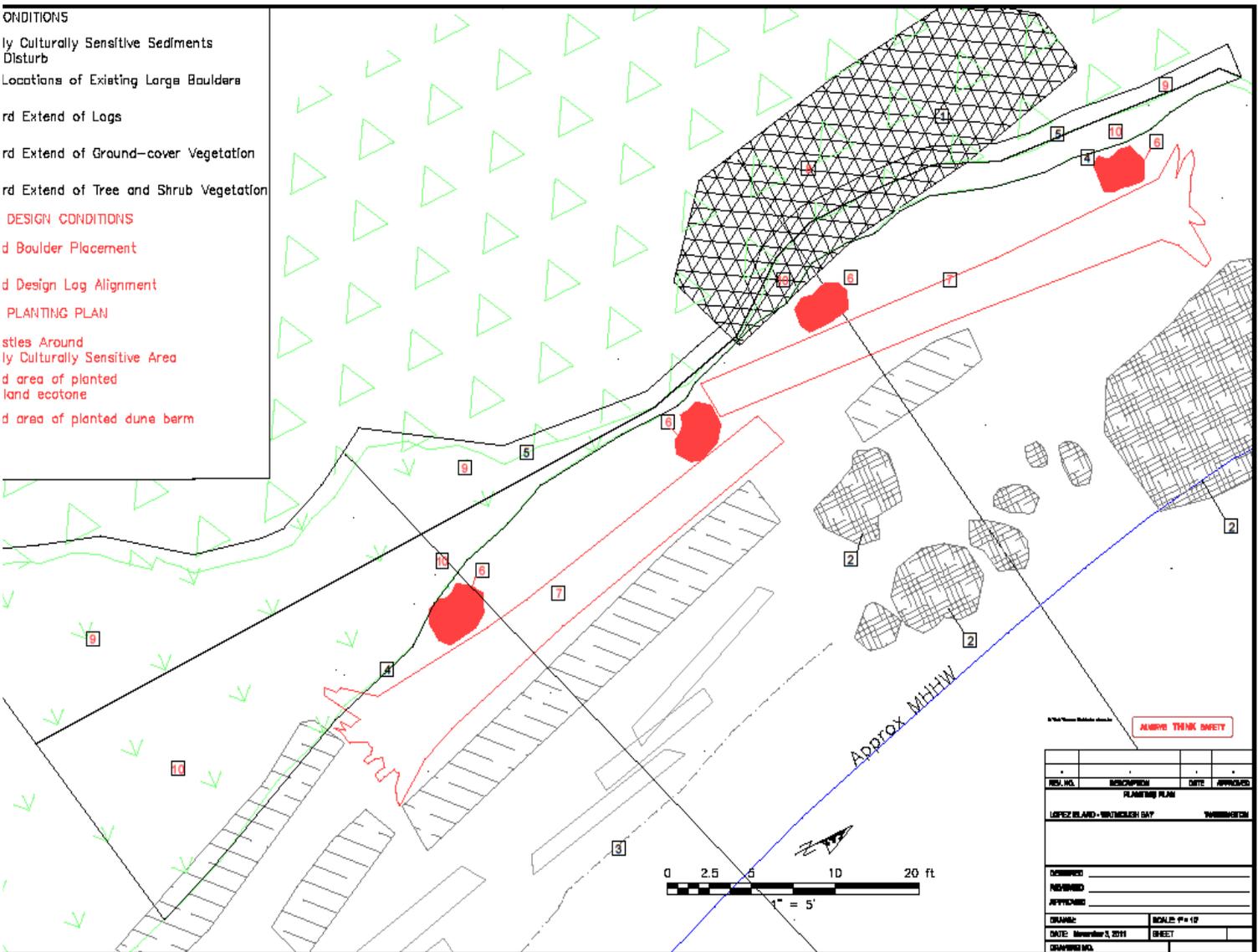
3.1 PREPARATION

- A. Locate and clearly identify culturally sensitive areas. Work at the site must be limited to the existing access road and beach.
- B. Locate and clearly identify design log alignment and anchoring boulder placement.
- C. Locate existing large boulders on lower beach and shallow subtidal for barge navigational purposes.

3.2 CONSTRUCTION

- A. Move existing logs within design alignment approximately 4FT waterward without damaging logs significantly.
- B. Place anchoring and rolling abatement boulders as noted on the drawing set.
- C. Hand excavate 6-9IN below ground of design log alignment and for boulder placement. Cultural deposits are present in the sediments below the beach gravel so the depth may need to be limited. Probing may be necessary to identify the depth of beach gravels at the locations the logs are to be placed. Archeologist should oversee this work.
- D. Place ballasted logs with cut level base along alignment with secured concrete anchors. Base of log should only be cut between 8IN and 12IN for level base as to not lose too much height from design logs. Placement of design log should be in alignment with existing grade and therefore slope slightly down waterward.
- E. Secure ballasted logs to the each other and to anchoring boulders.
- F. Place gravel 9IN deep behind ballasted logs landward and tapering from 9IN deep to grade 3FT to 5FT waterward.

6.3 Appendix C: Planting Plan



Watmough Bay Shoreline Stabilization Project Vegetation Plan – Final

Prepared for: Otak

Prepared by: Andrea MacLennan, MS,



Introduction

A vegetation enhancement plan was created to supplement the shoreline stabilization project at the Watmough Bay Bureau of Land Management property, on a pocket beach located on the southeast shore of Lopez Island. The recommended shoreline stabilization design entails ballasted log, boulder and (washed) gravel placement. The gravel would be placed landward and waterward of the design log and sloped waterward to the existing grade. An assemblage of native dune vegetation that are valued as natural erosion control, are recommended for planting atop and landward (but not waterward) of the gravel, which will transition to more upland, less salt-tolerant vegetation species.

All live plant species recommended below in this plan, can be purchased from Fourth Corner Nursery in Whatcom County or Sound Native Plants in Olympia, Washington. Seed (mixes) can be purchased from Sunmark Seeds.

Planting Plan

The project area extends across 300 feet of low bank waterfront. All work associated with the vegetation plan and shoreline stabilization project are limited to the area above MHHW (+7.5 MLLW). To reduce impact to soils, most planting can be conducted using seed mixes compiled from Sunmark Seeds (contact person Robin Cook 1-888-214-7333). Sunmark has provided cost estimates for creating seed mixes that include that appropriate seeds volumes and species mix for each planting zone, as included in the vegetation list shown in Table 1. Some species are not available as seed and must be planted as live plants (such as bare root). Care could be taken to minimize impact to soils by using bare root and very small planting plugs in areas that are outside of the most culturally sensitive areas. Seed should be used exclusively in the most culturally sensitive areas.

Prior to seeding the planting areas, the soil should be amended with a biotic soil amendment. Two bags of Permatatrix, which can also be sourced through Sunmark Seeds, could be used to amend the soils throughout the 3 planting zones. A nurse crop such as wheat grass or pokon barley could then be planted to stimulate microbial activity which will aid in the germination and root development of the seed. Seed mixes can then be distributed across the various planting zones.

American dunegrass (*Elymus mollis*) seed should be distributed waterward of all other vegetation as it can endure complete inundation and the root strength will augment the stability of the constructed berm. Dunegrass can also be purchased as bare root, and is relatively low in cost. Bare root dunegrass could be planted in the most waterward planting areas that are less culturally sensitive, as these areas are likely more vulnerable to wave induced erosion, which the dunegrass can help mitigate. Bare root dunegrass should be planted under 1-2 inches of sand and watered

occasionally in the first few dry months. It can also be planted from seed in the more culturally sensitive areas of the site. Pacific gumweed (*Grindelia integrifolia*) can also be planted from seed and could be included in a seed mix. The seed mix should be planted landward of the dunegrass seed. The same emergent seed mix could be used in both planting zones 8 and 10. Dunegrass can out-compete other species, so care should be taken to assure that the dunegrass does not dominate the planting area.

Table 1. Species, quantities and spacing of recommended vegetation for Watmough Bay property.

Zone	Type	Source	Quantity live plant	Common Name	Latin Name	Spacing
8	Midden	Live Start	8	American dunegrass	<i>Elymus mollis</i>	N/A
		Seed	Emergent seed mix	Yarrow	<i>Achillea millefolium</i>	
				Douglas aster	<i>Aster subspicatus</i>	
				Pacific gumweed	<i>Grindelia integrifolia</i>	
9	Trees	Live start	1	Hooker's willow	<i>Salix hookeriana</i>	8-12' apart on center
	Shrubs	Seed	N/A	Nootka rose	<i>Rosa nutkana</i>	N/A
				Common snowberry	<i>Symphoricarpos albus</i>	
				Oceanspray	<i>Holodiscus discolor</i>	
				Tall Oregon-grape	<i>Mahonia aquifolium</i>	
	Emergents, herbs, ground cover	Seed	N/A	Douglas aster	<i>Aster subspicatus</i>	N/A
				Yarrow	<i>Achillea millefolium</i>	
				Salal	<i>Gaultheria shallon</i>	
		Live Start	8	Sword Fern	<i>Polystichum munitum</i>	3-5' on center
			12	Pacific silverweed	<i>Potentilla anserina</i>	
8			Trailing Blackberry	<i>Rubus ursinus</i>		
10	Trees – landward extent only	Live start	1	Hooker's willow	<i>Salix hookeriana</i>	8-12' apart on center
	Shrubs - landward extent only	Seed	N/A	Oceanspray	<i>Holodiscus discolor</i>	N/A
	Emergents, herbs	Live start	5	Silver bursage	<i>Ambrosia chamissonis</i>	3-5' on center
		Seed	Emergent seed mix	American dunegrass	<i>Elymus mollis</i>	N/A
				Douglas aster	<i>Aster subspicatus</i>	
				Pacific gumweed	<i>Grindelia integrifolia</i>	
Yarrow	<i>Achillea millefolium</i>					

Landward of the top the berm in planting zone 10, Douglas aster (*Aster subspicatus*), dunegrass (*Elymus mollis*), Pacific gumweed (*Grindelia integrifolia*) and Yarrow (*Achillea millefolium*) should be planted using seed. Heath/Silver bursage (*Ambrosia chamissonis* v. *bipennatasecta*) is not available as seed therefore live plant starts should be used. Few shrubs and trees will be planted in this planting zone due to the proximity to the shoreline, however 2 Oceanspray shrubs and a single Willow (*Salix hookeriana*), should be seeded at the landward extent of the area. The Willow should be planted as a live plant as is not available as seed. Using bare root starts can reduce the impact to soils as they are considerably smaller than containers.

The most landward zone of the vegetation planting area (zone 9) consists of a more diverse suite of vegetation types including: trees, shrubs, emergents and ground cover vegetation. Trees consist of Hooker's Willow (*Salix hookeriana*); which is known to tolerate marine shoreline conditions, but again, is not available as seed and must be planted as a live plant. The recommended shrub species (Table 1) are also known to tolerate marine shoreline conditions and provide benefits to various near shore species. Each of the selected shrub species are available in seed and can be included in a seed mix for the Zone 9 planting area. The herbaceous/ground cover species included are representative of the dune-marine riparian ecotone and should be planted in the order presented in the table, from the most waterward extent of zone 3 moving landward. For example, Douglas aster (*Aster subpicatus*), Yarrow (*Achillea millefolium*) and Pacific silverweed (*Potentilla anserine ssp. pacifica*) should be planted waterward of Sword fern (*Polystichum munitum*), Trailing blackberry (*Rubus ursinus*) (Trailing blackberry) and Salal (*Gaultheria shallon*). Trailing blackberry is not available as seed and can be removed from the planting list if plants available as seed only are preferred. Sword fern and Pacific silverweed are also not available as seed and must be planted as live plants. Please refer to Table 1 for information regarding quantities and plant spacing guidelines, seed availability, as well as Sheet 1 for additional graphical representation of the planting plan.

General Guidance for Implementation

- It would be ideal if implementation of the vegetation plan was conducted in the fall, which would increase the chance of survival and reduce the frequency that irrigation is required. The ideal time for installing native tree and shrub plant stock is the late fall or early spring.
- Straw bales could be used as temporary barriers to preserve loose soil and prevent unnecessary turbidity/contact with surface water.
- Gravel should be inspected for weeds prior to placement.
- *Elymus mollis* seed should not be included as a seed mix, should be seeded separately and/or planted as bare root where possible, to avoid out-competing other vegetation.

Maintenance Plan

The revegetation should be monitored and maintained for a minimum of two years following installation. This service could easily be conducted by the original contractor hired to conduct planting. Maintenance of the site should include:

- Weeding of non-native/invasive species
- Irrigation should be conducted throughout the first year following installation with the following frequency: 1/week during summer, 2/month during wet season
- Removal/replacement of dead/dying plants
- Apply hot pepper wax spray to reduce deer foraging.

6.4 Appendix D: Sensitive Plants and Effects Determination

San Juan Islands potential rare plants, compiled from <http://www1.dnr.wa.gov/nhp/refdesk/lists/plantsxco/san.html>

Scientific Name	Common Name	State Status	Federal Status	Habitat	Potential for effect/Rationale	Source
<i>Carex pauciflora</i>	few-flowered sedge	S		Wet acidic environments at low to middle elevations, including sphagnum bogs and acidic peat; usually on open mats, but also in partial shade, 75 to 1390 meters.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not a wet environment).	Camp, Gamon
<i>Castilleja levisecta</i>	golden paintbrush	E	LT	Open grasslands in the Puget Trough low-lands, generally on glacial outwash or depositional material, 3 to 90 meters. Does not tolerate a closed canopy.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not an open grassland).	Camp, Gamon
<i>Castilleja victoriaea</i>	Victoria's paintbrush	E		Coastal freshwater seeps and vernal pools on thin soil over bedrock.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (no seeps or pools)	Camp, Gamon
<i>Crassula connata</i>	erect pygmy-weed	T		In dry areas that may be seasonally moist, including chaparral and wet to moist vernal pools on coastal bluffs, 4 to 30 meters. Found coastally on seasonally wet cliffs, rock outcrops, and steep slopes.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not on cliffs or outcrops).	Camp, Gamon
<i>Eurybia merita</i>	Arctic aster	S		Open rocky places, rock crevices, alpine lithosols, and unstable talus slopes, mostly at high elevations in the mountains from 700 to 2300 meters.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not open rocky).	Camp, Gamon
<i>Isoetes nuttallii</i>	Nuttall's quillwort	S		Terrestrial in seasonally wet ground, seepages, temporary streams, and mud near vernal pools. Typically at low to middle elevations; documented elevations in WA are 60 to 105 meters.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not a wet environment).	Camp, Gamon

<i>Lepidium oxycarpum</i>	sharpfruited peppergrass	E		Coastal, found in the salt spray zone, growing in moist cracks and vernal pools on bedrock, in sandy or dark saline soil in full sun.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not coastal in spray zone).	Camp, Gamon
<i>Liparis loeselii</i>	twayblade	E		Springs, bogs, wetlands, and wet sunny places in Douglas fir forests.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not a wet environment).	Camp, Gamon
<i>Lobelia dortmanna</i>	water lobelia	T		Generally in shallow water at the margins of lakes and ponds, but it can grow at depths of 8-10 feet.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not a wet environment).	Camp, Gamon
<i>Meconella oregana</i>	white meconella	T	SC	Primarily in open grassland; sometimes within a mosaic of forest and grassland on gradual to almost 100% slopes. Habitats are wet to moist in spring, but dry by early summer.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not open grassland).	Camp, Gamon
<i>Microseris bigelovii</i>	coast microseris	X		Grasslands on old dunes, glacial deposits, in small crevices, and on rock, usually with very little soil, 2 to 3 meters above the high tide line.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not open grassland).	Camp, Gamon
<i>Ophioglossum pusillum</i>	Adder's-tongue	T		Seasonally wet areas in pastures, old fields, roadside ditches, bogs, fens, wet meadows, flood plains, moist woods, grassy swales, dry or damp sand, dry hillsides, and in seasonally wet, acidic soil.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not a wet environment).	Camp, Gamon
<i>Orthocarpus bracteosus</i>	rosy owl-clover	E		Extant sites in WA are all associated with moist meadows in the transition zone between wetland and upland; they are dominated by grasses and forbs, in full sunlight with little to no shrub or tree cover.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not a moist meadow transition zone).	Camp, Gamon

<i>Oxytropis campestris</i> <i>var. gracilis</i>	slender crazyweed	S		Prairies, alpine meadows, open woodlands, and gravelly flood plains in moist or dry soils. Also found in San Juan Co., in open grasslands and on steep, dry, south-facing rock outcrops with shallow soil and some herbaceous cover, often in the salt spray zone.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not an open grassland).	Camp, Gamon
<i>Packera macounii</i>	Siskiyou Mountain ragwort	S		Open woods and dry open places (<i>Hitchcock, Senecio macounii</i>)	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not open and dry).	Hitchcock
<i>Potamogeton obtusifolius</i>	blunt-leaved pondweed	S		Submerged on banks of lakes, sloughs, and slow-flowing streams in 1 to 4 meters of water.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not submerged).	Camp, Gamon
<i>Ranunculus californicus</i>	California buttercup	T		Coastal bluffs, open grasslands, rocky slopes along the shore, and rocky wooded areas. Usually in dry grassland areas, but also found in moister sites.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not coastal, open grassland, or rocky wooded area).	Camp, Gamon
<i>Sericocarpus rigidus</i>	white-top aster	S	SC	Relatively flat, open grasslands of lowlands, usually in gravelly, glacial outwash soils. Elevations in WA 10 to 170 meters. Habitats are seasonally mesic but dry during late summer.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not open grassland).	Camp, Gamon
<i>Symphyotrichum boreale</i>	rush aster	T		Lakesides, marshes, bogs, and fens, including calcareous bogs and fens, open peat land, and sedge-dominated open sphagnum bogs.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not a wet environment).	Camp, Gamon
<i>Utricularia minor</i>	lesser bladderwort	R1		Occurs in low nutrient lakes and peat bog pools in the lowland and montane zones at elevations from 40 to 1200 meters in WA.	No effect. No documented occurrences on Lopez Island. Habitat not suitable (not a wet environment).	2005 WNHP

2011 Field guide to the rare plants of Washington. Edited by Pamela Camp and John G. Gamon, 1st edition.

2006 Chappell <http://www1.dnr.wa.gov/nhp/refdesk/communities/index.html>

1973 Hitchcock & Cronquist Flora of the Pacific Northwest, pg. 549.

State Status of plant species is determined by the Washington Natural Heritage Program. Factors considered include abundance, occurrence patterns, vulnerability, threats, existing protection, and taxonomic distinctness. Values include:

E = Endangered. In danger of becoming extinct or extirpated from Washington.

T = Threatened. Likely to become Endangered in Washington.

S = Sensitive. Vulnerable or declining and could become Endangered or Threatened in the state.

X = Possibly extinct or Extirpated from Washington.

R1 = Review group 1. Of potential concern but needs more field work to assign another rank.

R2 = Review group 2. Of potential concern but with unresolved taxonomic questions.

Federal Status under the U.S. Endangered Species Act(USES A) as published in the Federal Register:

LE = Listed Endangered. In danger of extinction.

LT = Listed Threatened. Likely to become endangered.

PE = Proposed Endangered.

PT = Proposed Threatened.

C = Candidate species. Sufficient information exists to support listing as Endangered or Threatened.

SC = Species of Concern. An unofficial status, the species appears to be in jeopardy, but insufficient information to support listing.

6.5 Appendix E-Impact Analysis for Wildlife Species of Greatest Conservation Concern, Watmough Bay

<i>Brachyramphus marmoratus</i>	Marbled Murrelet	NPSE. Marbled Murrelets may be found in the marine waters surrounding Lopez Island, but they are not known to nest or roost on the island itself. The proposed activities within Watmough Bay would not be expected to significantly alter the behavior of foraging birds. Additionally, this project would not result in the loss of suitable habitat or the destruction or adverse modification of designated critical habitat. Project activities could not reasonably be expected to contribute to changes in the overall distribution, abundance or availability of suitable habitat for this species. Thus overall the effects determination for this species is no effect.
<i>Phoebastria albatrus</i>	Short-tailed Albatross	No effect. Extremely rare transient not known to breed in Washington State (WA).
<i>Fratercula cirrhata</i>	Tufted Puffin	NPSE. The only Tufted Puffin breeding colony in San Juan County occurs on Colville island, 1/2 mile south of Lopez Island. No nesting or breeding habitat would be lost or disturbed. Construction activities may disturb individuals. Project activities could not reasonably be expected to contribute to changes in the overall distribution, abundance or availability of suitable habitat for this species.
<i>Aechmophorus occidentalis</i>	Western grebe	NPSE. May disturb individuals foraging in the area. Locally common in the winter. Typically moves inland to freshwater lakes, ponds and reservoirs in eastern WA to breed.
<i>Haliaeetus leucocephalus</i>	Bald Eagle	NPSE. May disturb individuals. There is a bald eagle nest located a little over one mile northeast of the action area, but this activity will occur outside the breeding period.
<i>Aquila chrysaetos</i>	Golden Eagle	NPSE. May disturb individuals if present. Nearest documented nest is on San Juan Island.
<i>Falco peregrinus</i>	Peregrine Falcon	NPSE. Although peregrine falcons nest on the cliff above Watmough Bay, a design feature of the Proposed Action is that the construction of the project features would occur in October, which is after the nesting season for peregrine falcons. No suitable nesting habitat will be removed or altered during implementation.
<i>Coccyzus americanus</i>	Yellow-billed Cuckoo	No effect. Extirpated as a breeder in WA. Not expected to occur in project area.

<i>Chaetura vauxi</i>	Vaux's Swift	NPSE. Vaux's swift are associated with old-growth forests where they nest and roost in hollow chambers created by pileated woodpeckers. Because no trees or snags will be removed during construction, and it occurs outside the nesting period, this project is not expected to result in a single nest failure. Potential to disturb individuals, if present. However, this species often nests in residential chimneys and can tolerate moderate levels of disturbance. Project activities could not reasonably be expected to contribute to changes in the overall distribution, abundance or availability of suitable habitat for this species.
<i>Dryocopus pileatus</i>	Pileated Woodpecker	NPSE. Large snags and large decaying live trees in older forests are used by pileated woodpeckers for nesting and roosting throughout their range. Potential to disturb individuals, if present. However, this species often inhabits residential areas and can tolerate moderate levels of disturbance. No suitable nesting or roosting habitat would be removed.
<i>Pooecetes gramineus affinis</i>	Oregon Vesper Sparrow	NPSE. Subspecies is found in remnant prairie habitat which is not present in the project area.
<i>Progne subis</i>	Purple Martin	NPSE. This species often inhabits residential areas and can tolerate moderate levels of disturbance. Nests and roosts in cavities of large snags and large decaying live trees created by pileated woodpeckers or flickers. No suitable nesting or roosting habitat would be removed. Project activities could not reasonably be expected to contribute to changes in the overall distribution, abundance or availability of suitable habitat for this species.
<i>Contopus cooperi</i>	Olive-sided flycatcher	NPSE. Species is common in most forested areas of WA. No suitable nesting or roosting habitat would be removed. Potential to disturb individuals, if present. Project activities could not reasonably be expected to contribute to changes in the overall distribution, abundance or availability of suitable habitat for this species.
<i>Histrionicus histrionicus</i>	Harlequin Duck	NPSE. May disturb individuals if present. No nesting habitat is present in the analysis area. Generally a winter resident that moves inland to swift torrents and rapid streams to breed (May-June initiation).
<i>Accipiter gentilis</i>	Northern Goshawk	No effect. Outside range of known breeding areas.

<i>Haliotis kamtschatkana</i>	Pinto (Northern) Abalone	No effect. Predominantly found in kelp beds along outer, well-exposed coasts; typically low intertidal to 30 feet depth, but ranges to 100 m depth.
<i>Ostrea conchaphila</i> -	Olympia Oyster	No effect. Marine Mollusk found in intertidal to 10m.
<i>Oeneis nevadensis gigas</i>	Great Arctic	NPSE. Limited information on subspecies distribution. Often found on bare mountain summits such as Mt. Constitution on Orcas Island. Not expected to occur in the project area, thus Project activities could not reasonably be expected to contribute to changes in the overall distribution, abundance or availability of suitable habitat for this species.
<i>Euchloe ausonides insulanus</i>	Island Marble	No effect. This subspecies is typically found in meadow or prairie habitat. Based on extensive surveys in 2005, this subspecies appears to be limited to San Juan and Lopez Islands in WA. The population which occurs on Lopez Island is not within the project area and the subspecies is not expected due to the lack of suitable habitat.
<i>Copablepharon fuscum</i>	Sand-verbena Moth	NPSE. Neither the moth or it's host plant (<i>Abronia latifolia</i>) have been documented in the project area. The host plant is typically found among dry grasses in rocky outcrops so it is unlikely to occur in the project area.
<i>Speyeria zerene bremnerii</i>	Valley Silverspot	No effect. This species is not known or expected to occur in the project area. The only known host plant is the western blue violet, <i>Viola adunca</i> which has not been documented on Lopez Island.
<i>Euphydryas editha taylori</i>	Taylor's Checkerspot (formerly Whulge Checkerspot)	No Effect. Not expected to occur in the project area. Taylor's checkerspot butterfly potentially occurs in the following Washington counties: Clallam, Thurston, and Pierce.
<i>Corynorhinus townsendii</i>	Townsend's Big-eared Bat	NPSE. This species uses caves, mines, hollow trees, and built structures for roosting. No suitable habitat for roosting, such as trees will be removed for this project. Project activities could not reasonably be expected to contribute to changes in the overall distribution, abundance or availability of suitable habitat for this species.

<i>Myotis keenii</i>	Keen's Long-eared Bat (formerly Keen's Myotis)	No Effect. Unlikely to occur in project area. This species has one of the smallest distributional ranges of any North American bat and is only documented at a few sites in western Washington (Jefferson and Clallam County).
<i>Myotis evotis</i>	Long-eared bat	No effect. Not known or believed to occur in San Juan County.
<i>Myotis volans</i>	Long-legged Myotis	NPSE. No suitable habitat for roosting, such as trees will be removed for this project. Project activities could not reasonably be expected to contribute to changes in the overall distribution, abundance or availability of suitable habitat for this species.
<i>Microtus townsendii pugetii</i>	Shaw Island Vole	NPSE. Subspecies is typically found along forest edges and prairie/meadow habitats. While the species is present on the island, suitable habitat does not occur in the analysis area. Project activities could not reasonably be expected to contribute to changes in the overall distribution, abundance or availability of suitable habitat for this species.
<i>Enhydra lutris</i>	Northern Sea Otter	No effect. The species is quite rare in the archipelago with only a few incidental sightings of individuals documented. Since reintroductions began for this species in 1969, their core range has remained primarily on the Olympic Peninsula, west of Port Angeles and south to Destruction Island (WDFW 2004).
<i>Eschrichtius robustus</i>	Gray Whale	No effect. No gray whales have been documented within Watmough Bay. Construction activities will be completed on land.
<i>Orcinus orca</i>	Orca (Killer Whale)	No effect. Construction activities will be completed on land. .
<i>Phocoena phocoena</i>	Pacific Harbor Porpoise	No effect. Construction activities will be completed on land.
<i>Eumetopias jubatus</i>	Steller (Northern) Sea Lion	No effect. Construction activities will be completed on land.
<i>Contia tenuis</i>	Sharptail Snake	No effect. The only documented occurrence in the County is from Orcas Island. Species is not known to occur on Lopez Island. Surveys were conducted for this species within suitable habitat on Lopez Island in 2010.