



December 13, 2021

Dear Members of the Washington Legislature,

Thank you for providing funding in the 2021-2023 Capital Budget for the YMCA of Greater Seattle to collaborate with the Squaxin Island Tribe and the Washington Department of Natural Resources in creating a plan to preserve and enhance the YMCA's Camp Colman while DNR moves forward with the restoration of the Whiteman Cove saltwater estuary.

The Capital Budget provided (1) \$100,000 for DNR to contract with a third party facilitator for the purpose of collaborating with the YMCA on finding solutions for maintaining a high-quality camp experience while establishing a barrier-free passage for migrating fish species at Whiteman Cove, (2) \$500,000 for DNR to grant to the YMCA to retain expertise to scope, plan, and advance the future of the Camp Colman experience given the restoration of the Whiteman cove estuary and (3) \$300,000 for DNR to design the fish blockage removal and predesign enhancements for a new bridge and roadway across Whiteman Cove that are part of the fish blockage removal project and necessary as part of maintaining the route as access to the camp, taking into consideration the means to maintain continuous road access to Camp Colman for campers and camp staff without disruption, ensure the continuation, mitigation and innovation of Camp Colman's recreational, water safety, and environmental education programs in the saltwater estuary, and maintain the critical outdoor experiences for historically marginalized and underrepresented communities..

The Capital Budget further required that "the planning process should be inclusive of tribal input, with an open invitation for their participation, and must include department technical experts, participation from the departments of ecology and fish and wildlife, and any other resources needed. The plan should include a vision for how the cove can be returned to a fully functioning estuary, benefiting native flora and fauna, as well as serve as an environmental outdoor educational opportunity that will serve youth and families, especially those from historically marginalized and underrepresented communities, and include educational opportunities for youth and families to learn of native cultural heritage unique and specific to the natural and human history of the site. The plan must identify specific projects and estimated costs, given estuary restoration, for physical improvements for the camp, such as water access structures or swimming facilities, with recommendations for funding."

DNR, on behalf of the YMCA, was required to submit a report on these efforts to the fiscal committees of the Legislature by December 31, 2021.

To meet the deadline established by the legislature, this preliminary report and the underlying study have been undertaken without the benefit of the design of the fish blockage removal and predesign enhancements for a new bridge and roadway across Whiteman Cove being completed. Additional planning and costs may be required depending on the nature of these final designs and enhancements.

The YMCA has been working with DNR, the Squaxin Island Tribe, Herrera Environmental Consultants, and community volunteers to study the impacts of the Whiteman Cove restoration project on Camp Colman and to identify costs associated with adapting the camp property and programs. Attached is the Executive Summary report of the preliminary findings of Herrera Environmental Consultants.

This report confirms that the restoration project will have significant impacts on the campsite and programs, in particular the water-based experiences. The report describes the investments that will be required to protect the integrity of the slopes, to relocate buildings and structures that will be compromised by the changing water levels, and to adapt the programs in the newly restored environment. The report estimates the cost of

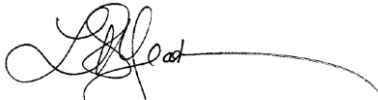
adapting the camp to be approximately \$15M. The Y plans to use the remaining funds from the 2021-2023 Capital Budget for additional studies and assessments necessary to fully understand the scope and needs of the project. (Reference Table 2 of Executive Summary).

This project has the potential to be a model for collaboration between parties in large-scale restoration projects. The YMCA's environmental education programs will be richer by the collaboration among DNR, the Squaxin Island Tribe, and the YMCA. This site will offer unique environmental education curricula that celebrates the history and culture of the original inhabitants of the land. Your investment in this project will yield results that are greater than the sum of their parts.

We thank you for helping us to participate in this important restoration project. With your continued support, we will ensure that generations of Washington youth continue to have opportunities to develop their fullest potential in spirit, mind, and body at Camp Colman.

For additional questions and information, please contact Gwen Ichinose-Bagley at gbagley@seattleyymca.org.

In Community,

A handwritten signature in black ink, appearing to read 'Loria B. Yeadon', with a long horizontal flourish extending to the right.

Loria B. Yeadon, President & CEO
YMCA of Greater Seattle

CC:

Alex Smith, Deputy Supervisor, Aquatic Resources, DNR

Kristen Swindoll, Assistant Division Manager, Aquatic Resources, DNR



**DEPARTMENT OF
NATURAL RESOURCES**

**OFFICE OF THE COMMISSIONER OF PUBLIC
LANDS**

1111 WASHINGTON ST SE MS
47001
OLYMPIA, WA 98504-7001

December 30th, 2021

The Honorable Bernard Dean
Chief Clerk of the House
338B Legislative Building
Olympia, WA 98504

The Honorable Brad Hendrickson
Secretary of the Senate
412 Legislative Building
Olympia, WA 98504

RE: Budget Proviso and Whiteman Cove Report on Progress

Dear Chief Clerk Dean and Secretary Hendrickson:

Please accept the enclosed report, submitted on behalf of Department of Natural Resources (DNR), as directed by the Legislature in the Sec. 3332 of the 2021-2023 Capital Budget (SHB 1080, Chapter 332, Laws of 2021). The capital budget provides an appropriation to DNR to grant funding to the YMCA of Greater Seattle (YMCA) and a requirement to submit a report to the legislature by December 31st, 2021 on how the funds have been spent. The report is attached.

The funds are for the YMCA to retain expertise to plan for the future of their Camp Colman on the Key Peninsula, given the expected physical changes resulting from the removal of the fish passage barrier on Whiteman Cove. Following the removal of the fish barrier, the cove will no longer function as a lagoon and instead will be a full functioning estuary, supporting fish habitat. This action to remove the fish barrier will also ensure DNR is brought into compliance with a federal court injunction related to tribal treaty rights.

The cove was created when a roadway berm closed the natural connection between the estuary and Case Inlet (on Puget Sound), over 50 years ago, creating a lagoon that the YMCA has used for boating and swimming activities for their campers. The YMCA camp facilities and educational programs will need to be adapted and redesigned when the barrier is removed. The budget proviso reads:

(2) \$500,000 is provided solely for the department to grant to the YMCA of greater Seattle to retain expertise to scope, plan, and advance the future of the Camp Colman experience given the restoration of the Whiteman cove estuary. The planning process should be inclusive of tribal input, with an open invitation for their participation, and must include department technical experts, participation from the departments of ecology and fish and wildlife, and any other resources needed. The plan should include a vision for how the cove can be returned to a fully functioning estuary, benefiting native flora and fauna, as well as serve as an environmental outdoor educational opportunity that will serve youth and families, especially those from historically marginalized and underrepresented communities, and include educational

opportunities for youth and families to learn of native cultural heritage unique and specific to the natural and human history of the site. The plan must identify specific projects and estimated costs, given estuary restoration, for physical improvements for the camp, such as water access structures or swimming facilities, with recommendations for funding. The department, on behalf of the YMCA, must submit the plan in a report to the fiscal committees of the legislature by December 31, 2021.

DNR entered into a contract with the YMCA for the fund transfer in July of 2021. The YMCA then contracted with a third party consultant to begin planning a new vision for how the estuary can work in tandem with a revised curriculum and environmental education opportunities. The report DNR is submitting today was developed by the YMCA and their consultants, and is an initial planning effort, with identification of the primary components of the YMCA's long term plan for Camp Colman. The YMCA spent \$95,000 of the \$500,000 appropriation to develop this plan and will spend the remaining resources in 2022-23 to complete their project proposal and preliminary design. DNR will continue to work with the YMCA in 2022-23 for continued planning and use of these funds to support that work. The YMCA report identifies additional funding needed to initiate their design work in 2022-23. Please see the attached report.

In the meantime, DNR has continued work on the design and permitting of the fish barrier removal work. The legislature appropriated \$300,000 to continue this work in 2021-23. After discussions this past summer and fall with the YMCA, DNR has concluded it is appropriate and necessary to also remove a second fish barrier located on the YMCA property that was installed by the Department of Fish and Wildlife in 1961. DNR also supports the request by the YMCA to regrade the road over the berm to function in conjunction with the road/bridge work proposed for state owned aquatic lands. As a result of these design changes, DNR is requesting an additional \$150,000 to complete the final design and permitting. Note that DNR received \$100,000 this biennium to facilitate meetings between DNR and the YMCA. \$80,000 of those funds will not be needed and we request they be re-appropriated to support the additional \$150,000 design work.

Finally, we wish to share that DNR will be requesting funds in 2023-25 for construction of the barrier removal, the new bridge and associated estuary restoration, at the same time the YMCA will be submitting their capital request for modifications to Camp Colman. We anticipate DNR will be requesting \$4.2M to \$5.0M, but that is an early estimate and subject to change as final design work and estimates are developed this winter. See table of estimates below.

5As noted in the attached report, the YMCA will be requesting \$7.7M to \$15.0M to implement the provisions of the attached report. Together, these funds will ensure the state removes the fish barrier and restores the lagoon to a fully functioning estuary, provides continued access to the YMCA camp via a new bridge with minimal disruption to the neighbors, and enables the YMCA to continue to provide important water safe recreational facilities for their campers and an outdoor educational experience that reflects the new changes in Whiteman Cove. For additional details on the YMCA's proposal, please see the attached executive summary and report.

Estimates for DNR construction for 2023-25

Item	2020 Estimate	Escalation to 2023 ¹	Escalation to 2024 ²
Excavate Channel and Place Material On Site	\$360,000	\$523,710	\$549,896
Roadway Improvements	\$140,000	\$203,665	\$213,848
Bridge Superstructure and Foundations	\$1,240,000	\$1,803,890	\$1,894,085
Tide Gate Demolition x2	\$100,000	\$145,475	\$152,749
Elevate Roadway 3 feet	\$126,600	\$184,171	\$193,380
Utility Relocation	\$100,000	\$145,475	\$152,749
Planting	\$20,000	\$29,095	\$30,550
<i>Subtotal</i>	\$2,086,600	\$3,035,481	\$3,187,255
<i>Mobilization (10%)</i>	\$208,660	\$303,548	\$318,726
Subtotal	\$2,295,260	\$3,339,029	\$3,505,981
Low (25% Contingency)	\$2,869,075	\$4,173,787	\$4,382,476
High (40% Contingency)	\$3,213,364	\$4,674,641	\$4,908,373

Notes:

- 1) Assumes 15% escalation for years 2021 and 2022, 10% escalation for year 2023
- 2) Assumes an additional 5% escalation for year 2024

Should you have any questions, please contact me at 360-486-3469 or Brian.Considine@dnr.wa.gov

Sincerely,



Brian Considine
 Legislative Director
 Office of the Commissioner of Public Lands

Enclosure: Legislative Report – Camp Colman Conceptual Development Plan, Longbranch, Washington; YMCA of Greater Seattle Letter to Washington Department of Natural Resources.

cc: Members of the House Capital Budget Committee
Members of the Senate Ways & Means Committee
Members of the House Appropriations Committee
Gwen Ichinose Bagley, Youth Development Officer; YMCA of Greater Seattle
Alex Smith, Deputy Supervisor of Forest Resilience & Aquatics
Ray Peters, Intergovernmental Tribal Liaison, Squaxin Island Tribe



December 17, 2021

Gwen Ichinose-Bagley
Meredith Cambre
YMCA of Greater Seattle
909 Fourth Avenue
Seattle, Washington 98104

Subject: Camp Colman Conceptual Development Plan, Longbranch, Washington

Dear Gwen Ichinose-Bagley and Meredith Cambre:

The Herrera team has evaluated a range of recommended actions for Camp Colman in response to the WDNR Restoration of Whiteman Cove. The recommended actions were identified based on our earlier assessment of risks to the Camp Colman property, meetings with YMCA staff, and the Needs Assessment provided by Kaleidoscope. Each opportunity was evaluated, described in concept, and includes additional supporting information relevant to your consideration and future planning for the Camp.

Sincerely,

Herrera Environmental Consultants, Inc.

Andrea MacLennan, MS
Senior Coastal Geomorphologist



Note:

Some pages in this document have been purposely skipped or blank pages inserted so that this document will print correctly when duplexed.



CAMP COLMAN CONCEPTUAL DEVELOPMENT PLAN

ASSOCIATED WITH THE RESTORATION OF WHITEMAN COVE, LONGBRANCH, WASHINGTON

**Prepared for
Gwen Ichinose-Bagley, Youth Development Officer
YMCA of Greater Seattle
909 Fourth Avenue
Seattle, Washington 98104**

**Prepared by
Herrera Environmental Consultants, Inc.
2200 Sixth Avenue, Suite 1100
Seattle, Washington 98121
Telephone: 206-441-9080**

December 17, 2021

CONTENTS

Executive Summary	ix
Introduction.....	1
Background	1
Current Camp Use.....	3
Summary of Risks Due to Whiteman Cove Restoration	3
Areas at Risk of Flooding	3
Areas at Risk of Erosion	3
Camp Colman Opportunities.....	4
Key Decision Points for YMCA	4
Criteria for Prioritizing Opportunities.....	6
Priority Actions.....	9
Relocate Cabins and Septic Pump Station at Risk from Bank Erosion.....	9
Modify Shoreline Access to Whiteman Cove	11
Remove Existing Boat House; Replace with Mobile Boat Storage	13
Develop a New Marine Education Center.....	14
Develop a Mobile Marine Center.....	14
Relocate Firepit, Stage, and Shed at Risk from Bluff Erosion	15
Develop and Implement a Physical and Ecological Monitoring Program.....	16
Rebuild Trail Along Whiteman Cove Shoreline	17
Develop and Implement Plans for Taylor Property – New Aquatics Center.....	17
Vegetation Management	18
Build Stewardship Program/Curriculum Focused on Restoration.....	19
Stormwater Management.....	19
Modify Existing Dock/Aquatics Program Center.....	20
Construct New Dock on Case Inlet.....	21
Permitting Review	22
Recommended Supporting Investigations.....	27
Stewardship Program Development Consultation.....	27
Geotechnical Assessment	27

Comprehensive Vegetation, Stormwater, and Trail Management Plan for Camp Colman.....	27
Taylor Property Pre-Design Study.....	28
Summary of Costs and Timelines.....	28
References.....	32

APPENDICES

Appendix A	Kaleidoscope Needs Assessment
Appendix B	Task 2 Risk Report

TABLES

Table ES-1.	Recommended Supporting Investigations and Cost Estimates.....	xii
Table ES-2.	Cost Estimates by Type of Action.....	xii
Table ES-3.	Costs and Types of Priority Actions Recommended for Camp Colman.	xiii
Table ES-4.	Cost Estimates and Timeline.	xiv
Table 1.	Permitting Needs Associated with Recommended Actions.....	23
Table 2.	Recommended Supporting Investigations and Cost Estimates.....	29
Table 3.	Cost Estimates by Type of Action.....	29
Table 4.	Costs and Types of Priority Actions Recommended for Camp Colman.	30
Table 5.	Cost Estimates and Timeline.	31

FIGURES

Figure ES-1.	Gangway, Decking, and Access Stairs Will Need to be Rebuilt to Accommodate Restored Water Level.	ix
Figure ES-2.	Existing Concrete Anchors Used to Secure the Lagoon Dock.....	x
Figure ES-3.	YMCA Camp Colman Prioritized Actions.....	xi
Figure 1.	Whiteman Cove, Camp Colman, and Camp Taylor Vicinity Map.....	2
Figure 2.	YMCA Camp Colman Prioritized Actions.....	7
Figure 3.	Location of Three Cabins and Onsite Sewage Pump Station Identified for Relocation During the Risk Assessment.....	10

Figure 4. Henderson and Rotary Cabins Near the Bluff Crest.....10

Figure 5. Gangway, Decking, and Access Stairs Will Need to be Rebuilt to Accommodate Restored Water Level.12

Figure 6. Example of Mobile Kayak Storage, Capable of Being Moved to Wherever the Boats will be Used.13

Figure 7. Examples of a Mobile Marine Lab Trailer (left) or Mobile Classroom Constructed from an Adapted Storage Container (right).15

Figure 8. Shed at the Firepit, Very Close to the Edge of an Undermined Bluff.15

Figure 9. Rills from Stormwater Flowing Down the Uplands to the Bluff Face.....20

Figure 10. Existing Concrete Anchors Used to Secure the Lagoon Dock.....21

EXECUTIVE SUMMARY

The Washington State Department of Natural Resources (WDNR) plans to conduct a large-scale restoration of the historical tidal channel that blocked tidal flow and fish passage between Case Inlet and Whiteman Cove. This restoration will enable the State of Washington to meet the needs of the 2013 federal court ruling *United States v Washington*, and the State of Washington's obligation under treaty agreements with 21 tribes to protect and preserve tribal fishing rights, including tide gate removal and restoration. WDFW installed tide gates and impounded the Whiteman Cove lagoon to develop a fish hatchery in the 1960s. The tide channel was filled, and tide gates were installed on the road resulting in a fish-passage barrier and conversion of the Whiteman Cove tidal embayment to a high-water saline lake. The YMCA of Greater Seattle's (GS YMCA) Camp Colman is located along the southwest shore of Whiteman Cove, which hosts an extensive aquatics program featuring swimming, small boat use, and general waterplay on the warm-lake-like waters of Whiteman Cove as a central feature of the Camp's identity and recreational amenities for the last several decades.

The GS YMCA contracted Herrera Environmental Consultants, Inc. (Herrera) to evaluate how the restoration will impact camp properties, and the scope, scale, and approximate cost of measures to mitigate these impacts and enhance related opportunities. Restored tidal flushing within Whiteman Cove will result in lower water levels within the Cove (lower than the static high-water level) approximately 80 percent of the time (Figure ES-1). The other 20 percent of the time, water levels within Whiteman Cove will be higher, with effects on surrounding infrastructure, access, and natural processes.



Figure ES-1. Gangway, Decking, and Access Stairs Will Need to be Rebuilt to Accommodate Restored Water Level.

Several actions that are presented and described in this report were developed based on current project understanding and available information, and as such they vary in the level of detail of the underlying assumptions and thus the degree of accuracy of the costs. Some of the opportunities are more specific and are based on a well-defined approach, while others are based on some high-level assumptions that need a significant amount of additional study.

Risks to Camp Colman associated with the restoration were broadly categorized as risks from either flooding or erosion resulting from the restored tidal flow in Whiteman Cove. These risks are described in detail in the Task 2 Risk Report, provided in Appendix B. The initial impacts to Whiteman Cove include inundation and potential erosion of the coastal path that extends along the southwest shore of Whiteman Cove, the historical marine science center, and the aquatics program area. Eventually, the coastal road will be breached by waves, which could contribute additional erosion of the shoreline. Areas at risk of erosion within Whiteman Cove were identified by evaluating slope, geology, and site topography (Figure ES-2). Erosion hazard areas are primarily along the south face of the bluffs (within Whiteman Cove) where the slope gradient is highest, and along some areas of the spit. The most concerning areas at risk of erosion include the locations near cabins; the access stairway and ramp to the aquatics area; and the firepit area, which has a very steep drop off, the toe of which will be inundated with tidal waters following restoration.



Figure ES-2. Existing Concrete Anchors Used to Secure the Lagoon Dock.

GS YMCA will need to outline a future vision for Camp Colman that is centered around environmental education and make several key decisions associated with revised camp programming to optimize this environmental education opportunity and a unique identity for Camp Colman. One of the key questions is, “How to reimagine the aquatics program, which has been at the heart of Camp Colman for decades and is central to the Camp’s identity?”

The Camp Colman master site plan should be updated to prioritize locations for new facilities and to further elucidate the new vision for Camp Colman. Other key decisions include:

1. Abandon or adopt aquatics program within Whiteman Cove lagoon,
2. Abandon or revise current access to Whiteman Cove lagoon,

3. Revise the aquatics program to be centered around the Case Inlet shoreline, and/or
4. Focus aquatics program on the Taylor property.

The list of development opportunities was evaluated and prioritized to guide the Greater Seattle YMCA through the complex decisions necessary to retool and adapt Camp Colman to the Whiteman Cove restoration (Figure ES-3). A qualitative scoring criteria was developed that considers mitigating erosion or flood risk, enhancement of camper experience, environmental educational opportunities, feasible costs, whether an opportunity will be possible to permit, and the degree to which the opportunity would add value to Camp investments. Each opportunity was evaluated and ranked. The list of priority actions is ranked from most important to less important actions for Camp Colman. Each action is fully described in the report and includes cost estimates that address permitting and construction.

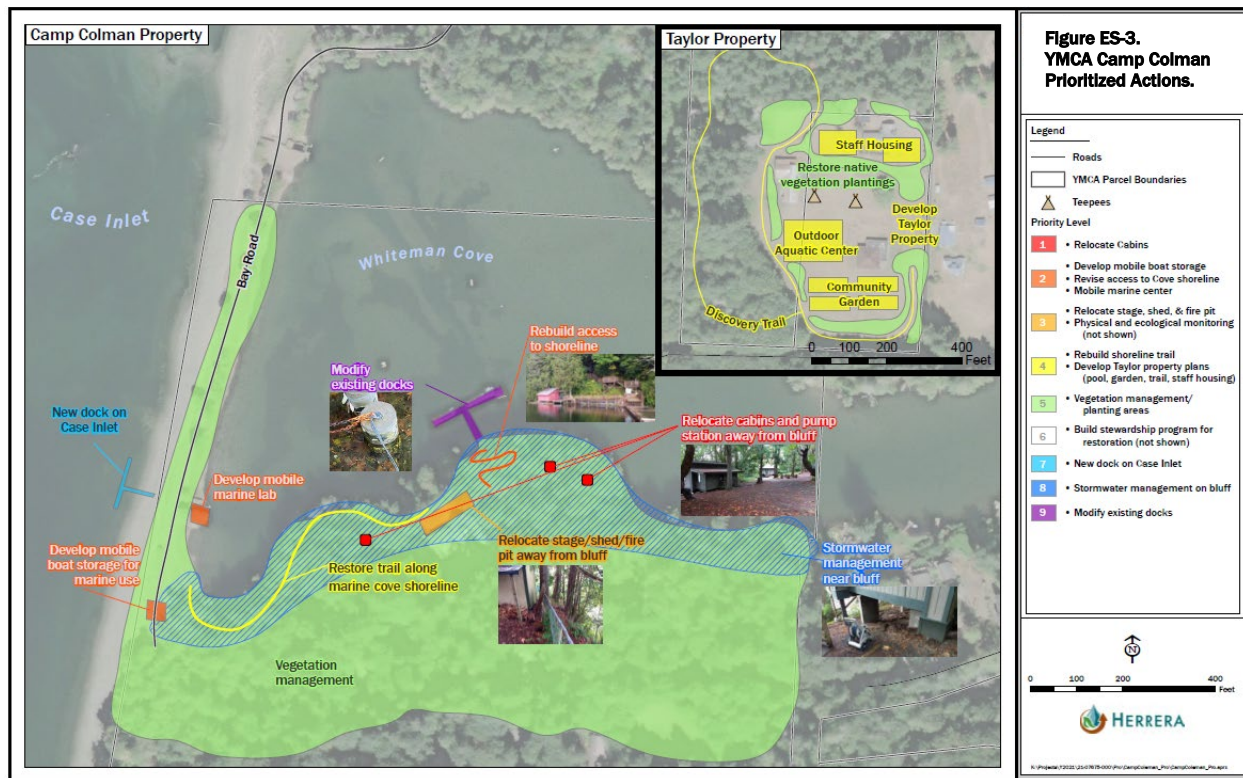


Figure ES-3. YMCA Camp Colman Prioritized Actions.

Actions and investments should be preceded by a suite of recommended supporting investigations, which are also more fully described in the text. These supporting investigations will help in the development of more precise cost estimates and informed decision making for the GS YMCA and Camp Colman (Table ES-1).

Recommended Supporting Investigations	Cost
Stewardship Program Development Consultation	\$15,000
Geotechnical Assessments	\$50,000
Comprehensive Vegetation, Stormwater, and Trail Management Plan	\$90,000
Taylor Property Pre-Design Study	\$250,000
Total	\$405,000

The actions that were identified and described (in the report) address various types of needs for Camp Colman resulting from the WDNR Restoration. These actions range from revised shoreline access, to moving at-risk camp infrastructure, and reformatting general YMCA camp programming. The bulk of the costs are associated with adapting Camp Colman infrastructure to the changing conditions resulting from the restoration, including replacing the loss of the aquatics program (Table ES-2). The cost of reconfiguring camp access to the marine shoreline was also considerable. Mitigating risk and focused investment in YMCA programming were the least cost-intensive actions (Table ES-2). Fire Suppression (up to \$1,300,000) and Contingency Funds for potential compensatory mitigation that may be required to implement these actions (up to \$500,000) were also included as they represent large costs that will be required by the GS YMCA because of the WDNR restoration of Whiteman Cove.

Cost Type	Minimum	Maximum
Mitigate Risk	\$460,000	\$1,670,000
Access	\$1,808,000	\$3,444,000
Infrastructure	\$4,984,000	\$9,175,000
YMCA	\$125,000	\$175,000
Contingency Funds	\$300,000	\$500,000

The current cost estimates (Table ES-3) reflect a general range based on Herrera’s existing understanding of the YMCA’s values and objectives and the Camp Colman properties. However, these costs are estimates; and their accuracy is variable, largely due to the clarity and finality of decisions and supporting information relevant to the action. These costs also do not account for all land use and permitting requirements that may be triggered by developments.

Table ES-3. Costs and Types of Priority Actions Recommended for Camp Colman.

Priority Actions	Type	Design + Permit + Build	
		Cost Low	Cost High
Relocate Cabins and Septic Pump Station	Mitigate Risk	\$400,000	\$1,500,000
Fire Suppression (required to meet fire code for relocation of cabins)	Infrastructure	\$1,000,000	\$1,300,000
Modify Shoreline Access to Whiteman Cove	Access	\$113,000	\$345,000
Remove Existing Boat House; Replace with Mobile Boat Storage	Infrastructure	\$38,000	\$75,000
Develop Mobile Marine Center and Truck	Infrastructure	\$195,000	\$220,000
Construct New Marine Education Center	Infrastructure	\$1,000,000	\$2,000,000
Relocate Firepit, Stage, and Storage Shed	Mitigate Risk	\$48,000	\$105,000
Develop and Implement Physical and Ecological Monitoring Program	YMCA	\$45,000	\$95,000
Rebuild Trail Along Whiteman Cove Shoreline	Access	\$87,000	\$309,000
Implement Plans for Taylor Property	Infrastructure	\$2,500,000	\$5,000,000
Vegetation Management	Mitigate Risk	\$12,000	\$65,000
Build Stewardship Program/Curriculum	YMCA	\$80,000	\$80,000
Stormwater Management	Infrastructure	\$143,000	\$240,000
Modify Existing Dock/Aquatics Program Center	Infrastructure	\$108,000	\$340,000
Construct New Dock on Case Inlet	Access	\$1,608,000	\$2,790,000
Contingency Funds ^a	Access	\$300,000	\$500,000
Total		\$7,677,000	\$14,964,000^b

^a Funding needed to mitigate impacts derived from different actions.

^b This cost estimate is in 2021 dollars.

In total, the cost of all actions will range from \$7,677,000 to \$14,964,000 (in 2021 dollars), not including the recommended supporting investigations. Additional funds will be required in the 2022–2023 supplemental budget prior to the restoration implementation, which is planned for summer of 2023.

Funding requests for the future have been escalated to reflect the use of 2021 dollars in the development of cost estimates. The escalation rate applied was 4 percent per year and was applied only to the data summaries in which the biennium requests are noted. For all funding requests we recommend requesting the upper end of the range since all actions are merely design concepts and additional unexpected costs will undoubtedly occur.

Based on this analysis, the coarse status of these actions, Camp Colman’s operating needs, the timeline of the WDNR restoration, and the quick timeline in which these estimates were requested, Herrera recommends that the GS YMCA request a total of \$1,406,080 from the 2022–2023 supplemental budget, and \$13,645,230 from the 2023–2025 biennium capital budget, to support the GS YMCA and Camp Colman adapting in response to the WDNR Whiteman Cove restoration (Table ES-4).

Table ES-4. Cost Estimates and Timeline.		
Timelines	Actions	Cost
Proviso/Current	Recommended Supporting Investigations: Stewardship Program Development; Geotechnical Assessments; Comprehensive Vegetation, Stormwater, and Trail Management Plan. Not to exceed the \$500,000 allotted within the Proviso.	\$405,000
Supplemental Budget 2022–2023	Fire Suppression	\$1,406,080
Needs for 2023–2025 Capital Budget	Relocate At Risk Cabins and Septic Pump, Remove Boat House and Replace with Trailer and Upland Boat Storage, Relocate Firepit, Stage and Shed, Modify Existing Dock/Aquatics Program, Implement Plans for Taylor Property, Build Stewardship Program/Curriculum, Modify Shoreline Access to Whiteman Cove, Develop Mobile Marine Center and Truck, Develop and Implement Physical and Ecological Monitoring Program, Rebuild Trail along Whiteman Cove Shoreline, Vegetation Management, Stormwater Management, Construct New Marine Education Center, Construct New Dock on Case Inlet, Contingency Funds	\$13,645,230

INTRODUCTION

The YMCA of Greater Seattle contracted Herrera Environmental Consultants, Inc. (Herrera) to assess the YMCA Camp Colman properties at Whiteman Cove, located along the northeast shore of Case Inlet in Pierce County, Washington. The purpose of the study is to better understand the character of changes that may take place because of the Washington State Department of Natural Resources (WDNR) planned restoration of tidal flow into the embayment, how those changes will impact the camp properties, and the scope, scale, and approximate cost of measures to mitigate these impacts.

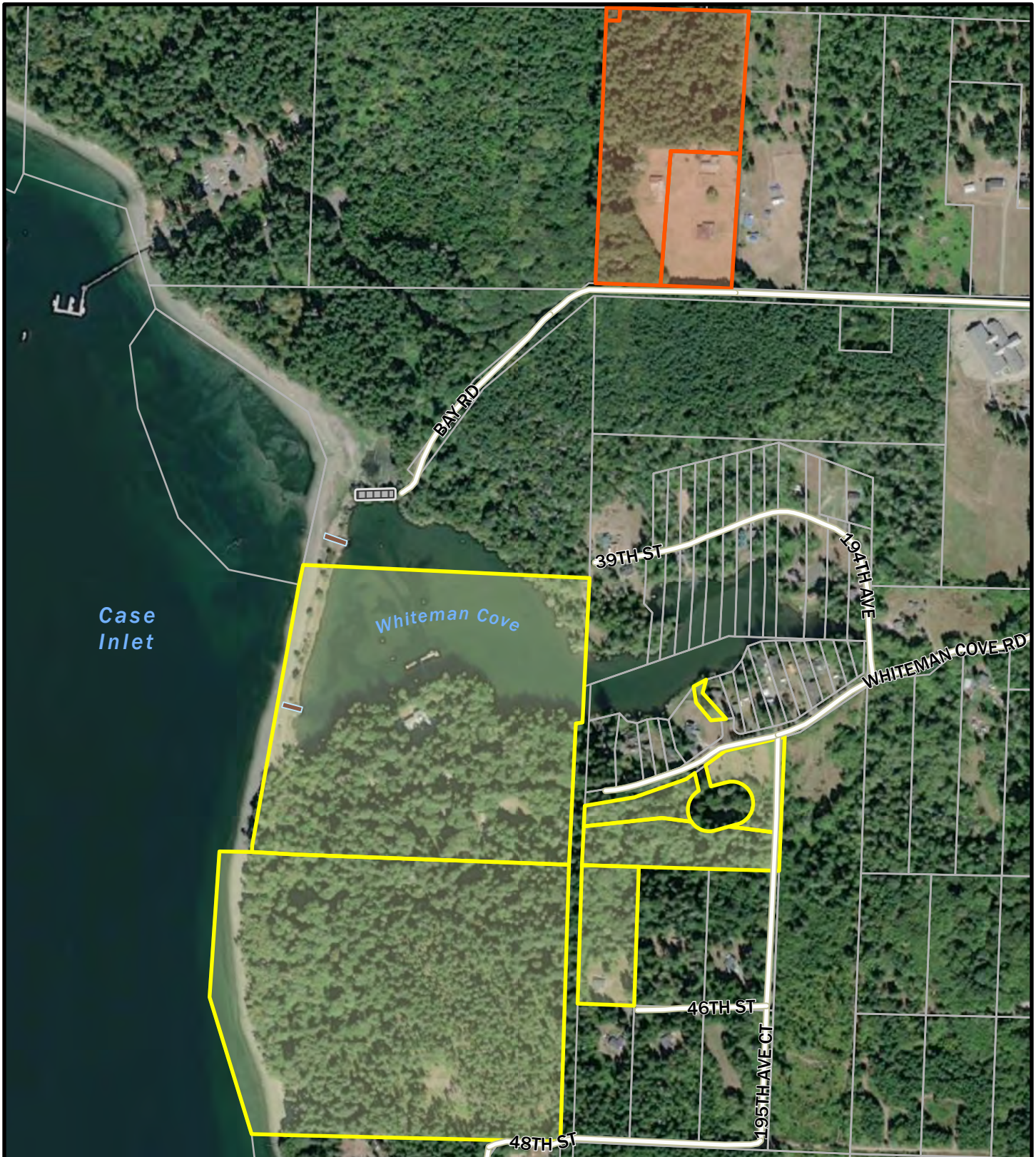
This study contains summary of relevant background conditions at the site, a review of the proposed tidal flow restoration project, a discussion of the risks associated with the landscape changes resulting from the restoration project, and a prioritized list of recommended opportunities for action and additional studies to refine the understanding of the risks and mitigation opportunities for Camp Colman.

The opportunities that are presented in this report were developed based on current project understanding and available information and as such they vary in the level of detail of the underlying assumptions and thus the degree of accuracy of the costs. In developing the opportunities Herrera has a bias for being more inclusive of possible required mitigation opportunities rather than limiting this study only to those that were well understood. Thus, some of the opportunities are more specific and are based on a well-defined approach, while others are based on some high-level assumptions that need a significant amount of additional study.

BACKGROUND

YMCA Camp Colman is located along the south shore of Whiteman Cove, on northeast Case Inlet, in Pierce County, Washington (Figure 1). The WDNR plans to conduct a large-scale restoration of the historical tidal channel that once connected Case Inlet and Whiteman Cove, which was blocked in 1962. Bay Road now runs across the filled tidal channel, which provides the primary vehicular access to YMCA Camp Colman. Restoration of tidal flow will result in inherent changes to the Camp Colman property including areas of increased flooding and erosion, as well as unique opportunities for environmental education and stewardship.

Under the 2013 federal court ruling *United States v Washington*, the State of Washington has an obligation under treaty agreements with 21 tribes to protect and preserve tribal fishing rights. This obligation includes restoration of fish passage at “dams, culverts, tide gates, dikes, and other instream structures” (*United States v. Washington* 2013). In accordance with the ruling, WDNR is seeking to remove the tide gate under state ownership at Whiteman Cove and restore fish passage between Whiteman Cove and Case Inlet (WDNR 2021).



Legend



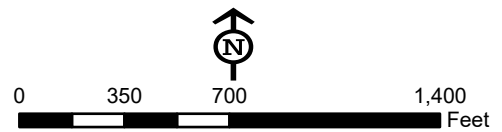
-  Roads
-  Proposed Bridge
-  Existing Tide Gates
-  Pierce County Tax Parcels
-  YMCA Camp Colman Properties
-  YMCA Camp Taylor Properties



Figure 1. Whiteman Cove, Camp Colman, and Camp Taylor Vicinity Map.



CURRENT CAMP USE

Primary site uses at Camp Colman center around recreation and education in the existing Whiteman Cove saltwater lagoon. This includes swimming and watercraft use of the lagoon by various user groups (child/youth recreation, all-ages outdoor education, organizational retreat groups, etc.). It is anticipated that restored tidal flushing will result in a natural tidal regime Whiteman Cove, in which water levels are currently held near mean higher high water. As a result of the restoration, the available times and areas in which Whiteman Cove is accessible for recreation and education activities will be significantly reduced, which will require Camp Colman to reconfigure a central part of the Camp Colman camper experience and camp identity, the aquatics program. A needs assessment describing current uses, anticipated impacts, recommended actions, and opportunities for new program growth and site utilization is included in Appendix A.

SUMMARY OF RISKS DUE TO WHITEMAN COVE RESTORATION

Risks to Camp Colman associated with the restoration were evaluated and broadly categorized as risks from either flooding or erosion resulting from the restored tidal flow in Whiteman Cove. These risks are described in detail in the Task 2 Risk Report, provided in Appendix B, and briefly summarized below.

Areas at Risk of Flooding

The initial impacts to Whiteman Cove include inundation and potential erosion of the coastal path that extend along the southwest shore of Whiteman Cove, the historical marine science center, and the aquatics program area. Eventually the coastal road will be breached by waves, which could contribute additional erosion of the shoreline. Adding elevation to Bay Road is a key element of the bridge restoration design, which should occur along the full extent of the road to preserve access to Camp Colman.

Areas at Risk of Erosion

Areas at risk of erosion within Whiteman Cove were identified by evaluating slope, geology, and site topography. Erosion hazard areas are primarily along the south face of the bluffs (within Whiteman Cove) where the slope gradient is highest, and along some areas of the spit. The most concerning areas at risk of erosion include the locations near cabins, the access stairway and ramp to the aquatics area, and the firepit area, which has a very steep drop off that will soon be inundated with tidal waters.

CAMP COLMAN OPPORTUNITIES

Appendix A outlines a future vision for Camp Colman centered around environmental education, experiential learning, Pacific Northwest history, salmon lifecycles, marine ecosystems, shellfish, climate change, and the Coast Salish People, Squaxin Island Tribes and other (northwest) indigenous cultures. The restoration of Whiteman Cove presents an incredible learning opportunity to be an endless source of adventure and inquiry for summer campers and guests year-round including students and families.

The Greater Seattle YMCA can recreate Camp Colman's identity in alignment with this vision. YMCA leaders will need to answer the following questions to recreate the Camp's identity:

- How to reimagine the aquatics program, which has been at the heart of Camp Colman for decades?
- How to distinguish this YMCA summer camp?
- How to distinguish this Outdoor Educational Experience (OEE) from other OEE centers?
- How to appeal to retreat groups?

The Camp Colman master site plan should be updated to prioritize areas in which new facilities should be located and to further elucidate the new vision for Camp Colman.

Each of the new and revised camp developments described in this document will require additional analysis to identify exact locations and specifications relevant to the successful implementation of each project, such as capacity targets, which may have implications on the cost estimates included herein.

KEY DECISION POINTS FOR YMCA

One of the most critical decisions that the YMCA must make is whether to continue their aquatics program on the Whiteman Cove shoreline, adapt the program to the Case Inlet shoreline, refocus swimming activities on new developments on the Taylor Property, or some combination of these three options. A pre-design study of the Taylor property should be conducted to fully understand the site's potential, necessary developments to support an aquatics program, and to establish accurate cost estimates to reach these goals.

The existing infrastructure associated with both shoreline access to Whiteman Cove lagoon and the aquatics program will no longer be functional in the restored conditions and should be salvaged prior to restoration implementation. Shoreline access to Whiteman Cove from within Camp Colman will need to be adapted to restored shoreline conditions both alongshore and

from the uplands to the shoreline. Access for campers and guests with disabilities could also be accommodated during this period.

There will be a time during which access to the lagoon should not be permitted by campers. During construction and through the first year or two following restoration, conditions will be changing and somewhat uncertain within the lagoon. The level of uncertainty could result in unexpected risks to campers. After a couple of winter seasons, physical conditions within the restored tidal channel and lagoon will reach a new dynamic equilibrium and exploring the lagoon shoreline will be safe again for campers. Camp Colman staff should be trained in how to read the tide charts for within the lagoon and waterward shoreline, predict when strong currents may occur in the tidal channel, and outline additional safety concerns in the restored tidal environment.

It will not be possible for the current aquatics program to resume within the Cove. However, a revised program could be developed that works with the restored conditions. The revised program would be inherently different and may not require docks and boat storage within the Cove. If docks are desired within the Cove they would need to be attached to piles and better anchored to the shoreline, to rise and fall with the fluctuating water levels.

Alternatively, the revised aquatics program could be centered around access to the Case Inlet shoreline. Investments could instead be focused on boat storage and access to the Case Inlet shoreline. Boats would need to be transported considerable distances across the tide flats to access the water during low tides (most frequent conditions during the day in the summer). A pier could facilitate access to the marine shoreline and perhaps boat storage, however permitting large new overwater structures in the current regulatory environment is far from simple and often takes years of preliminary assessments and permitting with considerable cost.

As described in the Needs Assessment (Appendix A), the potential pending development of the Taylor Property could include a large outdoor pool, which would provide the opportunity for campers to swim and other valuable camper experiences. An updated Camp Colman master plan could integrate the revised programs for Camp Colman and developments on the Taylor Property. Major changes to the camp necessary to mitigate risks from restoration will likely trigger the need for additional updated codes, most notably, fire suppression on the camp property, which will also need funding.

CRITERIA FOR PRIORITIZING OPPORTUNITIES

The list of development opportunities described below were evaluated and prioritized to guide the Greater Seattle YMCA through the complex decisions necessary to retool and adapt Camp Colman to the Whiteman Cove restoration (Figure 2). This conceptual development plan aims to both harness the opportunities and mitigate the risks associated with the Whiteman Cove restoration. Qualitative scoring criteria was developed that takes into account mitigating erosion or flood risk, enhancement of camper experience, environmental educational opportunities, feasible costs, possible to permit and the degree to which the opportunity would add value to Camp investments. Each opportunity was evaluated for each criterion and scored across a gradient ranging from low-moderate-high or very high. Very high scores were limited to opportunities that mitigate potential risk to human life. Scores were assigned to each qualitative rank and summed to identify the highest-ranking opportunities.

Camp Colman Property

Taylor Property

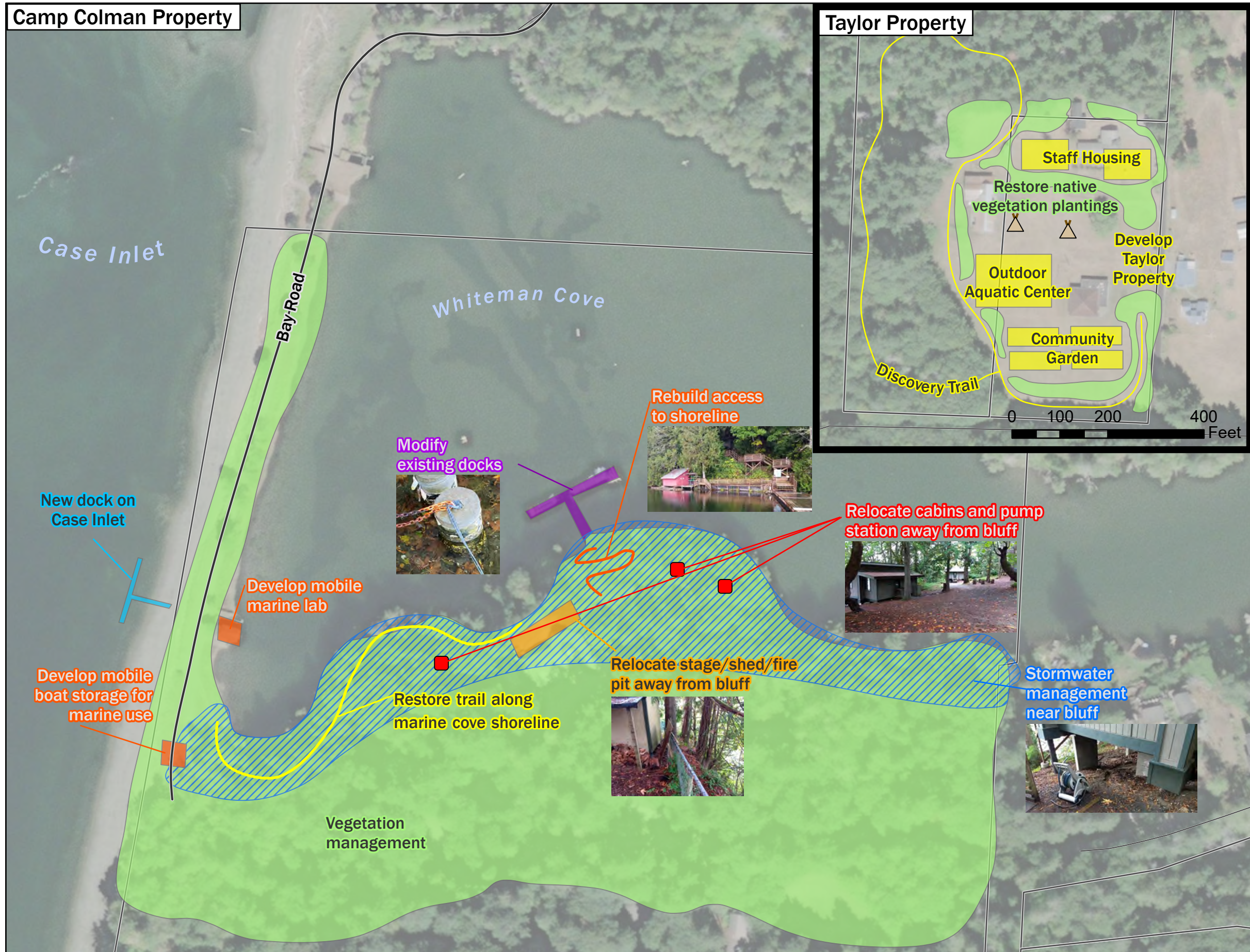


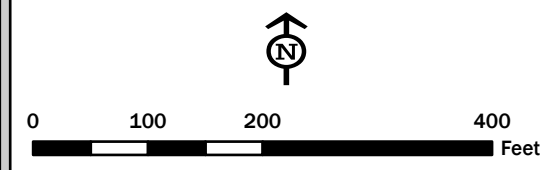
Figure 2.
YMCA Camp Colman Prioritized Actions.

Legend

- Roads
- ▭ YMCA Parcel Boundaries
- ▲ Teepees

Priority Level

- 1** • Relocate Cabins
- 2** • Develop mobile boat storage
• Revise access to Cove shoreline
• Mobile marine center
- 3** • Relocate stage, shed, & fire pit
• Physical and ecological monitoring (not shown)
- 4** • Rebuild shoreline trail
• Develop Taylor property plans (pool, garden, trail, staff housing)
- 5** • Vegetation management/
planting areas
- 6** • Build stewardship program for restoration (not shown)
- 7** • New dock on Case Inlet
- 8** • Stormwater management on bluff
- 9** • Modify existing docks



PRIORITY ACTIONS

The list of priority actions outlined below are presented in ranked order from most important to less important actions for Camp Colman. Each action description includes a general description of the approach, need, critical elements for being a priority for the Greater Seattle YMCA, key considerations, necessary related actions, and permitting needs.

Relocate Cabins and Septic Pump Station at Risk from Bank Erosion

Cabins and the onsite wastewater pump station that are near the bluff crest should be relocated farther landward to address the human health risk of bluff failure while the cabins are occupied (Figures 3 and 4). These structures should first be evaluated to determine if relocating is necessary or if structure demolition and rebuilding is a more appropriate option. Of primary concern is Henderson, Rotary, and Calvin cabins, which already exhibit signs of soil creep around them (e.g., tree bases bent toward the water). Relocation entails preparing a new location through clearing a pad, building a new foundation, providing utility connections, lifting the cabins off their foundations and transporting them to the new site, and demolishing the old foundation and utilities and restoring the former location. Moving a serviceable building is typically a more significant cost savings compared to new construction. Relocating the onsite wastewater pump station will also require relocating the associated plumbing and electrical to the new location and making sure its sufficiently downslope from the lowest cabin.

Currently, all three cabins are within a 300-foot walk of the main lodge, so maintaining the existing level of proximity to the heart of the camp would be vital to maintaining camper experience. The YMCA Camp Colman Needs Assessment indicated that locating cabins within 600 feet is ideal, although 1,200 feet may be acceptable (Kaleidoscope Inc. 2021, Appendix A). Given the density of cabins already within a short distance of the lodge, moving the cabins a short distance away from the bluff may be a good option, although an acceptable setback distance from the steep slope would have to be developed prior to deciding on a location.

The historical onsite wastewater design documents available from the Tacoma-Pierce County Health Department were reviewed. Based on these documents it appears that the camp buildings are served by at least three community drain field systems. Each of these systems typically consists of each cabin having its own 1,000-gallon, two-chamber septic tank that flows to a community pump station. The community pump station then pumps the wastewater up to a community drain field located upslope of the tennis courts. The community pump station for system "B" is located between Henderson and Rotary cabins and will need to be relocated to a location away from the bluff. Community pump station "B" serves at least Henderson, Rotary, Sleem, and Kiwanis cabins. There may be other cabins connected to this pump station. To ensure this pump station can continue to serve all the connected cabins, the grades will need to be checked and additional pumps added if necessary to ensure all the wastewater can be collected.

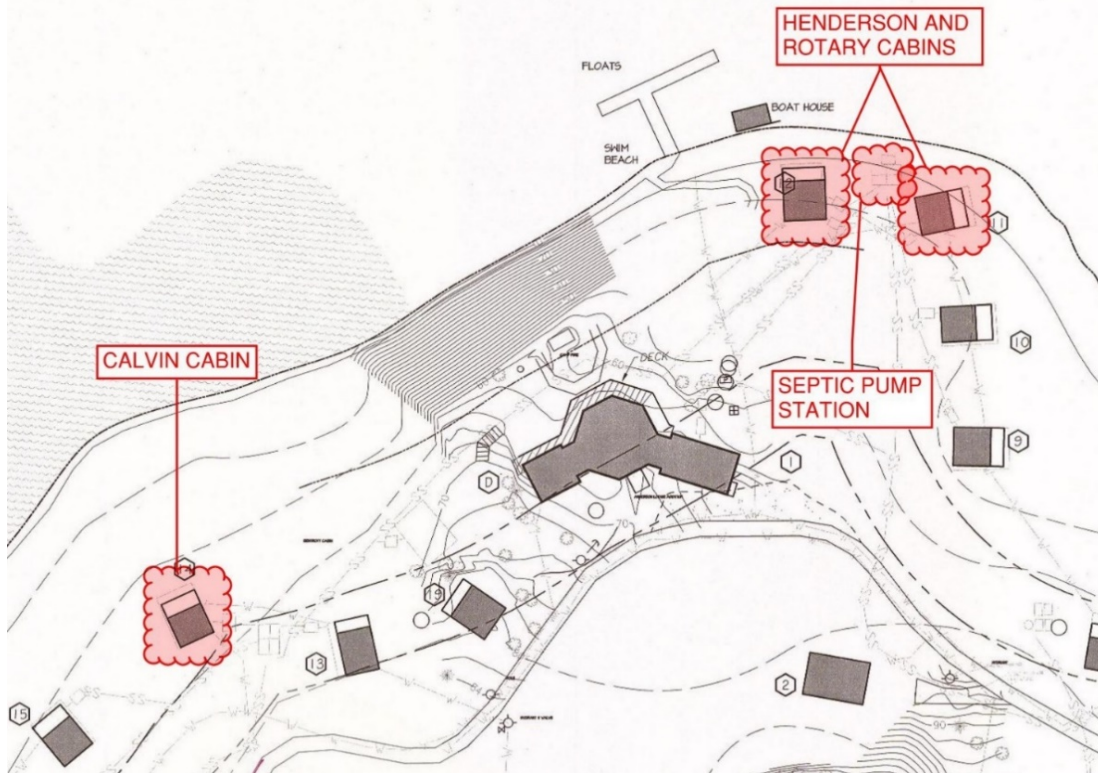


Figure 3. Location of Three Cabins and Onsite Sewage Pump Station Identified for Relocation During the Risk Assessment.



Figure 4. Henderson and Rotary Cabins Near the Bluff Crest.

While the risk of bluff failure will likely increase slowly over the years that follow restoration of Whiteman Cove restoration project, cabin and septic pump station relocation is critical to maintaining the safety of camp guests. We recommend this be given priority consideration and be completed within the next 3 to 5 years. Identifying an acceptable setback distance from the bluff will be an important first step to determining potential locations for relocation.

In addition to the onsite septic system components, various sections of the potable water and electrical system will need to be reviewed and services to the cabins to be cut, capped, and removed.

Future actions to assist with relocation include:

- Additional topographic survey and geotechnical analysis of the steep bluffs to identify a recommended setback distance and potential areas for relocation.
- Onsite wastewater design and permit application to relocate community onsite wastewater pump station "B" away from the bluff.
- Analysis of other existing utilities (water and power) which may need to be relocated out of the bluff zone and services to relocated cabins cut, capped, and removed.

The relocation of the cabins will require authorization from the County for regulatory compliance with its shoreline regulations and critical areas ordinance (Titles 18E and 18S of Pierce County Code [PCC]). The relocation of the cabins will likely receive a Determination of Non-Significance for SEPA review and a Shoreline Exemption for shoreline compliance. A SEPA Checklist will have to be prepared. Due to the lack of in-water construction associated with this action, it is anticipated that no permit reviews by WDFW for an HPA or the USACE for Section 401/404 compliance will be required. Should the project receive federal funding, a NEPA regulatory review will be required.

In addition to the above, building permits and onsite wastewater permits will be needed. The cost for permitting the relocation of the cabins will be moderate compared to the high costs for permitting in-water construction projects.

Estimated Range of Costs: \$400,000 to \$1,500,000 for all three cabins, the pump station, and the associated utilities

Modify Shoreline Access to Whiteman Cove

The access stairway to the Whiteman Cove aquatics program area should be rebuilt to strengthen its footings and potentially repositioned to traverse a less steep area, as the bluff face is very steep and vulnerable to future erosion following restoration. The base of the access stairway will be inundated by tides regularly, and so should be removed (Figure 5). This would include the walkway to the boat storage building, which should also be replaced. Much of the

existing stairs decking appears to be in good condition and may be simply reset on new, deeper foundations. Modifying the shoreline access assumes that the existing dock and shoreline trail locations will continue to be used in the future.



Figure 5. Gangway, Decking, and Access Stairs Will Need to be Rebuilt to Accommodate Restored Water Level.

An improved foundation system for the stairway and decks will have to be designed to provide more stability. Some options for this include helical piles or small-diameter pin piles that can be driven in with portable machinery, an important factor on steep slopes. If helical or small pin piles are not an option, more complex solutions may need to be developed. Geotechnical investigations will be key in determining which method works best in the existing location or if a nearby alternative should be found.

With continued use of the existing dock, a pier should be included in the new access stairway design to access a dock subject to fluctuation water levels. The lowest deck in the stairway could be rebuilt for this purpose, extending farther toward the water on piles. A gangway would be attached to the pier with the other end on a dock secured to piles (see below).

Future actions to assist with relocation include:

- Additional topographic survey and geotechnical analysis around the existing stairway to determine anchoring methods

These proposed actions will require federal, state and Pierce County regulatory reviews and implementation of environmental protective measures according to the provisions of the National and State Environmental Policy Acts, the Clean Water and Coastal Zone Management Acts, Washington State Hydraulic Code, local shoreline and critical areas ordinances and other laws governing fish and wildlife habitats and cultural resources. The estimated permitting costs

for these actions are high due to the amount of documentation necessary for project reviews at multiple regulatory agencies.

Estimated Range of Costs: \$113,000 to \$345,000

Remove Existing Boat House; Replace with Mobile Boat Storage

The existing boat house on the lagoon will be regularly flooded following restoration and should be moved. While the existing structure could be moved or a new building built, restoration provides an opportunity to reimagine the storage of the Camp's boats in a way that is more flexible for boating inside and outside the lagoon. A mobile storage wrack could be moved to the spit to access Case Inlet or to Camp Taylor for classes in the pool (Figure 6). The mobile storage could then be parked under cover during the off season.



Figure 6. Example of Mobile Kayak Storage, Capable of Being Moved to Wherever the Boats will be Used.

A mobile boat storage option could easily be parked anywhere on the camp, assuming at least one Camp Colman vehicle has a trailer hitch. Covered off-season storage could be built, or more simply, the boats could be parked and covered with tarps. Aside from demolition of the existing boat house, mobile storage options could be easily acquired and require very little planning and no permitting.

A typical trailer designed to carry about a dozen kayaks and canoes will cost between \$3,000 and \$5,000 each. Another \$2,000 would cover a simple open storage shed for parking the trailer during the off season. Total cost would therefore be approximately \$5,000 to \$7,000 per dozen boats. A more costly option, offered for comparison, is to build a new shed like that currently in use at the dock. The maximum size that does not require a permit in Pierce County is 200 square feet. The overall cost would likely be approximately \$20,000, whether built on site or prebuilt and customized for boat storage. A single shed could likely store approximately 24 boats.

This option presents low permitting needs and costs as in-water construction is avoided. Pierce County typically exempts structures of 200 square feet or less from permitting requirements, although shoreline and critical areas project reviews may be required when built within 200 feet of the OHWM or bluff face.

Estimated Range of Costs: \$38,000 to \$75,000 for up to 24 boats

Develop a New Marine Education Center

The current marine education center, located on the spit on the east side of Bay Road, will likely be inundated following the restoration and particularly during high water and storm events. Any structure that would be located on the spit or adjacent to the Cove shoreline is vulnerable to implications of either the restoration, coastal flooding (as mapped by FEMA), sea level rise, and/or coastal erosion.

The proposed marine education center could be limited to a classroom-sized educational facility in which educational workshops and lessons could be hosted focused on marine ecosystems, nearshore restoration, and Indigenous Cultures in the Pacific Northwest. The estimated cost for a permanent facility would be approximately \$1,000,000 to \$2,000,000. Siting the structure may be complicated due to the current regulatory constraints on building in close proximity to the shoreline. The proposed structure could be sited in the uplands with an adequate setback distance, so as to feel immersed in the marine environment, but also adhere to current shoreline regulations. A pre-design study would be required to initiate the process, which would cost roughly \$250,000.

Estimated Range of Costs: \$1,000,000 to \$2,000,000

Develop a Mobile Marine Center

The current regulatory environment makes constructing a permanent building in the shoreline jurisdiction highly constrained and costly. We recommend considering an innovative solution for a marine education center that could be a mobile structure that is sited along the marine shorelines during the summer months and relocated to higher within the Camp Colman uplands during winter months. Non-permanent, mobile features are not regulated in the same way as permanent structures.

The potential value for a mobile marine lab in the Puget Sound region is great. There are many different environmental educational organizations that may have interested in collaborating on the development of a unique mobile marine lab facility. Alternatively, it could be a valuable amenity/investment for multiple YMCA programs. We recommend conducting outreach to similarly minded organizations, such as the Seattle Aquarium and Puget Sound Partnership to explore the potential for partnerships in curriculum development and potential support.

Figure 7 shows some snapshots of [a similar mobile marine lab](#) concept developed by the Florida Fishing Association. Additional imagery is available on their website and Facebook account. They funded the marine lab through a local grant program; and the total cost shared below included the cost of the touch-tank, generator (not necessary for all applications), trailer conversion, 10 solar panels with batteries, a truck capable of towing the trailer, and a sand box.



Figure 7. Examples of a Mobile Marine Lab Trailer (left) or Mobile Classroom Constructed from an [Adapted Storage Container](#) (right).

Estimated Range of Costs: \$195,000 to \$220,000

Relocate Firepit, Stage, and Shed at Risk from Bluff Erosion

The campfire ring, stage, and shed should be relocated to a location further landward from the bluff crest (Figure 8). Although the toe of bluff is currently not exposed to marine waters, it will be following restoration during high tides and high-water events. With the stage and shed located at the bluff crest with and foundation to help stabilize them, they are particularly vulnerable to landslides and slope instability.



Figure 8. Shed at the Firepit, Very Close to the Edge of an Undermined Bluff.

DRAFT Preliminary Report—Additional Assessments Needed

Examination of the bluff during the site assessment showed obvious signs of instability just below the fence in that location. The bluff is substantially undermined, with roots exposed up to 12 inches from the edge where the bluff has been slowly eroding out from under the trees.

The simplest approach to relocation is to identify and clear a nearby site and then move the two structures to the new location. Both could likely be attached to a wooden sled and dragged into position or loaded onto a flatbed using a winch. Much of the cost would be in clearing trees and the earthwork necessary to create tiers of seating around the stage.

Alternatively, a new stage and shed could be constructed and the old structures removed entirely. While new construction is a more expensive option, it does provide the opportunity to create a new camper experience as well as resetting the lifespan of the amenity.

Required permits will likely include a review of critical areas, a shoreline exemption, a land use – clearing and grading permit and a SEPA checklist.

Estimated Range of Costs: \$48,000 to \$105,000

Develop and Implement a Physical and Ecological Monitoring Program

Having a clear baseline understanding of nearshore conditions prior to and following restoration will be an important element of documenting the impacts of the restoration as they occur. Regular monitoring provides useful data that can be used to answer questions about the past and future of site conditions and empowers site managers to make informed decisions. Annual topographic surveys can be used to document surface erosion, mass wasting, and document erosion rates over time.

An ecological monitoring plan could be developed and designed to be implemented by campers to document and learn about the ecological changes taking place as a result of the restoration. There are several [nearshore ecological monitoring](#) programs in the Puget Sound region that use standardized data collection for nearshore restoration monitoring, which could be used as a model for monitoring at Camp Colman. Standard protocols can be used to identify and document species in the lagoon and along the Case Inlet shore, changes in vegetation, slope stability, and the like.

Some monitoring should be conducted in the field by professionals. An important element of physical monitoring is having reference points with known elevations that could be marked by the Camp's local surveyor. Other specific locations should be identified from which regular photos should be taken. At least 5 years of physical monitoring should be conducted (and is supported by this cost estimate), as it often takes at least 5 years for a site to stabilize and species to return following restoration. Monitoring data should be analyzed and reported upon by a professional.

Estimated Range of Costs: \$45,000 to \$95,000

Rebuild Trail Along Whiteman Cove Shoreline

Portions of the existing shoreline trail between the spit and the lagoon dock will be inundated during the first spring tide cycle following restoration. Over time, repeated tidal inundation will cause erosion, making the current trail unusable. The trail is highly constrained between the lagoon and the steep bluff for most of its length, making a new waterside location difficult. Most of the trail could be built up in place with a short retaining wall and gravel fill. Where the elevations are lowest, closer to the spit, an elevated walkway could be constructed on short piles at an elevation that keeps it above all but the highest winter tides.

While the trail will certainly be inundated relatively frequently after restoration, the erosion and loss of function will likely happen slowly over a period of several years. Before then, the existing trail will remain functional for most tide heights. During the busiest summer months, tides are generally low during the day, so inundation will occur during times of low usage. The YMCA therefore has time to adapt and plan a new trail following restoration. An elevated walkway would require geotechnical and archaeological investigations and may be difficult to secure permits where the path crosses existing wetlands.

A low-cost option for the trail would be to elevate where necessary and move the crossing point away from low wetland areas. This would avoid the need for an elevated boardwalk, a relatively costly option. However, providing a boardwalk presents many educational opportunities such as wildlife viewing platforms and close observation of sensitive wetland vegetation.

Due to the tidal inundation at the trail location and proposed pile installations to support a boardwalk or other trail access, permitting of this project action alternative will require federal, state and Pierce County environmental regulatory reviews for construction authorization. The cost associated with permitting a wetland boardwalk is anticipated to be high.

Estimated Range of Costs: \$87,000 to \$309,000

Develop and Implement Plans for Taylor Property – New Aquatics Center

The Taylor Property has the potential to replace the existing aquatics program. It has land conducive to the development of an aquatics center, but the location has some challenges, with close neighbors, little privacy, and is a considerable distance from the main Camp Colman campus. Kaleidoscope recommended that if the aquatics program is relocated to the Taylor property, then the model would need to expand beyond just swimming to include additional recreational areas. Additional recreation at the site could include trails and gardens, as well as additional staff housing.

Very few plans and information has been developed on the development of the Taylor Property to date. Currently, there is very little information on the desired program for this potential facility and for the capacity of this site to support this program (i.e., utilities, access). A range of possible configurations for such a facility could be imagined ranging from a pool and restroom building to a more elaborate waterplay facility. Plans for the property should include a building for staff housing, gardens and vegetation planning, in addition to the aquatics center.

The following costs were developed for a range possibilities from a simple pool and restroom building to a more fully featured aquatics center building with a much larger pool for \$5,000,000. The final budget could easily exceed this amount depending on the YMCA's need and site constraints. To finalize the scope-scale development and costs, a pre-design study is required and is a top priority for early recommended supporting investigations. Aquatic centers can cost significantly more than the upper end of the presented range and can easily be in the \$10,000,000 to \$15,000,000 range, depending on whether it is outdoors or indoors, the size of the supporting facility (capacity), and other rooms/facilities that the development includes. The cost estimate included below is for a relatively simple outdoor pool with changing rooms and bathrooms, comparable to but slightly larger than the pool at YMCA Camp Orkila.

Estimated Range of Costs: \$2,500,000 to \$5,000,000. See *Recommended Supporting Investigations*, below.

Vegetation Management

Enhancing native vegetation cover, particularly in areas at risk of erosion, will help to reduce erosion vulnerability along the bluff shoreline. Conifers should be planted landward of the bluff crest to provide additional water absorption and structure to bluff soils. As older, existing trees are eventually eroded from the bluff, planting these additional trees will ensure that trees are perpetually enhancing the stability of the bluff, particularly along steep shoreline areas. Over time, recruitment of large woody debris (LWD) from lower elevations of the bluff face will occur, with trees falling to the beach and bluff toe. Consider hiring an arborist to actively manage the ways in which trees erode from the bluff.

Nonnative English ivy (*Helix hedera*) and Himalayan blackberry (*Rubus armeniacas*) should be removed from trees and surrounding soils where possible. Ivy and blackberry can impair the growth and health of other native shrubs and trees, create a monoculture, and exclude the growth of other plant species that contribute to soil stability. This has already happened in some areas where invasive species are abundant, particularly along the bluff face waterward of the lodge.

It is likely that the removal of nonnative, invasive vegetation will be required as a mitigating component of many of the project's construction actions. Monitoring of the success of the removal of invasive vegetation and or the installation of native vegetation will likely be required as a permit mitigating condition for one or more of the proposed project components and therefore vegetation management actions should be coordinated with the permitting process

rather than voluntarily implemented prior to permit issue. The native plant installations and performance monitoring of vegetation management actions can be an excellent educational opportunity for campers to learn of the importance of native vegetation in environmentally sensitive areas.

Estimated Range of Costs: \$12,000 to \$65,000. See *Recommended Supporting Investigations*, below.

Build Stewardship Program/Curriculum Focused on Restoration

New camp programming needs to be developed that is focused on the environmental education opportunities associated with the Whiteman Cove restoration. This programming would be central to a revised identity for Camp Colman and could be approached from various angles for different groups and markets. Partnership organizations could contribute to the new Camp programming and this unique opportunity for enhanced stewardship, experiential/applied learning of STEM in a living classroom. This professional would develop new curriculum for experiential environmental education and have the significant task of collaborating with educators to define learning goals and create teaching areas to align with those goals. A subject matter expert would be best suited to support Camp Colman in this endeavor.

The model could include:

- Creating a nearshore restoration demonstration site with a focus on:
 - Climate change adaptation, STEM
 - Coast Salish: Indigenous people of the Pacific Northwest
- Potential Partner Organizations: Pierce Conservation District, South Puget Sound Salmon Enhancement Group, Tribes (Squaxin Island, Nisqually, Puyallup), University of Washington, Puget Sound Partnership/Institute, Shore Friendly.

Estimated Range of Costs: \$80,000

Stormwater Management

The combination of uncontrolled sheet flow and shallow concentrated stormwater flows, shallow groundwater, documented poor permeability of the underlying geology, and presence of soils that are vulnerable to erosion suggests that improved stormwater management is necessary to reduce erosion hazards, see Figure 9. Water from gutters, cleared areas, trails, and parking lots should not allowed to flow directly toward and down the bluff face but should be collected and conveyed to the toe of the bluff or dispersed in areas that will not exacerbate erosion hazards. dissipated in areas with low slopes and dense upland vegetation or tightlined directly to base of the bluff.



Figure 9. Rills from Stormwater Flowing Down the Uplands to the Bluff Face.

To implement proper stormwater management, first a plan will need to be developed. Next a system to convey stormwater flows in the core camp area to the toe of the bluff will need to be installed. Then other stormwater improvements will need to be implemented as per the plan that is developed.

Estimated Range of Costs: \$75,000 for drainage and \$50,000 for additional, improvements across camp, \$23,000 – \$95,000 for permitting.

Total: \$143,000 to \$240,000

Modify Existing Dock/Aquatics Program Center

The current, fixed attachment of the dock to the shore does not allow for the rise and fall of tides expected after restoration. Under fluctuating water levels, the current cement anchors are insufficient for keeping the dock in place (Figure 10). Steel piles should be driven in, and the dock attached to them to allow it to rise and fall with the tide in the same position, particularly during storms. A new gangway will be required, secured to a deck or pier elevated above the highest tides to allow for vertical movement of the dock. Part of the existing shoreline access stairway could be rebuilt or repurposed for this function (see above).

Restoration of tidal fluctuation with Whiteman Cove will immediately impact the functionality of the existing dock, so adaptation of the dock should happen prior to or during restoration. The dock current appears functional and may be reused with little change other than how it is kept in place. Geotechnical investigations will be required to determine pile size, location, and depth. Permitting of pile-driving activities within marine environments can be done but will take time and usually require marine mammal monitoring during construction to prevent disturbance, particularly of whales.



Figure 10. Existing Concrete Anchors Used to Secure the Lagoon Dock.

The project component will require federal, State, and local permitting reviews for environmental regulatory compliance. The anticipated permitting costs are estimated to be high due to the proposed in-water construction and will require an extended duration for the permitting process. However, this adaptation of an existing shoreline use should be permissible.

Estimated Range of Costs: \$108,000 to \$340,000

Construct New Dock on Case Inlet

An alternative to adapting the Whiteman Cove dock would be construction of a new dock on Case Inlet, similar to, but at a smaller scale than, the dock at Joemma State Park. The ideal location for such a dock would be near the base of the spit, in the vicinity of the bottom of the hill. This would provide closer access to deep water, which results in a shorter (and less costly) pier. A Case Inlet dock would provide access to the water considerably more frequently than the dock in Whiteman Cove, which would be frequently grounded during low tide.

A new 300-foot pier would be constructed, attached to the base of the spit by an abutment at approximately the current road elevation. This abutment would require a small amount of shoreline armoring, either a concrete or riprap wall, to provide protection from wave energy. The pier would be designed to provide 6 feet of clearance between rails, allowing people to pass when carrying boats to and from the dock. Support for the pier decking would be approximately 40 steel piles, driven in pairs with steel beams between.

Construction of a new docks will require grating to allow light penetration through slatted decking, typically made of fibrous composite material for extra traction. Dock pilings will be required to stabilize the structure along with a gangway to provide access at all tide levels.

A geotechnical analysis will be required early in the design process to inform the type, size, and location of support pilings, which are a significant portion of the overall cost. Other specialized design would include structural analysis of the pier and a wave energy analysis for the support pilings. Archaeological investigation will also be required for any work on the spit, including installation of the abutment and piles. A bathymetric survey of the tidelands within 400 ft of the shoreline will help inform the overall length required to maintain water access during low tides.

An important consideration when relocating a dock from a protected location such as Whiteman Cove to open water is the safety of swimmers and boaters. Attention must be paid to tide levels, particularly the anticipated change in tide and to a lesser extent current induced by tidal flow. At very low tides the gangway is likely to be quite steep, making hauling boats up and down challenging, particularly for children.

Construction of a marine dock will require federal, State, and local permitting reviews for environmental regulatory compliance. The anticipated permitting costs are estimated to be very high due to the proposed in-water construction and will require an extended permitting process. The current regulatory framework is not conducive to new dock construction, so engaging with tribes and permitting agencies early will be very important to judging the likelihood of acquiring permits.

Estimated Range of Costs: \$1,608,000 to \$2,790,000

Permitting Review

Likely permitting requirements (Table 1) were established for each action. As actions are conceptual in status, it is important to be mindful that a formal permit review process is typically applied on more well-developed actions. As a result, there may be some changes to the permitting requirements as projects evolve and plans become more detailed.

Table 1. Permitting Needs Associated with Recommended Actions.

Camp Colman Actions	PERMITTING NEEDS																
	Pierce County						Washington Department of Fish and Wildlife	Washington State Department of Natural Resources	US Army Corps of Engineers ^a								Washington State Department of Ecology ^b
	Pierce County Building Permit	Critical Areas Review	Shoreline Compliance (Exemption or Substantial Development Permit) ^c	Geotechnical Assessment	Land Use (clearing and/or grading)	State Environmental Policy Act (SEPA) Compliance	Hydraulic Project Approval (HPA) ^a	WDNR Lease	CWA Section 404 Nationwide or Individual Authorization/Rivers and Harbors Act	Section 7 Endangered Species Act Compliance	Essential Fish Habitat (Magnuson Stevens-Fisheries Conservation Act Compliance)	Pre-Construction Forage Fish Survey	Marine Mammal Monitoring	Coastal Management Zone Certification	Section 106 National Historic Preservation Act Compliance	401 Water Quality Certification	
Relocate Cabins and Septic Pump Station		X	Exemption	X	X	X											
Rebuild Trail Along Whiteman Cove Shoreline		X	Exemption	X	X	X		?									
Modify Existing Dock/Aquatics Program Center		X	Exemption or Substantial Development		X	X	X	X	X	X	X	X	X	X	X	X	
Construct Pier on Case Inlet		X	Substantial Development		X	X	X	X	X	X	X	X	X	X	X	X	
Remove Existing Boat House: Replace with Mobile Boat Storage		X	Exemption			X	?		?	?				?	?		
Modify Shoreline Access to Whiteman Cove		X	Exemption	X	X	X	X	?	X	x	X	X	X	X	X	X	
Develop and Implement Physical and Ecological Monitoring Program																	
Stormwater Management		X	Exemption	X	X	X										X	
Vegetation Management		?	Exemption		?	?											
Relocate Firepit, Stage, and Storage Shed		X	Exemption		X	X											
Implement Plans for Taylor Property																	
Build Stewardship Program/Curriculum																	
Develop Mobile Marine Center		X (demolition only, may be exempt)	Exemption		X (demolition only)	X											

^a Washington Department of Fish and Wildlife and US Army Corps of Engineers require a Joint Aquatic Resource Permit (JARPA) Application and Site Plans.

^b Washington State Department of Ecology administers Section 401 Water Quality Certifications of the Clean Water Act for federal permitting compliance in Washington state.

^c Pierce County shoreline permitting is required for all in-water construction and activities occurring 200 feet landward of the Ordinary High Water Mark (OHWM), unless exempted by the Revised Code of Washington.

All project activities proposed to occur within 200 feet of the Ordinary High Water Mark (OHWM) of Case Inlet and Whiteman Cove will require review and authorization according to Pierce County's shoreline regulations (Title 18S PCC). Pierce County will review the project components within its shoreline jurisdiction according to the criteria set forth in the Shoreline Master Program Guidelines for a Shoreline Exemption or Substantial Shoreline Development Permit as required by the State's Shoreline Management Act (RCW 90.58, WAC 173.27).

All project components proposed to occur in or near Pierce County's protected critical areas (wetlands, fish and wildlife habitat areas, floodplain and steep slopes and associated buffers/setbacks) will also be reviewed according to the compliance requirements of Title 18E – Development Regulations-Critical Areas of PCC.

All project components that will result in in-water construction (below the Ordinary High Water Mark of the Cove or Case Inlet) or potential changes in hydrologic regimes will also require approval from Washington Department of Fish and Wildlife (WDFW) for a Hydraulic Project Approval (HPA) permit. The WDNR's review of their aquatic lease requirements may also need to be completed.

Any and all proposed modifications to the existing dock and or installations of new dock components or changes in the hydrological regime below the High Tide Line (HTL) of Whiteman Cove or Case Inlet will require federal authorization by the US Army Corps of Engineers (USACE) for compliance with Sections 404 and 401 of the Clean Water Act and Section 10 of the Rivers and Harbor Act (Case Inlet). The repair, maintenance, and *in situ* replacement of the existing dock at Whiteman Cove may potentially be authorized by a nationwide permit. However, any expansion of the existing dock footprint or the installation of new dock components, such as relocating the aquatic activities at Case Inlet, will likely exceed the requirements for a Nationwide Permit, and therefore will require an individual project review with an obligatory public notice comment period. The timing for an Individual permit project review is typically 2 to 3 years; however, some docks or marina actions take considerably longer for permit approval.

Federal permit authorizations additionally require compliance with Section 7 of the Endangered Species Act (ESA), Section 106 of the National and Historic Preservation Act, the Coastal Management Act and the National Environmental Policy Act (NEPA). Protections to Essential Fish Habitat (EFH) as regulated by the Magnuson-Stevens Fisheries Conservation Act and compliance with the Marine Mammal Protection Act will also need to be reviewed as documented in a Biological Evaluation/Biological Assessment report prepared by the applicant for submittal to the USACE, NOAA Fisheries (National Marine Fisheries Service) and US Fish and Wildlife (USFWS). Pile driving associated with dock construction results in construction generated in-air and underwater noise that may affect fish, marine mammals and foraging seabirds unless mitigating measures are applied.

For NEPA compliance, the project may meet the criteria of a Categorical Exclusion. Otherwise, an Environmental Assessment supporting a Finding of No Significant Impact (FONSI) or a comprehensive Environmental impact Statement may be required for federal review by the federal \Lead Agency. Similar to NEPA, the State’s Environmental Policy Act (SEPA) lead agency (mostly likely Pierce County) will determine if project-associated environmental impacts are non-significant or significant based on the initial submittal of a SEPA Checklist document.

All agency project reviews will require an analysis of the project’s components to avoid, minimize and mitigate for environmental impacts. For those components of the project that result in unavoidable environmental impacts, a discussion regarding the necessity of a proposed action and proposed mitigating measures to minimize impacts will be required. For example, if a new dock was proposed for installation in Case Inlet, it is necessity for camp operations and rationale for the non-feasibility of using any existing public docks within the immediate vicinity of the site would need to be stated.

RECOMMENDED SUPPORTING INVESTIGATIONS

Stewardship Program Development Consultation

Creating a new program model requires alignment of the organization and facility's assets with the needs of the users to develop a program that is missionally vital and can be financially viable to operate. We would recommend a process that includes working with YMCA Camp Colman staff to assess current curriculum for relevance, visioning new learning models for summer camp, and outdoor educational experiences and retreat programming. The process would include gathering input from potential partners to expand resources as well as gathering input from current and potential constituent groups about the need for learning outcomes to be offered in this new and expanded program. Additionally, the process will include financial modeling to define annual expenses (such as staffing, supplies, site support) and the necessary income (guests in each program model) to support a viable program model.

The outcome of the consultation will include vision definition for a stewardship program aligned with partner and constituent needs as well as an initial operating financial model to identify levels of use necessary for long term financial health.

Estimated Cost: \$13,500

Geotechnical Assessment

Geotechnical investigations will be required for several of the above actions. Most of the geotechnical work will entail determining the bearing capacity for foundations (relocated cabins) and piles (dock, stairway, and boardwalk). Work to be done would likely first entail hand-dug pits with follow up of several drill holes in key areas. Subsurface investigations could also help increase certainty on bluff-crest setback distances for existing and future development of the camp.

A significant portion of the investigation costs will be in mobilization of equipment and reporting. Therefore, planning ahead and aggregating the geotechnical assessments into one larger investigation could provide an overall cost savings.

Estimated Cost: \$50,000

Comprehensive Vegetation, Stormwater, and Trail Management Plan for Camp Colman

This plan will 1) assess the character and extent of the vegetation on site that will affect the management of stormwater, the stability of the bluff, and the erosion risk, 2) the existing stormwater flow patterns, the bluff stability and erosion risks associated with stormwater and

the opportunities to address those risks, and 3) an assessment of the existing trail network, its condition and suitability for the intended use, and its landslide and erosion risk. For each of the three topics to be covered in the study, the site will be analyzed and a list of prioritized recommended improvements will be developed along with planning level costs.

Estimated Cost: \$75,000

Taylor Property Pre-Design Study

A pre-design study is needed to determine the scope, scale, and budget for the new aquatics facility on the Taylor Property. The scope of work for this study is expected to include the following:

1. Development of a business plan
2. Defining program elements and space allocation
3. Site analysis
4. Concept level siting and layout options (three)
5. Preliminary building designs for the new pool and locker room facility
6. Marketing product of at least three renderings
7. Utility study
8. Permitting requirement identification
9. Building and construction cost estimates
10. Construction timeline

Estimated Range of Costs: \$250,000

SUMMARY OF COSTS AND TIMELINES

The most immediate needs for funding and adaptation of Camp Colman to support the Whiteman Cove restoration consists of stewardship program development consultation, geotechnical assessments for identifying optimal locations for structure relocation, comprehensive planning for vegetation, stormwater and trails, and the Taylor Property pre-design study (Table 2). Each of these efforts would be prerequisites to larger adaptation of Camp Colman infrastructure and would provide key information relevant to future decision making and priorities of Camp needs.

Recommended Supporting Investigations	Cost
Stewardship Program Development Consultation	\$15,000
Geotechnical Assessments	\$50,000
Comprehensive Vegetation, Stormwater, and Trail Management Plan	\$90,000
Taylor Property Pre-Design Study	\$250,000
Total	\$405,000

The actions that were identified and described (above) address various types of needs for Camp Colman resulting from the WDNR Restoration. These actions range from revised shoreline access, to moving at-risk camp infrastructure and reformatting general YMCA camp programming. The bulk of the costs are associated with adapting Camp infrastructure to the changing conditions associated with the restoration, including replacing the loss of the aquatics program (Table 3). The cost of reconfiguring camp access to the marine shoreline was also considerable. Mitigating risk and focused investment in YMCA programming were the least cost-intensive actions (Table 3). Fire Suppression (up to \$1,300,000) and Contingency Funds for potential regulatory driven mitigation that may be required to implement these actions (up to \$500,000) were also included as they represent large costs that will be required by the GS YMCA because of the WDNR restoration of Whiteman Cove.

Cost Type	Minimum	Maximum
Mitigate Risk	\$460,000	\$1,670,000
Access	\$1,808,000	\$3,444,000
Infrastructure	\$4,984,000	\$9,175,000
YMCA	\$125,000	\$175,000
Contingency Funds	\$300,000	\$500,000

Not all actions may be required or are appealing to the YMCA of Greater Seattle. Some critical decisions may represent more of a fork in the road where the selection of a specific course of action may result in another action no longer being necessary.

Following completion of the recommended supporting investigations outlined above, several of the cost estimates presented below will be refined and increased in accuracy. The actions to mitigate risk should be implemented without delay.

The current cost estimates (Table 4) reflect a general range based on Herrera’s existing understanding of the YMCA’s values and objectives and the Camp Colman properties. However, these costs are estimates and their accuracy is variable, largely due to the clarity and finality of decisions and supporting information relevant to the action. These costs also do not account for all land use and permitting requirements that may be triggered by developments. However, fire suppression requirements will be triggered by moving and/or rebuilding structures on the property, the costs of which are substantial. Therefore, these costs are included below. In

addition, funding to support some regulatory driven mitigation associated with each of these actions has been included.

Priority Actions	Type	Design + Permit + Build	
		Cost Low	Cost High
Relocate Cabins and Septic Pump Station	Mitigate Risk	\$400,000	\$1,500,000
Fire Suppression (required to meet fire code for relocation of cabins)	Infrastructure	\$1,000,000	\$1,300,000
Modify Shoreline Access to Whiteman Cove	Access	\$113,000	\$345,000
Remove Existing Boat House; Replace with Mobile Boat Storage	Infrastructure	\$38,000	\$75,000
Develop Mobile Marine Center + Truck	Infrastructure	\$195,000	\$220,000
Construct New Marine Education Center	Infrastructure	\$1,000,000	\$2,000,000
Relocate Firepit, Stage, and Storage Shed	Mitigate Risk	\$48,000	\$105,000
Develop and Implement Physical and Ecological Monitoring Program	YMCA	\$45,000	\$95,000
Rebuild Trail Along Whiteman Cove Shoreline	Access	\$87,000	\$309,000
Implement Plans for Taylor Property	Infrastructure	\$2,500,000	\$5,000,000
Vegetation Management	Mitigate Risk	\$12,000	\$65,000
Build Stewardship Program/Curriculum	YMCA	\$80,000	\$80,000
Stormwater Management	Infrastructure	\$143,000	\$240,000
Modify Existing Dock/Aquatics Program Center	Infrastructure	\$108,000	\$340,000
Construct New Dock on Case Inlet	Access	\$1,608,000	\$2,790,000
Contingency Funds ^a	Access	\$300,000	\$500,000
Total		\$7,677,000	\$14,964,000^b

^a Funding needed to mitigate impacts derived from different actions.

^b This cost estimate is in 2021 dollars.

In total the cost of all actions will range from \$7,677,000 to \$14,964,000 (in 2021 dollars), not including the recommended supporting investigations. The recommended supporting investigations can be funded by the Proviso. Additional funds will be required in the 2022–2023 supplemental budget to support development of YMCA programs and infrastructure and to mitigate risk prior to the restoration implementation, which is planned for summer of 2023.

Funding requests for the future have been escalated to reflect the use of 2021 dollars in the development of cost estimates. The escalation rate applied was 4 percent per year and was applied only to these data summaries in which the biennium requests are noted. For all funding requests we recommend requesting the upper end of the range as all actions are merely design concepts, and additional unexpected costs will indubitably occur.

Based on this analysis, the coarse status of these actions, Camp Colman’s operating needs, the timeline of the WDNR restoration, and the quick timeline in which these estimates were requested, Herrera recommends that the GS YMCA requests a total of \$1,406,080 from the

2022–2023 supplemental budget, and \$13,645,230 from the 2023–2025 biennium capital budget, to support the GS YMCA and Camp Colman adapting in response to the WDNR Whiteman Cove restoration (Table 5).

Table 5. Cost Estimates and Timeline.		
Timelines	Actions	Cost
Proviso/Current	Recommended Supporting Investigations: Stewardship Program Development; Geotechnical Assessments; Comprehensive Vegetation, Stormwater, and Trail Management Plan. Not to exceed the \$500,000 allotted within the Proviso.	\$405,000
Supplemental Budget 2022–2023	Fire Suppression	\$1,406,080
Needs for 2023–2025 Capital Budget	Relocate At Risk Cabins and Septic Pump, Remove Boat House and Replace with Trailer and Upland Boat Storage, Relocate Firepit, Stage and Shed, Modify Existing Dock/Aquatics Program, Implement Plans for Taylor Property, Build Stewardship Program/Curriculum, Modify Shoreline Access to Whiteman Cove, Develop Mobile Marine Center and Truck, Develop and Implement Physical and Ecological Monitoring Program, Rebuild Trail along Whiteman Cove Shoreline, Vegetation Management, Stormwater Management, Construct New Marine Education Center, Construct New Dock on Case Inlet, Contingency Funds	\$13,645,230

REFERENCES

Anchor QEA. 2015. Draft Preliminary Design Report Whiteman Cove Estuary Restoration. Anchor QEA, LLC, Bellingham, Washington.

Anchor QEA. 2020. Whiteman Cove Project Hydraulic Assessment. Anchor QEA, LLC, Bellingham, Washington.

WDNR. 2020. Whiteman Cove Project Feasibility Report, prepared for Washington State Department of Natural Resources by Anchor QEA, Blue Coast Engineering, and KPFF. Washington State Department of Natural Resources, Olympia, Washington.

APPENDIX A

Kaleidoscope Needs Assessment

YMCA Camp Colman Needs Assessment October 2021

Current Program and Operation

YMCA Camp Colman’s program is centered around the recreation, educational area and aesthetic of the enclosed saltwater lagoon. The identity and distinguishing character of the program, through marketing and branding has been the enclosed saltwater lagoon.

Three primary operating models comprise the YMCA’s program at Camp Colman: summer residential children and youth camps, outdoor environmental education (OEE) through the school year and retreat events for all ages including families, women’s groups, and parent/child events through the year.

With the re-creation of the current lagoon area, the impact on program will be significant.

	Current Use	Shifting with Project	Opportunities	Questions
Summer Camp	Swim, boating, kayaking, paddle board, water play (inflatables), program/teaching areas	Water activities will be limited to times of high tide and/or a very reduced area that retains sufficient water.	Expand program and teaching areas including environmental study, history of area	How to re-create daily water activity areas including area for swimming AND boating?
OEE	Boating, kayaking, paddleboard, education areas	Water activities will be limited to times of high tide and/or a very reduced area that retains sufficient water.	Expand education areas including new marine center, add program related to native populations, salmon recovery, etc.	Short term school groups (2-3 days) may not have access for use of boats, paddleboard.
Retreat	Boating, kayaking, paddle board, program/teaching areas	Water activities will be limited to times of high tide and/or a very reduced area that retains sufficient water.	Expand program and teaching areas including environmental study, history of area	How to re-create water activity areas for boating, especially during short term retreats (2-3 days)?

Other implications to the operating model may include the loss of key facilities on the property including guest cabins and a group campfire area. Replacing the number of bed capacity of lost guest cabins will be necessary as each operating model currently utilizes the space for guests. The group campfire area will be a key space to re-define as this setting is an integral part of evening program for all models, summer camp, OEE groups and retreat events.

As Camp Colman reviews and plans for each operating model, it is key to:

- Maintain full capacity of the summer camp program (the signature program and main income driver);
- Continue to develop retreat programs;
- Expand program quality and define the unique opportunities of OEE at Camp Colman.



YMCA Camp Colman

Needs Assessment

October 2021

The consultant's perspective is that the summer camp program is at most risk with the re-creation of the lagoon as play and adventure are key to building community, discovering self and teaching values of camp. Short term retreats can more easily adjust to the opportunities the site affords. OEE will have great opportunity to expand curriculum and create a unique model for schools.

Site Review - Program Perspective

Anderson Lodge (main lodge and dining hall) is the central core of all programs and is center to the layout of Camp Colman. Cabin villages for guests are built in relation to Anderson Lodge within short walking distance. The lagoon provides the expanded view from Anderson Lodge and the water front program area. Other program areas, such as adventure and an initiatives course are further from the core of the property. This classic layout provides guests easy access to the dining hall three times a day for meals. Kaleidoscope advises camps and planners to locate youth lodging within 900'-1,200' radius of dining, less in relation to terrain. Adult guests prefer lodging within 600' radius of the core. Common program areas are typically within the 1,200' radius with destination program areas beyond this distance.

Future Program Needs

For Camp Colman to continue offering the operating models key to their mission and identity, these areas need to be developed:

- Waterfront (with dock) to provide for boating, kayaking, paddleboard
- Pool for swimming, a daily activity for all guests in summer
- Marine Center for teaching to expand OEE quality and curriculum
- Relocated cabins
- Relocated group campfire area

Future Site Development – Mitigation of Changing Landscape

Waterfront

It is imperative that the re-shaping of the lagoon provide a waterfront for activity such as boats, kayaks, paddleboards. This area has been a primary activity for summer camp each day. With 200 campers in weeklong sessions, water access is a part of the daily rotation of camper groups so that each camper can experience the waterfront multiple times per week.

Pool / Aquatic Center

Daily swimming is a main summer camp activity for all campers. Locating a site for a pool is challenging on the Camp Colman property. For a swim period to be a part of the daily activity schedule, it needs to be located in close proximity to the core of camp. Locating a flat and open area in the core may not be possible without relocating other structures, creating a flat area and removal of vegetation. Areas to consider for development may include the garden area and the playfield. Both areas have challenges including close neighbors and current use. A potential area for development of a pool is the Camp Taylor property recently acquired by the YMCA. While this area is conducive for a pool, the location is challenging as it is a significant distance for campers. The program model would need to shift to create a destination area where camper groups could spend 3-4 hours with multiple recreation areas including a pool. Transportation (bus, bikes, secured hayride) will be necessary.



YMCA Camp Colman

Needs Assessment

October 2021

Marine Center

Close access to the water will allow for a unique and complimentary education center to expand curriculum and share the story of why this project is imperative to the ecology of the area.

Relocated Cabins and Group Campfire Ring

The property has limits to available land for new facilities, but cabins can be designed to work with the landscape and topography. Further study can define the best location for relocated cabins and new cabins that were proposed in a previous planning project by Camp Colman.

The group campfire area will be more challenging as it needs to be located within the core in a setting that captures the beauty and views of the location.

FUTURE VISION

The potential for Camp Colman to be an education center that provides teaching about the history of the area, the Squaxin Island Tribe, salmon lifecycle and marine ecosystems, and Northwest culture is significant with the re-created lagoon. Each of the three primary operating models will benefit from this opportunity to expand curriculum in each setting. The impact of recreation, especially for summer children and youth camp is a crucial concern. Camp Colman leaders will need to recreate the identity defining these questions:

- How to distinguish in YMCA summer camps in the Association?
- How to distinguish among OEE centers?
- How to appeal to retreat groups?

Recommended Next Steps

With the determination of the outcome of re-creating the lagoon, Camp Colman needs to update the master site plan to locate the displaced facilities and recreation functions, including:

- Waterfront
- Pool (and accompanying recreation areas, if remote from core)
- Marine center
- Relocated cabins
- Relocated group campfire area

The master site plan needs to review all current property use, potential areas to develop, define the scope of development to quantify necessary capacity of each facility or area, create initial concepts and elevations for primary initiatives and create an opinion of probable costs to identify development costs for each project in the updated plan.



APPENDIX B

Task 2 Risk Report



October 27, 2021

Gwen Ichinose-Bagley
Meredith Cambre
YMCA of Greater Seattle
909 Fourth Avenue
Seattle, WA 98104

Subject: Risks to Camp Colman from Whiteman Cove Restoration, Longbranch, Washington

Dear Gwen Ichinose-Bagley and Meredith Cambre:

The Herrera team reviewed relevant background information on the DNR Restoration of Whiteman Cove and visited the site to better understand baseline conditions at Camp Colman. Based on this early assessment of the site and our current understanding of the DNR restoration, we have compiled the following review of potential risks to the Camp Colman property and camp facilities. This Task 2 report will form the foundation for the Task 3 Conceptual Development Plan.

Sincerely,

Herrera Environmental Consultants, Inc.

Andrea MacLennan, MS Senior
Coastal Geomorphologist



Note:

Some pages in this document have been purposely skipped or blank pages inserted so that this document will print correctly when duplexed.



RISKS TO CAMP COLMAN FROM WHITEMAN COVE RESTORATION

LONGBRANCH, WASHINGTON

**Prepared for
Gwen Ichinose Bagley, Youth Development Officer
YMCA of Greater Seattle
909 Fourth Avenue
Seattle, WA 98104**

**Prepared by
Herrera Environmental Consultants, Inc.
2200 Sixth Avenue, Suite 1100
Seattle, Washington 98121
Telephone: 206-441-9080**

**DRAFT
October 27, 2021**

CONTENTS

Objectives.....	1
Background	1
Historical Conditions.....	3
Summary of Changes Resulting from Restoration	6
Data Gaps & Uncertainties	11
Current Camp Use.....	12
Areas at Risk Due to Whiteman Cove Restoration.....	12
Areas At Risk of Flooding.....	12
Areas at Risk of Erosion	15
Recommendations.....	15
Modify Existing Dock/Aquatics Program Center.....	15
Monitor	16
Stormwater Management.....	17
Vegetation Management.....	17
Relocating Camp Infrastructure.....	18
Next Steps.....	19
References.....	20

TABLES

Table 1. Tidal Datums at Whiteman Cove (AnchorQEA 2020).....	7
--	---

FIGURES

Figure 1. Whiteman Cove and Camp Colman Vicinity Map.....	2
Figure 2. 1955 Aerial Image, Whiteman Cove (USGS).	4
Figure 3. 1961 Aerial Photo, Whiteman Cove (Pacific Aerial Surveys).....	5
Figure 4. 2019 Aerial Photo, Whiteman Cove (Pierce County).	5
Figure 5. Draft Conceptual Design, Option 3 (AnchorQEA 2015).....	6
Figure 6. Predicted Water Surface Elevations in Whiteman Cove and Case Inlet (Anchor QEA, 2020).	8
Figure 7. Water Depth During Low Tide Conditions, Based on Modeling Results (from Anchor QEA 2020; Appendix A).....	9
Figure 8. Stages of Bluff Recession from the Toe Up the Bluff Face Resulting from Rise in Water Level from (Krueger, 2019).....	11
Figure 9. Areas at Risk of Flooding Following Whiteman cove Fish Passage Restoration.....	13
Figure 10. Areas at Risk of Erosion Following Whiteman Cove Fish Passage Restoration.....	14
Figure 11. Existing Cement Anchors for Docks in Whiteman Cove.....	15
Figure 12. Gangway, Decking, and Access Stairs Will Need To Be Rebuilt to Accommodate Restored Water Level.....	16
Figure 13. Rills from stormwater Flowing Down the Uplands to the Bluff Face.....	17
Figure 14. Henderson and Rotary Cabins in Close Proximity to the Bluff Crest.....	18
Figure 15. Close Proximity of Storage Shed to Bluff Crest.....	19

OBJECTIVES

YMCA Camp Colman is located along the south shore of Whiteman Cove, on northeast Case Inlet, in Pierce County, Washington (Figure 1). The Washington Department of Natural Resources plans to conduct a large-scale restoration of the tidal channel that flows into Whiteman Cove, which was blocked in 1962. Restoration of tidal flow will result in inherent changes to the Camp Colman property including areas of increased flooding and erosion, as well as unique opportunities for environmental education and stewardship.

The objectives of this study are to evaluate site conditions, document likely changes to nearshore conditions on the YMCA Properties, identify potential risks to camp infrastructure, and outline opportunities for the Camp's waterfront programs.

This report consists of a summary of relevant background conditions at the site, followed by a summary of likely impacts to the Camp Colman property, and recommendations for Camp Colman infrastructure that will likely be affected following the DNR restoration. These recommendations and results will be then integrated to develop an alternatives analysis to guide the selection of a preferred design concept to address the ongoing combined issues of stormwater management and bluff recession.

BACKGROUND

The subject property, YMCA Camp Colman, is located along the south shore of Whiteman Cove, on northeast Case Inlet in Pierce County, Washington. In its current state, Whiteman Cove is separated from Case Inlet by a filled historical tidal channel, on top of which runs Bay Road (Figure 1). This road provides the primary vehicular access to YMCA Camp Colman. Limited hydrologic exchange between Whiteman Cove and Case Inlet occurs through two large, gated culverts underneath Bay Road.

Under the 2013 federal court ruling *U.S. v Washington*, the State of Washington has an obligation under treaty agreements with 21 tribes to protect and preserve tribal fishing rights. This obligation includes restoration of fish passage at "dams, culverts, tide gates, dikes, and other instream structures" (United States v. Washington, 2013). In accordance with the ruling, DNR is seeking to remove the tide gate under state ownership at Whiteman Cove and restore fish passage between Whiteman Cove and Case Inlet (DNR, 2021).



Legend




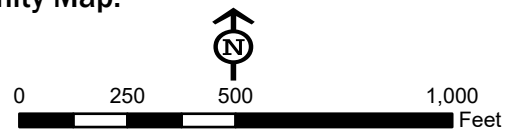
-  YMCA Parcels
-  Pierce County Tax Parcels
-  Roads



Figure 1.
Whiteman Cove and Camp Colman
Vicinity Map.



A preliminary restoration feasibility study requested by DNR in 2015 found that restoration of fish passage would require a tide channel greater than 40 feet wide to ensure that water velocities did not limit fish movement between Whiteman Cove and Case Inlet (Anchor QEA, 2015). This minimum size limitation informed the 2020 hydrologic assessment of the site, which evaluated four alternative fish passage restoration designs (Anchor QEA, Blue Coast Engineering, KPFF, 2020). Each alternative would restore fish passage while maintaining or rerouting vehicular access to Camp Colman. These alternatives included:

- Option 1: A new gated control structure at the current location of the DNR control structure, with improvements to access to Camp Colman
- Option 2: New weir control structure at historical opening to the north, with improvements to access to Camp Colman
- Option 3: Open channel at historical opening to the north; construct a bridge over the new opening to maintain vehicle access to Camp Colman
- Option 4: Open channel at historical opening to the north; construct a new road along existing, undeveloped county right-of-way from south into Camp Colman

The 2020 hydrologic assessment and feasibility report were provided to stakeholders, including local Tribal governments, YMCA Camp Colman representatives, and private property owners, for feedback on proposed alternatives and associated costs and impacts. Based on this feedback, DNR selected Option 3 as the preferred alternative for restoration (DNR, 2021).

Historical Conditions

Prior to the 1960's, Whiteman Cove functioned as a tidally-influenced barrier estuarine lagoon with a tidal channel connecting the lagoon (Whiteman Cove) to Case Inlet (Figure 2). This tide channel was closed off in 1962 by the Washington Department of Fisheries in order to create a saltwater lake (also described as a "perched brackish water lagoon") suitable for rearing juvenile salmon (DNR, 2021; Figure 3). An intermittent freshwater stream outlets to Whiteman Cove's eastern extent, contributing to brackish conditions in the lagoon (Anchor QEA, Blue Coast Engineering, KPFF, 2020).

With the 1962 conversion to a fishery site, tidal exchange at Whiteman Cove was redirected to two large, gated culverts along the barrier (spit), allowing for restricted water flow in and out of the embayment. The historic tidal channel was filled and paved over, and currently provides vehicular access to YMCA Camp Colman. Use of Whiteman Cove as a managed fishery site was discontinued in the 1970s, but the road and associated tide gate infrastructure were left in place at the site (DNR, 2021).

In current conditions, minimal tidal exchange occurs between Whiteman Cove and Case Inlet, and the potential for fish passage into Whiteman Cove is relatively low (Figure 4). A 2012 WDFW

survey found that the northern gated culvert was completely impassable. The passage utility of the southern culvert is unknown but was found to be at least somewhat obstructed in a 2000 field survey by Pierce Conservation District (Anchor QEA, Blue Coast Engineering, KPFF, 2020).



Figure 2. 1955 Aerial Image, Whiteman Cove (USGS).



Figure 3. 1961 Aerial Photo, Whiteman Cove (Pacific Aerial Surveys)



Figure 4. 2019 Aerial Photo, Whiteman Cove (Pierce County).

Summary of Changes Resulting from Restoration

DNR has been working with a consultant team lead by Anchor QEA on preliminary studies and engineering designs for the restored tidal flushing in Whiteman Cove. Of the proposed restoration options, Option 3, consisting of an open channel with a bridge to maintain current access to Camp Colman, was selected to meet the needs of the injunction to restore fish passage to and from Whiteman Cove (Figure 5).

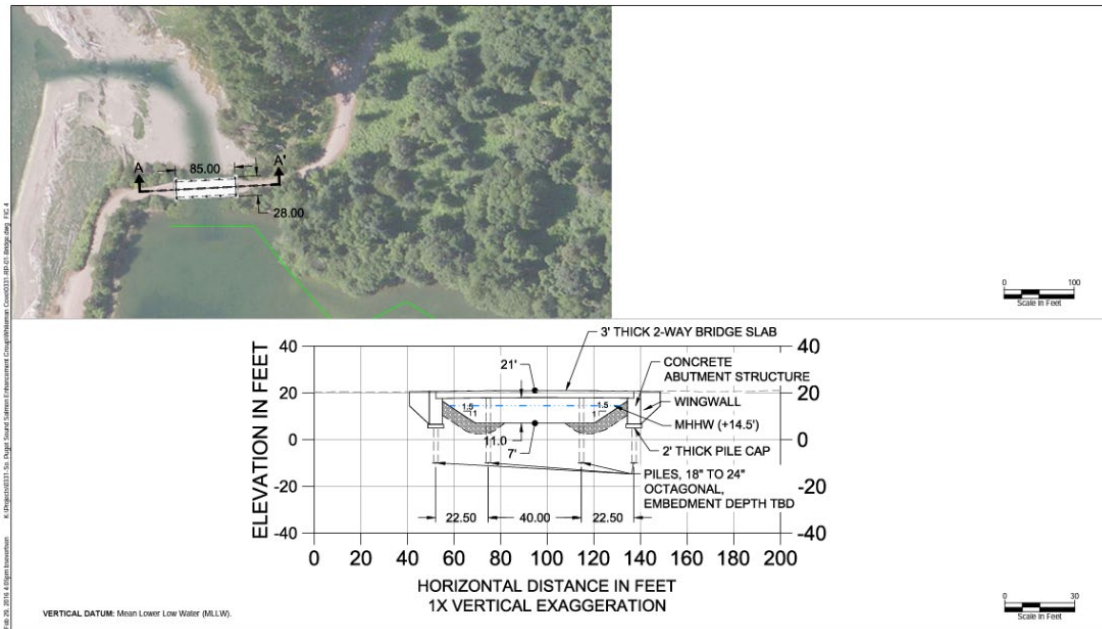


Figure 5. Draft Conceptual Design, Option 3 (AnchorQEA 2015).

The selected design alternative, Option 3, would restore regular tidal inundation to Whiteman Cove in the vicinity of the historical tidal channel. This would be accomplished through removal of a portion of the fill across the historical tidal channel and the associated gated culverts (on DNR-owned land). A 100-foot (single/multi-span) bridge would be constructed over the reopened channel (Anchor QEA, 2015).

Per design details in the 2020 hydraulic assessment and feasibility report by Anchor QEA and others, the restored tidal channel design will have a natural (sand and gravel) bottom and will be aligned due north from Whiteman Cove. The channel would be designed at the elevation of the historical channel, thought to be about 3 feet NAVD88 (+7 feet mean lower low water (MLLW)). The elevation of the bottom of the channel (thalweg) would be allowed to fluctuate but is expected to remain stable within a range of a several feet over the long term. The channel will gradually curl to the northwest and connect with Case Inlet at a bed elevation of approximately +2 feet NAVD88 (+6 feet MLLW; Anchor QEA, Blue Coast Engineering, KPFF, 2020).

The restored inlet would measure approximately 550 feet long with a bed slope of 0.002. At its maximum, the restored channel would measure approximately 85 feet in width at the mean higher high water (MHHW) elevation (+10.4 feet NAVD88) and approximately 62 feet wide at

the thalweg (+3 feet NAVD88). The channel side slopes would be set to a slope of 1.5H (horizontal):1V (vertical). This option would also include a bridge and abutments along the existing alignment of the access road. The bridge design would entail adequate freeboard above extreme water levels. As such, the bridge deck is not expected to affect the hydraulics of the inlet (Anchor QEA, 2020).

Restored water levels in the lagoon would be synchronized with Case Inlet, except when tides are below the elevation of the bottom of the channel. Although the proposed restored tidal channel would be considerably smaller than the width of the historical opening (which was between 100 and 120 feet wide; Anchor QEA 2020), results of 2D model simulations show that tidal exchange will be similar to historical conditions (Anchor QEA, 2020).

As a result of the proposed restoration approach, full inundation and drying of Whiteman Cove will be restored over the tidal cycle. Currently water surface elevations (WSE) in the Cove currently range from 13 feet MLLW (+9 feet NAVD88) to 14.5 feet MLLW (+10.5 feet NAVD88) but remain relatively constant at +13 feet MLLW (or 8.9 feet NAVD88; Table 1; Figure 6; Anchor QEA 2020). Following restoration, WSE within the Cove will be lower than the current water level elevation roughly 85 percent of the time, and higher than current water levels between 5 percent and 20 percent of the time over the course of a year (Anchor QEA, 2020).

During low tides in Case Inlet, the water level in the cove will drop approximately 6 feet below the current water level. This will result in most of the cove going dry at tides lower than 7 feet MLLW (+3 feet NAVD88). The tide is expected to be lower than this value about 30 percent of the time over the year (Anchor QEA, 2020). Increases in WSE from current conditions will primarily occur during high tides. However, as a result of the restored tidal flushing, the inner shoreline of Whiteman Cove will be more vulnerable to high water events, including storm surges caused by low pressure systems in the region as well as sea level rise. The effective 100-year Federal Emergency Management Agency (FEMA) flood elevation in Whiteman Cove is currently 17.1 feet MLLW (+13 feet NAVD88). Sea level rise projections for 2050 will likely contribute an additional 0.7 feet of water surface elevation, and considerably more between 2050 and 2100 (Miller, et al., 2020).

Tidal Datum	Elevations Relative to MLLW (feet)	Elevation NAVD88 (feet)
Current water level in Whiteman Cove	14.1	10
MHHW	14.5	10.4
Highest Astronomical Tide (HAT)	16.5	12.4
FEMA 100-year flood elevation	17.3	13
Mean higher high water (MHHW)	14.5	10.4
MHHW + SLR by 2050 (0.7 foot)	15.2	11.1
HAT + SLR by 2050 (0.7 foot)	17.2	13.1
FEMA 100-year elevation without wave run-up + SLR by 2050 (0.7 foot)	18	13.9

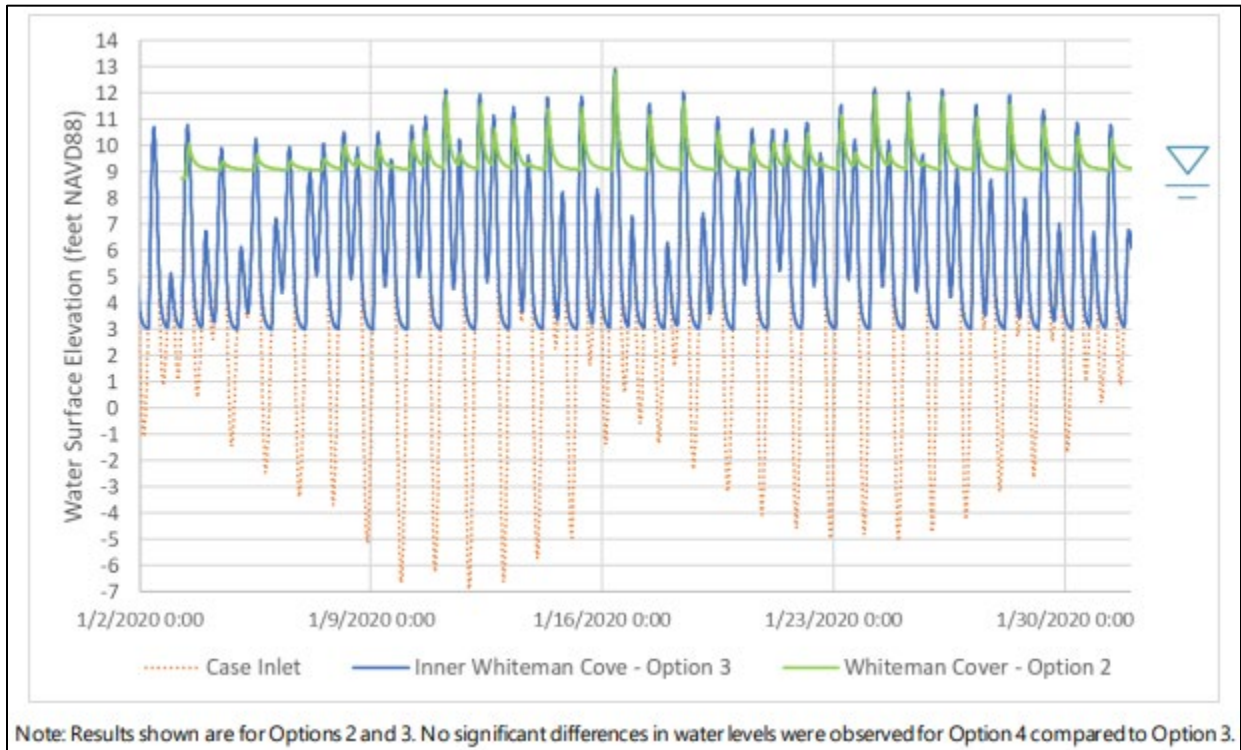


Figure 6. Predicted Water Surface Elevations in Whiteman Cove and Case Inlet (Anchor QEA, 2020).

The decrease in WSE at Whiteman Cove will have implications on the usability of the lagoon for swimming and boating. Additionally, the natural processes and decay of organic material is likely to contribute to sulfur-like odors during low tides in the lagoon. When low tides in Case Inlet drop below the proposed thalweg (lowest elevation in the restored tidal channel; 7 feet MLLW, +3 feet NAVD88) most of the lagoon shore will be dry with some ponding in areas below the thalweg elevation. Water levels are expected to be lower than 7 feet MLLW about 35 percent of the time over a typical year (Anchor QEA 2020). Figure 7 shows the areas in which there will likely be ponded water, based on the existing restoration design and recent bathymetric mapping.

Although more limited in frequency, there will also be regular times during which the WSE in Whiteman Cove is higher than the current elevation of +13 feet MLLW (8.9 feet NAVD 88). Anchor QEA’s hydraulic modeling outputs showed that heightened WSE could range from a few inches to up to three (or more)h higher in Whiteman Cove, primarily during higher-high tides. Less frequently, but still regularly (several days per month), water surface elevations will exceed 13 feet twice per day (Anchor QEA, 2020).



Figure 7. Water Depth During Low Tide Conditions, Based on Modeling Results (from Anchor QEA 2020; Appendix A).

The additional WSE will result in flooding of areas that are not currently subjected to salt water, which will be discussed further below (see *Areas at Risk of Flooding*). The additional areas flooded with salt water will result in a broader band of salt marsh vegetation within the Cove, likely within the elevations of 9 to 11 feet NAVD88 (13.1 to 17.1 feet MLLW). Expanded saltwater inundation will also result in changes to riparian vegetation along the shoreline, such as die-back of less salt tolerant upland vegetation that have grown in since the tide channel was filled, including trees along the shoreline of the Cove.

The added WSE will also affect the stability of the bluff along the south shore of the Cove, where Camp Colman is currently centered. Reintroducing tidal waters to the bluff toe will result in natural coastal bluff recession processes, which demonstrate a dynamic equilibrium between the water level, the toe of the bluff and the bluff crest. Water table elevations and bluff geology can also contribute to bluff erosion rates. As WSE increases against the toe of the bluff, the saturated bluff toe will erode and become undermined, which will drive landward adjustment up the bluff face and recession eventual recession of the bluff crest.

Bluff geology on the Camp Colman property is largely a product of the last period of glaciation, the Vashon Stade of the Fraser Glaciation, which ended roughly 14,000 years ago. Locally, glacial till is mapped overlying advance outwash sands (Powell, 2018). Glacial till is described as an unsorted and highly compacted mixture of clay, silt, sand and gravel deposited directly by glacier ice (Logan et al. 2003). Beneath the glacial till, glacial outwash sands were mapped and described as sand and gravel and lacustrine clay, silt and sand of northern source, deposited

during glacial advance, generally permeable with low cohesivity relative to overlying and underlying sediments and subject to deep-seated sliding (Logan et al. 2003). Further east, including the Taylor property, surface geology is mapped as lacustrine clayey and fine sandy silt (Logan et al. 2003).

Landslide deposits have also been mapped in the area by Pierce County and DNR. Pierce County mapped much of the Camp Colman uplands as being within potential landslide hazard areas due to the bluff geology and slope (Pierce County PLS, 2018). Coring data showed that water was perched due to the poorly draining glacial till, in which ponded water can often be observed at the surface following periods of heavy rain. Soils mapped near the Whiteman Cove shoreline consist of surface soils from the Kitsap-Indianola complex, at 45- to-70-degree slopes. These soils are listed as a severe erosion hazard. The corresponding geologic unit for these soils is glaciolacustrine deposits. Farther south, soils are sandier and are considered only a moderate erosion hazard (Powell, 2018).

Previous studies have been conducted of bluffs with similar glacial geology along the shores of Lake Michigan, which has incurred dramatic changes in water surface elevations (Krueger, 2019). Higher bluff slope angles were found to result in a greater percentage of the bluff face being unstable, though all bluffs showed spatial and temporal variability in response to mechanisms that triggered erosion events (such as heavy precipitation events; Krueger, 2019). In addition, shallow bluff failures (less than 3 feet in depth) occurred as a series of events instead of as one mass movement (Krueger, 2019). Bluffs comprised of less cohesive sandy bluff sediment exhibited more failures relative to those comprised of till-like units. Pore water pressure and water table elevation also contributed to unstable bluff surfaces (Krueger, 2019).

The pace at which this process of erosion will occur is uncertain. Krueger et al. (2019) found that the average time between water level increase and erosion events was approximately 5 years, resulting in landslide propagation up the bluff face at an average rate of approximately 6 to 14 feet per year (Figure 8). The bluffs within the Cove at Camp Colman are likely to adjust at a significantly slower pace due to the lack of wave energy within the Cove to transport landslide colluvium eastward, which temporarily buffers the toe of the slope from additional erosion. The bluff-derived sediment deposited on the lagoon beach will eventually erode, however, and this cycle of bluff recession will resume, as it does on all coastal slopes. This natural coastal bluff erosion process will persist over time due to additional WSE adjustments associated with sea level rise.

Landslides occur almost every year in the Puget Sound region during the wet season, which typically lasts from October through April. Previous research has documented a known precipitation threshold for when landslides are most likely to occur in the region. Shallow landslides most commonly occur during and following approximately 3 days of very heavy precipitation, longer periods (15 to 32 days) of substantial rainfall or some combination of the two (Scheevel et al. 2017). Coastal bluffs landslide susceptibility is greater when high water events coincide with periods of heavy precipitation. Therefore landslide activity is most likely to occur on the Camp Colman bluffs during heavy rains at Camp Colman over the 5 to 10 years that follow restoration at Whiteman Cove and more gradually in the years that follow that.

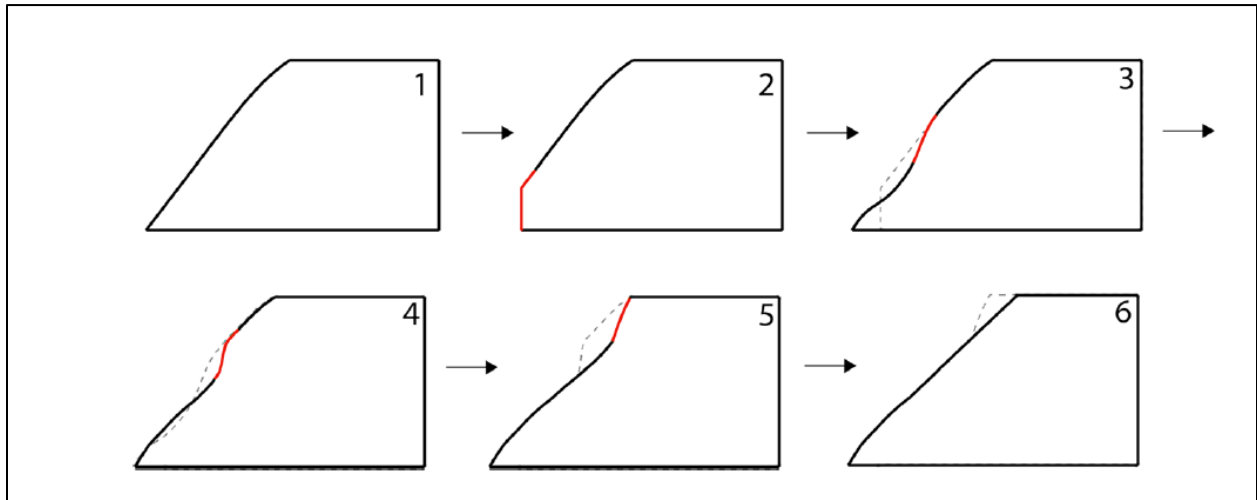


Figure 8. Stages of Bluff Recession from the Toe Up the Bluff Face Resulting from Rise in Water Level from (Krueger, 2019)

DATA GAPS & UNCERTAINTIES

There are several data gaps and uncertainties associated with the implications of the Whiteman Cove restoration on the Camp Colman property. Accurate, recent site topographic mapping is critical to both understanding bluff geometry and identifying precise elevations within the buffer where most change is likely to occur – primarily from the beach to the uplands. Understanding the current shape of the bluff profile and its natural angle of repose will aid in the interpretation of how the bluff will respond to the heightened water levels as well as the likely pace of bluff crest recession, which has obvious implications on the safety of Camp Colman buildings and infrastructure. Although very informative, LIDAR data is of coarse resolution and is not optimal in areas where there is very dense forested vegetation.

Additional specifications and model outputs associated with the restoration design are also relevant to forecasting changes that may occur on the Camp Colman properties. Specific design details, such as the restored channel geometry and changes to lagoon bathymetry, will have implications on water surface elevations within the restored lagoon. Currently, it is uncertain whether additional dredging or filling in the lagoon basin will be conducted to recreate historical conditions.

Background bluff recession rates within the lagoon are also uncertain. Background bluff recession rates are long-term erosion rates from the time prior to the closure of the tidal channel and the relatively static water surface elevations within the lagoon. There is no known data on bluff recession rates within the lagoon, though they are likely to be similar to other coastal bluffs in southern Puget Sound with minimal wave exposure, similar upland geology, and similar tidal range. The expected rate of bluff retreat for these conditions would likely range from 0.05 to 0.20 feet per year (CGS, 2018).

Future rates of sea level rise will also contribute to both flooding and erosion hazards at Camp Colman. Although best available science (Miller, et al., 2018) exist for sea level rise projections in the Puget Sound region, there is considerable uncertainty with respect to the timelines in which sea level rise will occur, particularly beyond 2050, when their impacts to bluff stability will be most profound.

CURRENT CAMP USE

Primary site uses at Camp Colman center around recreation and education in the existing Whiteman Cove saltwater lagoon. This includes swimming and watercraft use of the lagoon by various user groups (child/youth recreation, all-ages outdoor education, organizational retreat groups, etc.). It is anticipated that restored tidal cycles and lower average water levels in Whiteman Cove will reduce the times and areas in which water is accessible for recreation and education activities. A needs assessment describing current uses, anticipated impacts, recommended actions, and opportunities for new program growth and site utilization is included in Appendix A (Oates, 2021).

AREAS AT RISK DUE TO WHITEMAN COVE RESTORATION

Risks to Camp Colman associated with the restoration were broadly categorized as risks from either flooding or erosion resulting from the restored tidal flow in Whiteman Cove. These risks are both described in the following sections as well as spatially in Figures 9 and 10.

Areas At Risk of Flooding

Risk associated with flooding were identified by elevation using the Pierce County LIDAR data (2011), slope data and water surface elevation data. We recommend that these areas be re-evaluated following acquisition of additional, more-current topographic survey data. The risk of flooding will increase over time at Camp Colman, but the most dramatic changes will likely occur within a few years following restoration of tidal flushing and then continually due to additional water level contributed from SLR.

The initial impacts to Whiteman Cove include inundation and potential erosion of the coastal path that extend along the southwest shore of Whiteman Cove, the historical marine science center, and the aquatics program area. Eventually the coastal road will be breached by waves, which could contribute additional erosion of the shoreline (Figure 9).



Figure 9. Areas at Risk of Flooding Following Whiteman Cove Fish Passage Restoration.

- Legend**
- Flood Hazard Areas
 - Roads
 - YMCA Parcels
 - Pierce County Tax Parcels







Figure 10. Areas at Risk of Erosion Following Whiteman Cove Fish Passage Restoration.

- Legend**
- Erosion Hazard Areas
 - Roads
 - YMCA Parcels
 - Pierce County Tax Parcels





Areas at Risk of Erosion

Areas at risk of erosion within Whiteman Cove are shown in Figure 10. These areas of heightened erosion risk will increase over time and were identified by evaluating slope, geology, and site topography. These areas should be re-evaluated if and when updated site topography data is available. Erosion hazard areas are primarily along the south face of the bluffs where the slope gradient is highest, and along some areas of the spit (Figure 10). The most concerning areas at risk of erosion include the locations near cabins, the access stairway and ramp to the aquatics area, and the firepit area, which has a very steep drop-off that will soon be inundated with tidal waters.

RECOMMENDATIONS

These recommendations are based on mapped risk areas associated with the restoration of Whiteman Cove. Each recommendation considers potential risk to campers in an uncertain, changing environment.

Modify Existing Dock/Aquatics Program Center

The current cement anchors are insufficient for the restored tidal environment (Figure 11). These anchors should be replaced with piles that will allow the dock and other overwater structures to rise and fall with the tide and be secured in the same position, particularly during storms. The current, fixed attachment of the dock to the shore does not allow for the rise and fall of tides expected after restoration.



Figure 11. Existing Cement Anchors for Docks in Whiteman Cove.

A new gangway will be required, secured to a deck or pier elevated above the highest tides to allow for vertical movement of the dock (Figure 12). Part of the existing decking along the access stairs could be repurposed for attaching the gangway. The access stairway to the aquatics program area should be rebuilt with its footings set at a higher elevation, and potentially repositioned to traverse a less steep area, as the bluff face is very steep and vulnerable to future erosion following restoration. The boat house located at the toe of the bluff should also be either relocated or an additional suitable location for storage should be constructed near the shoreline. Alternatively, although likely at a higher cost, a floating storage structure could be incorporated into the dock.



Figure 12. Gangway, Decking, and Access Stairs Will Need To Be Rebuilt to Accommodate Restored Water Level.

Monitor

Having a clear baseline understanding of nearshore conditions prior to and immediately following restoration will be an important element of documenting impacts of the restoration as they occur. Regular monitoring provides useful data that can be used to answer questions about the past and future of site conditions and empowers site managers to make sound decisions. Annual topographic surveys can be used to document surface erosion and document erosion rates over time.

Additional ecological monitoring could be conducted to document the changes and benefits of restoration, including presence of marine species (Figure 11, note crab), birds, fish, marine riparian areas (shoreline vegetation), and large woody debris presence. Some monitoring should be conducted in the field by professionals, but there is considerable opportunity to expand this opportunity to the camper community. An important element of any survey is having regular references points from which to collect photos and other measurements.

Stormwater Management

The combination of shallow groundwater at the site, documented poor permeability of the underlying geology, and presence of soils that are vulnerable to erosion suggests that improved stormwater management could benefit erosion hazard areas. Water from gutters and parking lots should not be allowed to flow directly down the bluff face but should be captured and dissipated in areas with low slopes and dense upland vegetation or tightlined directly to base of the bluff (Figure 13). Additional data on the existing topography and drainage infrastructure will be required for design of a stormwater management system.



Figure 13. Rills from stormwater Flowing Down the Uplands to the Bluff Face.

Vegetation Management

Enhancing native vegetation cover, particularly in areas at risk of erosion, will help to reduce erosion vulnerability along the bluff shoreline. Conifers should be planted landward of the bluff crest to provide additional water absorption and structure to bluff soils. As older, existing trees are eventually eroded from the bluff, planting these additional trees will ensure that trees are perpetually enhancing the stability of the bluff, particularly along steep shoreline areas. Over time, recruitment of large woody debris (LWD) from lower elevations of the bluff face will occur, with trees falling to the beach and bluff toe. Consider hiring an arborist to actively manage the ways in which trees erode from the bluff.

Non-native English ivy (*Helix hedera*) and Himalayan blackberry (*Rubus armeniacas*) should be removed from trees and surrounding soils where possible. Ivy and blackberry can impair the growth and health of other native shrubs and trees, create a monoculture, and exclude the growth of other plant species that contribute to soil stability. This has already happened in some

areas where invasive species are abundant, particularly along the bluff face waterward of the lodge.

Relocating Camp Infrastructure

Cabins that are near the bluff crest should be relocated farther landward (Figures 14 and 15). Of primary concern is Henderson and Rotary cabins, which already exhibit signs of soil creep around them (e.g., tree bases bent toward the water). Additional topographic survey of the steep bluffs will help identify a recommended setback distance and potential areas for relocation.

Similarly, the campfire ring and shed should be relocated to a location away from the bluff crest (Figure 15). Examination of the bluff showed obvious signs of instability just below the fence in that location, with roots exposed up to 12 inches from the edge where the bluff has been slowly eroding out from under the trees.



Figure 14. Henderson and Rotary Cabins in Close Proximity to the Bluff Crest.



Figure 15. Close Proximity of Storage Shed to Bluff Crest.

Next Steps

This report represents the first deliverable and presents Herrera’s assessment of existing conditions and the potential risks associated with Whiteman Cove Restoration. The next report will focus on providing a conceptual development plan that focuses on adapting to the risks and opportunities associated with restoration of tidal flow within Whiteman Cove. Opportunity areas will be ranked with relevant supporting information compiled on project costs, permitting requirements, and YMCA cultural values. Design concepts, cost estimates, and permitting recommendations will be developed for the highest-ranking opportunities.

REFERENCES

- Anchor QEA. (2015). *Draft Preliminary Design Report Whiteman Cove Estuary Restoration*. Bellingham: Anchor QEA, LLC.
- Anchor QEA. (2020). *Whiteman Cove Project Hydraulic Assessment*. Bellingham: Anchor QEA, LLC.
- Anchor QEA, Blue Coast Engineering, KPFF. (2020). *Whiteman Cove Project Feasibility Report*. Olympia: Washington State Department of Natural Resources.
- CGS. (2018). Long-term bluff recession rates in Puget Sound: Implications for the prioritization and design of restoration projects. Bellingham, WA.
- DNR. (2021). *Whiteman Cove Restoration*. Retrieved from Washington State Department of Natural Resources: <https://www.dnr.wa.gov/whitemancoverestoration>
- DOE. (1979). Pierce County Slope Stability Maps. *Washington State Coastal Zone Atlas, Volume 7*. Olympia.
- Krueger, R. (2019). Three-dimensional stability analysis fo bluffs along the Lake Michigan shoreline in eastern Wisconsin. Madison, WI: University of Wisconsin - Madison.
- Logan, R. Walsh, T., and Polenz, M. (2003). Geologic Map of the Longbranch 7.5-minute Quadrangle, Thurston, Pierce and Mason Counties, Washington. Prepared by Washington Department of Natural Resources: Division of Geology and Earth Resources Open File Report 2003-21.
- Miller, I. M., Morgan, H., Mauger, G., Newton, T., Weldon, R., Schmidt, D., . . . Grossman, E. (2018). *Projected Sea Level Rise for Washington State – A 2018 Assessment*. Seattle: A collaboration of Washington Sea Grant, University of Washington Climate Impacts Group, University of Oregon, University of Washington, and US Geological Survey. Prepared for the Washington Coastal Resilience Project.
- Miller, I. M., Morgan, H., Mauger, G., Newton, T., Weldon, R., Schmidt, D., . . . Grossman, E. (2020). *Projected Sea Level Rise for Washington State – A 2018 Assessment*. A collaboration of Washington Sea Grant, University of Washington Climate Impacts Group, Oregon State University, University of Washington, and U.S. Geological Survey. Pierce County: Washington Coastal Resilience Project.
- Oates, J. (2021). *YMCA Camp Colman Needs Assessment*. Westerville, OH: Kaleidoscope, Inc.
- Pierce County PLS. (2018). *Possible Site Constraint - Landslide Hazard Area*. Tacoma: Pierce County Planning and Land Services.
- Powell, R. B. (2018). *Geotechnical Engineering Assessment*. Tacoma: Robinson-Noble.

Sheevel, C., Baum, R., Mirus, B., Smith J. (2017.) Precipitation Thresholds for Landslide Occurrence Near Seattle, Mukilteo and Everett, Washington. USGS Open-File Report 2017-1039. 60p.

United States v. Washington, No. C70-9213 (W.D. Wash March 29, 2013).

