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Introduction

This section summarizes the analysis methods used to develop the final prioritized list of natural resource (wetlands, riparian, and floodplain) restoration and/or enhancement sites and the results of that analysis for the Nisqually Bluff Study Area of the Nisqually Watershed. The final stage of the watershed characterization analysis combines the ecological benefits of each DAU and the environmental benefits of each natural resource site to develop a list of natural resource sites that will provide the greatest functional “lift” in the Study Area.

Part I. What are the Landscape Conditions in the Nisqually Bluff Study Area?

Current conditions

Current land-use within the Nisqually Bluff Study Area was determined by processing Aerial photography and SPOT 10 meter satellite imagery captured in 2009. The results presented in Figures 9.0 and 9.1 indicate that approximately 20% of the Nisqually Bluff Study Area is covered by the built environment. The Nisqually Bluff Study Area is primarily residential.

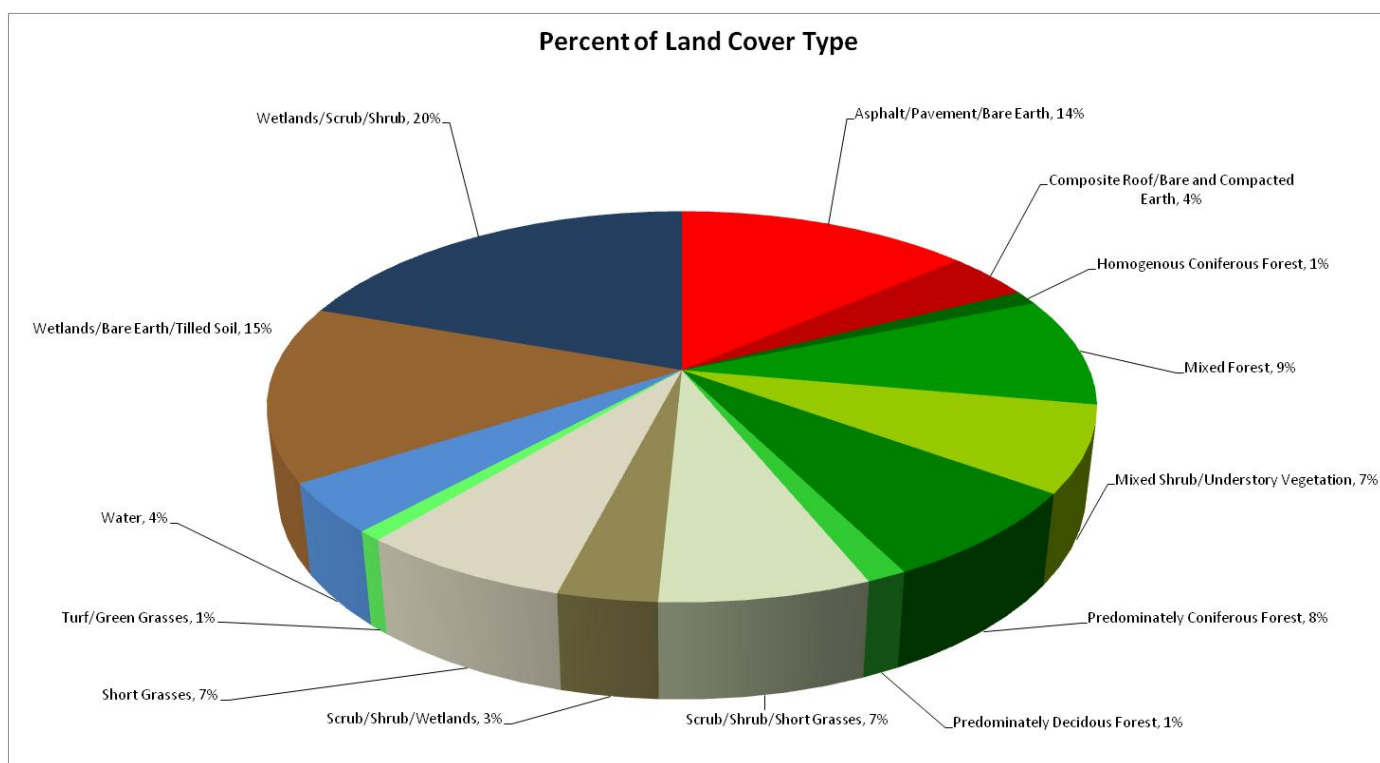


Figure 9.0 Classification Percent Totals for Nisqually Bluff Study Area
Land cover data from 2009 SPOT imagery.

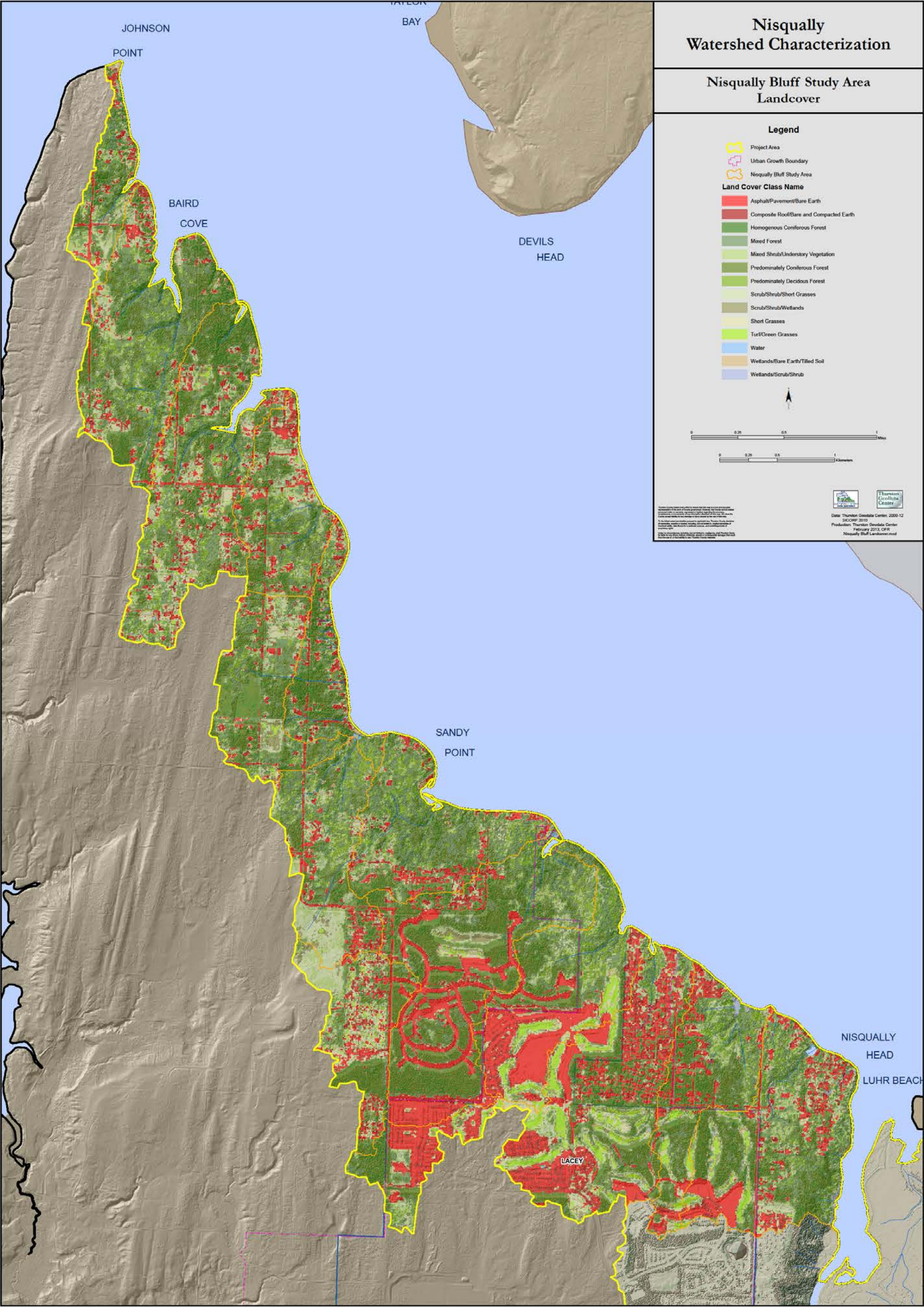


Figure 9.1 Nisqually Bluff Study Area Land Cover

Part II. Characterize Condition of Ecological Processes in Study Area

Five ecological processes and habitat connectivity were assessed. The five ecological processes include the delivery and movement of water, sediment, wood, pollutants, and heat. As outlined in the Methods Document (Appendix A of this document) the Matrix of Pathways and Indicators (MPI) was used to determine the function of each ecological process and biological indicator at the DAU scale. Following the assessment of each individual ecological process and habitat connectivity, the Rules and Assumptions (Tables 3-8 in the Methods document) were used to rank each DAU as Properly Functioning (PF), At Risk (AR), or Not Properly Functioning (NPF). For complete details of the values used in the MPI, please consult Table 2 in the Methods document. For complete details of the Rules and Assumptions, please consult Tables 3 through 8 in the Methods document.

There is 24 DAUs totaling 9,076 acres (14 sq miles) in the Nisqually Bluff Study Area.

Determine the Ecological Benefit of the DAU

The assessment of each individual ecological process and habitat connectivity using the indicators listed in Chapter One and the Methods MPI, and the application of the Rules and describe a baseline condition of ecological health for each DAU. All DAUs are identified for further consideration. DAUs in the “At Risk” category for multiple key ecological processes are assumed to provide the greatest potential to maximize environmental benefits when natural resource sites are restored within that DAU. A N/A indicates that there is no data for that DAU.

Table 9.0 describes the function level of five ecological process and habitat connectivity as PF, AR, or NPF.

Table 9.0 Nisqually Bluff Ecological and Biological Function Rank

DAU Id	Ecological Processes							Biological Element
	Acres	Sq Mi	Water	Sediment	Pollutants	Heat	Wood	Habitat Connectivity
12	130.30	0.20	NPF	AR	NPF	PF	AR	AR
15	462.49	0.72	AR	PF	NPF	AR	AR	AR
14	279.30	0.44	AR	PF	AR	AR	NPF	AR
13	520.08	0.81	NPF	AR	NPF	AR	NPF	AR
10	219.59	0.34	NPF	AR	AR	PF	NPF	AR
11	376.10	0.59	NPF	PF	AR	PF	NPF	AR
9	586.16	0.92	NPF	PF	NPF	NPF	AR	AR
8	325.40	0.51	AR	AR	PF	AR	AR	AR
6	262.75	0.41	PF	PF	NPF	N/A	NPF	AR
5	165.80	0.26	AR	AR	AR	PF	NPF	AR
4	237.20	0.37	AR	PF	AR	AR	NPF	AR
3	507.96	0.79	AR	PF	NPF	NPF	AR	AR
7	285.08	0.45	AR	AR	AR	AR	AR	NPF

Ecological Processes								Biological Element
DAU Id	Acres	Sq Mi	Water	Sediment	Pollutants	Heat	Wood	Habitat Connectivity
2	432.44	0.68	PF	AR	N/A	PF	N/A	NPF
1	139.15	0.22	AR	PF	N/A	PF	N/A	NPF

An aggregation of the function level of these processes and habitat connectivity are then used to provide an overall function level and ranking of each DAU as described in the following Table 9.1.

Table 9.1 Final DAU Ecological and Biological Benefit Rank

Ecological Processes						Biological Element		
DAU Id	Water	Wood	Sediment	Pollutants	Heat	Habitat Connectivity	Total Score	Weighted Rank
12	3	1	0	0	1	1	6	High
15	3	0	0	1	1	1	6	High
14	3	0	1	1	0	1	6	High
13	3	1	0	1	0	1	6	High
10	3	1	1	0	0	1	6	High
11	3	0	1	0	0	1	5	Moderate
9	3	0	0	0	1	1	5	Moderate
7	0	1	1	1	1	0	4	Moderate
8	0	1	0	1	1	1	4	Moderate
6	3	0	0	0	0	1	4	Moderate
5	0	1	1	0	0	1	3	Moderate
4	0	0	1	1	0	1	3	Moderate

The weighted rank is used in the evaluation of potential restoration and enhancement sites when the DAUs and resource sites are combined to provide a prioritized list of natural resource sites.

As shown in Table 9.1 and Figure 9.2, the Nisqually Bluff Study Area has 12 DAUs that have restoration potential (weighted rank of high or moderate). DAUs ranked Low are listed in Appendix B.

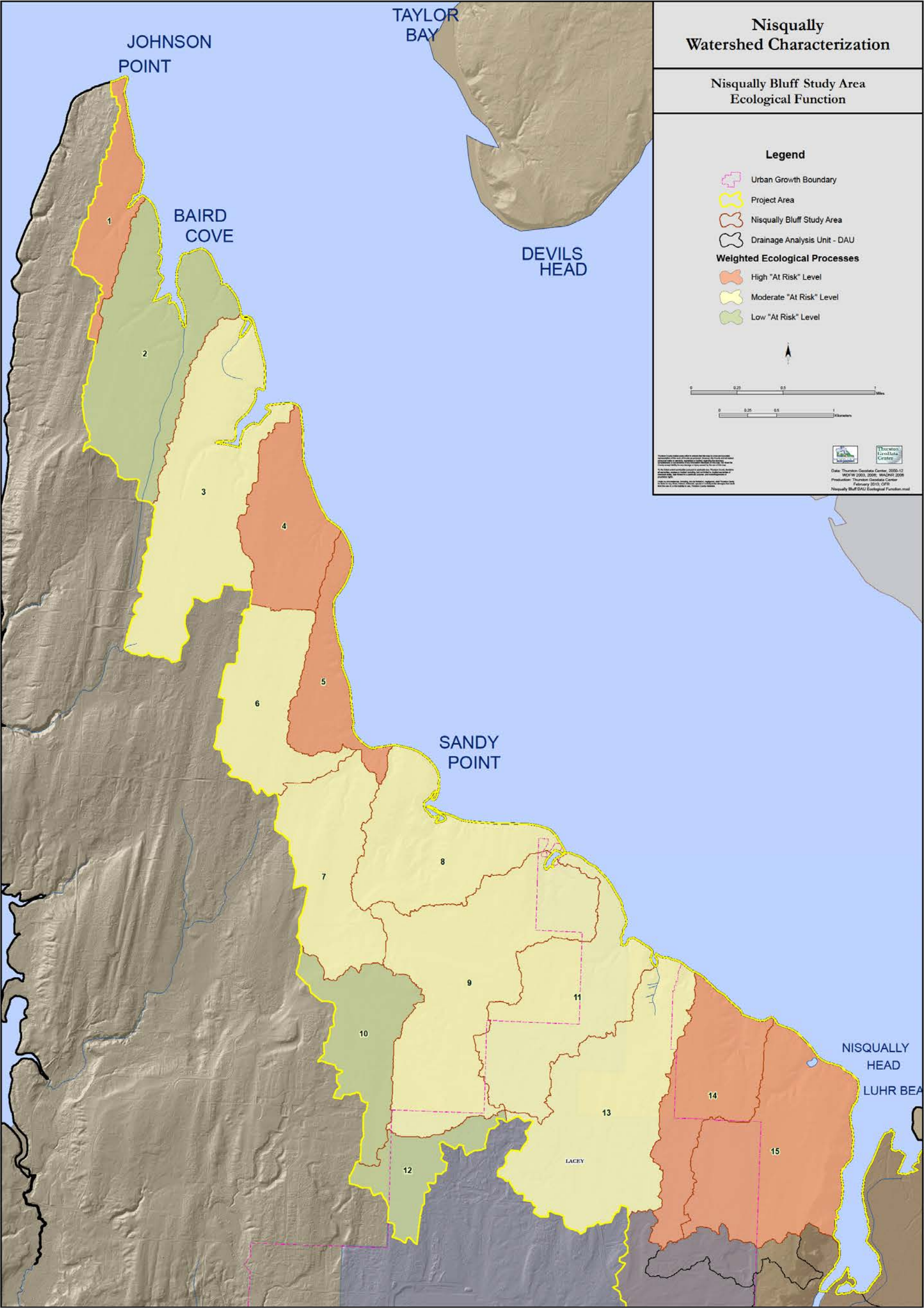


Figure 9.2 Nisqually Bluff Study Area Ecological Function

Part III. Characterize Natural Resource Sites in Study Area

This section evaluates natural resource sites within the study area. The watershed characterization methods do not assess potential restoration sites at the parcel or jurisdictional boundary. The methods focus on the landscape only. The purpose is to determine natural resource sites that can be restored or enhanced in the surrounding landscape that will provide the greatest functional lift. The analysis is conducted concurrently with the analyses of the ecological processes and the one biological element, habitat connectivity. Upon completion of the DAU and natural resource site analysis, the sites identified are ranked within their corresponding DAU.

Determine the Environmental Benefit of the Resource Sites

The natural resource sites are evaluated based on the attributes during site assessment using Tables 13 to 15 in the Methods document. The sites are then assigned an environmental benefit final score.

Following the conversion of natural resource sites from a numerical score to a rank of Low, Moderate, or High rank, there were a total of 120 sites. Table 9.2 details the results.

Table 9.2 Nisqually Bluff Environmental Benefit Ranking of Natural Resource Sites

Nisqually Bluff Potential Restoration Sites				
Rank	Wetland	Riparian	Floodplain	Total
High	9	2	0	11
Medium	22	14	0	36
Low	60	12	1	73

Part IV. Assess Potential Sites within the DAU

This section presents the results of a ranking process for all potential natural resource restoration sites within the DAU. This ranking of a natural resource restoration site is based on a combination of each site's individual site rank combined with the ranking of the DAU within which the restoration site is located. The result of this combination is a final score from 0 to 6, with a score of 6 representing those sites with the greatest potential for environmental benefit if restored. See Chapter 1 Part III and the Methods document for a description of the methodology used.

Following evaluation, a total of 120 sites in the Nisqually Bluff Study Area were ranked within their corresponding DAU. Of those 120 sites, there were 47 sites that had high or moderate restoration value.

A site with a Low environmental benefit is a preservation site or completely degraded site that would provide a minimal environmental benefit if restored.

Results of natural resource restoration site ranking for wetlands, riparian and floodplain areas are described in the following sections.

The following wetlands, riparian and floodplain sections describe the final combined ecological benefit (DAU) and environmental benefit (site) ranking of natural resource sites.

Wetlands Condition

Table 9.3 presents the results of wetland site ranking. The wetland rank is the result of the combined wetland restoration potential and the DAU ranking. There are 47 sites that ranked high or moderate.

Wetland sites ranked Low or less than one acre are not included in Table 9.3. However, they have been ranked and are listed in Appendix C. Figure 9.3 shows the location of each wetland restoration site.

Table 9.3 Wetland Sites

Site ID	Wetlands Rank	Combined DAU and Site Score	Acres
Wetland23	High	6	2.16
Wetland87	High	6	5.25
Wetland40	High	4	2.72
Wetland60	High	4	14.07
Wetland62	High	4	12.82
Wetland84	High	4	2.03
Wetland4	High	2	3.63
Wetland71	Moderate	5	10.90
Wetland88	Moderate	5	8.28
Wetland10	Moderate	3	4.34
Wetland16	Moderate	3	2.62
Wetland24	Moderate	3	23.64
Wetland33	Moderate	3	7.80
Wetland43	Moderate	3	1.51
Wetland51	Moderate	3	14.28
Wetland54	Moderate	3	2.02
Wetland58	Moderate	3	4.82
Wetland61	Moderate	3	3.01
Wetland64	Moderate	3	3.10
Wetland135	Moderate	3	9.92
Wetland18	Moderate	1	9.11
Wetland89	Moderate	1	3.79

The following figures appear cluttered when printed at a scale less than 33 x 44 inches (the format it was developed for). The maps are best viewed electronically where the viewing area is easily enlarged.



Figure 9.3 Nisqually Bluff Study Area Ecological Processes and Site Ranking - Wetlands

Riparian condition

Table 9.4 presents the results of riparian restoration site ranking taking into account the combined riparian restoration potential and the DAU ranking. There are 16 riparian sites that ranked high or moderate. The resulting combined score of the natural resource sites within the context of the DAU were scored and displayed are in Figure 9.4.

Riparian sites ranked Low are not included in Table 9.4. However, they have been ranked and are listed in Appendix C.

Table 9.4 Riparian Sites

Site ID	Riparian Rank	Combined DAU and Site Score	Acres
Riparian124	High	6	17.20
Riparian36	High	4	54.88
Riparian30	Moderate	5	4.44
Riparian31	Moderate	5	6.21
Riparian32	Moderate	5	6.32
Riparian33	Moderate	5	7.96
Riparian34	Moderate	5	31.87
Riparian37	Moderate	5	23.18
Riparian39	Moderate	5	41.95
Riparian40	Moderate	5	11.16
Riparian41	Moderate	5	10.66
Riparian42	Moderate	5	6.64
Riparian19	Moderate	3	18.43
Riparian22	Moderate	3	57.46
Riparian35	Moderate	3	48.75
Riparian26	Moderate	1	21.00

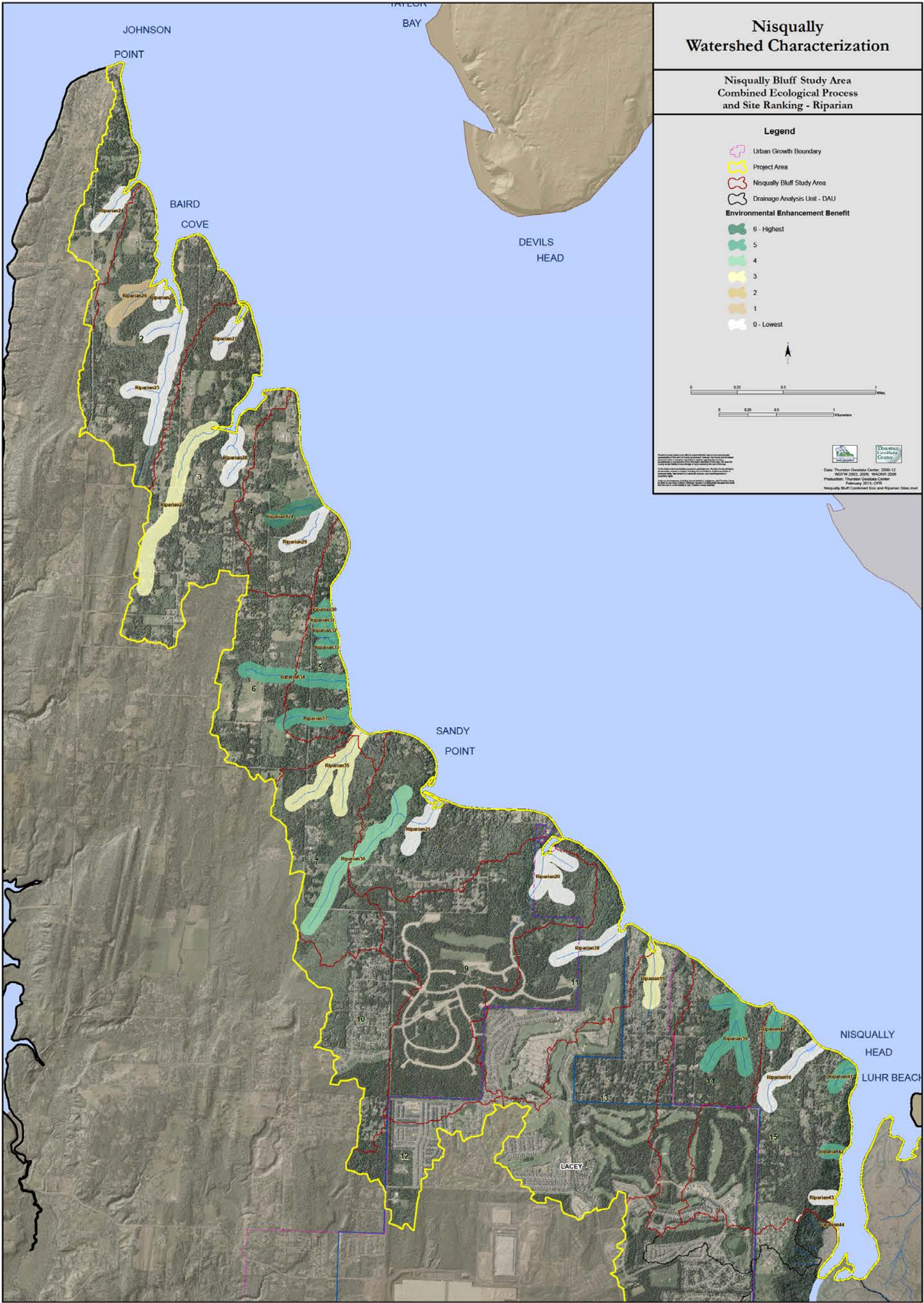


Figure 9.4 Nisqually Bluff Study Area Ecological Processes and Site Ranking – Riparian

Floodplain Condition

There are no floodplain sites ranked high or moderate. There is one site ranked Low and is listed in Appendix C.

Figure 9.5 displays the one restoration site.

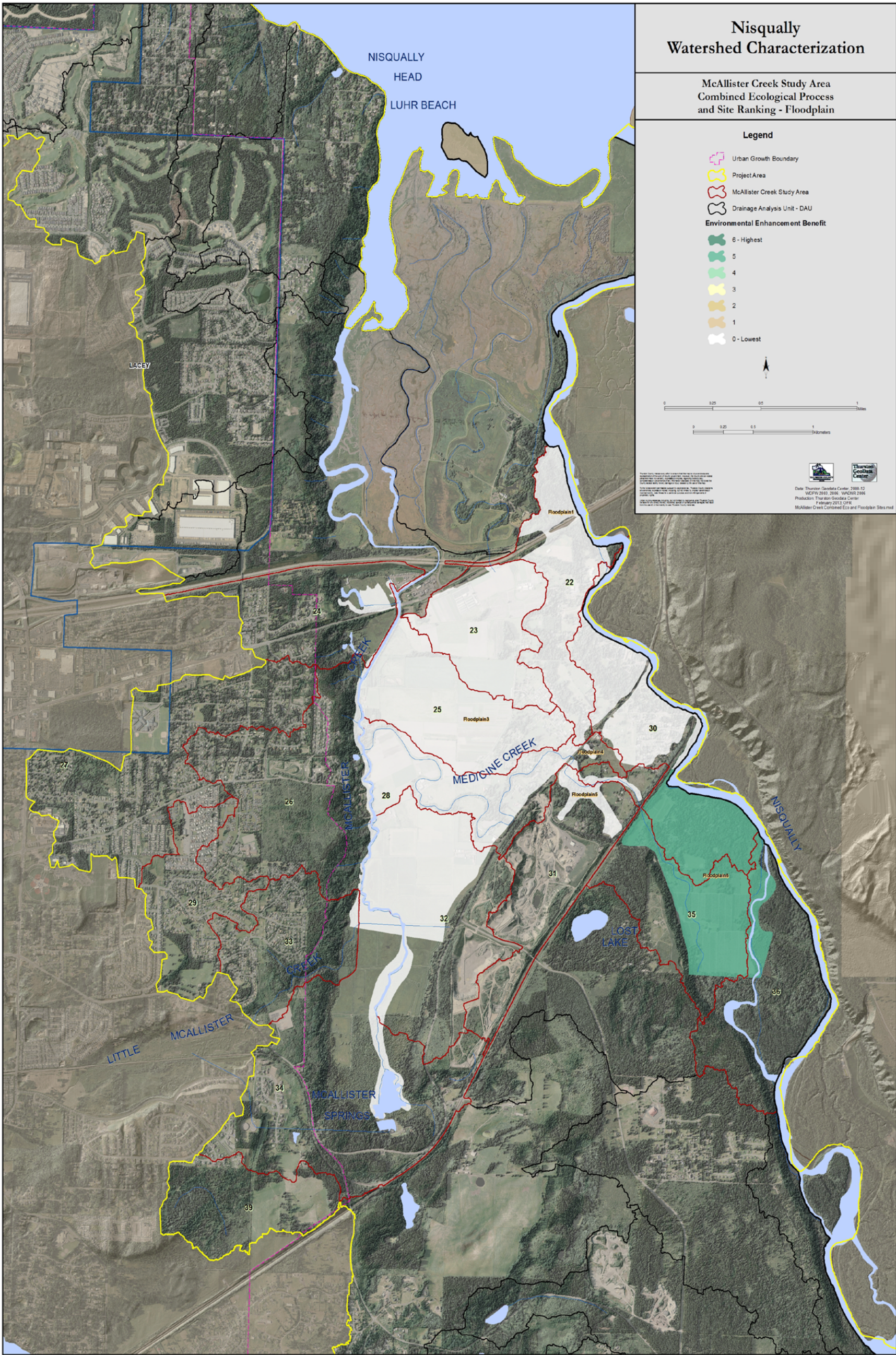


Figure 9.5 Nisqually Bluff Study Area Ecological Processes and Site Ranking – Floodplain