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Introduction

This section summarizes the methods used to develop the final list of natural resource (wetlands, riparian, and floodplain) restoration and/or enhancement sites and the results of that analysis for the McAllister Creek 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 McAllister Creek Study Area?

Current conditions

Current land-use within the Study Area was determined by processing Aerial photography and SPOT 10 meter satellite imagery captured in 2009. The results are presented in Figure 7.0 and 7.1 and indicate that approximately 21% of the McAllister Study Area is covered by the built environment. A large amount of the percent impervious is a result of the Holroyd gravel pit located on the east side of the study area. Another contributing factor to the large amount of impervious results from the numerous residential developments on the McAllister bluff.

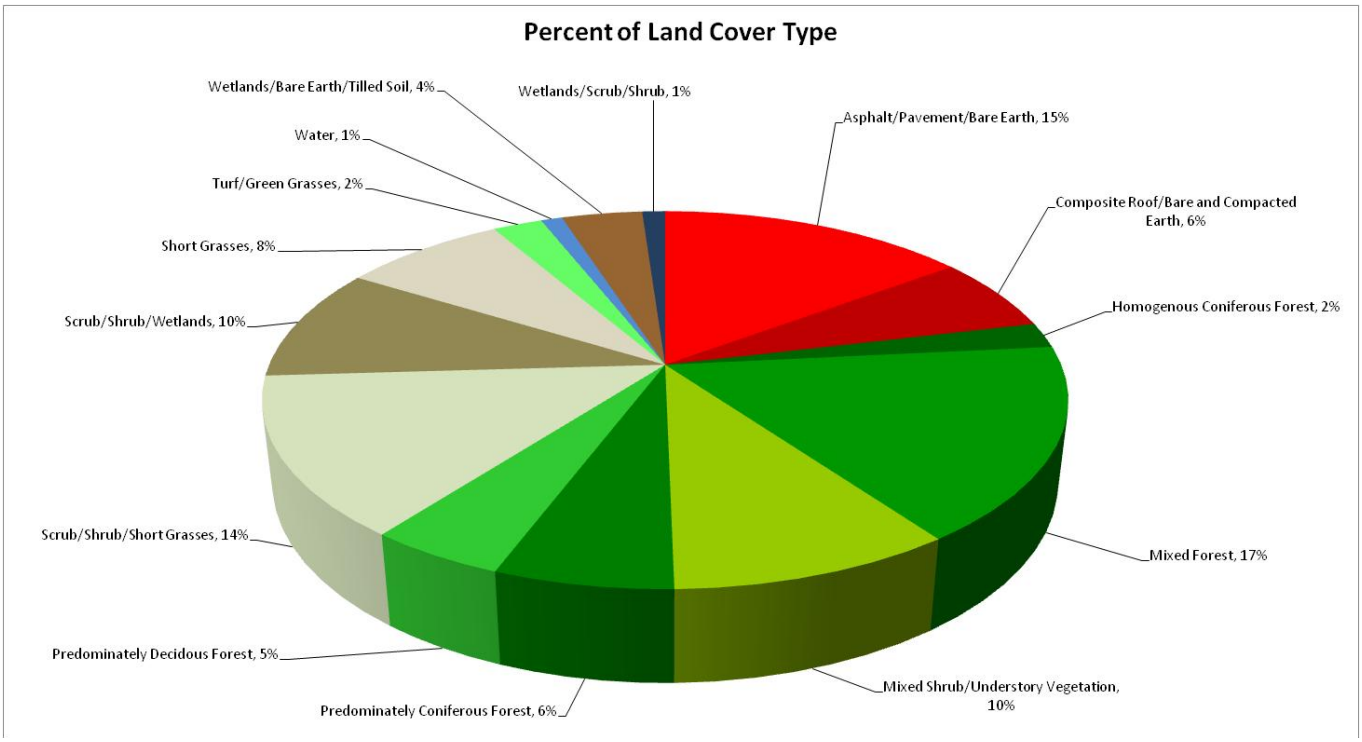

Figure 7.0 Classification Percent Totals for McAllister Creek Study Area
Land cover data from 2009 SPOT imagery.

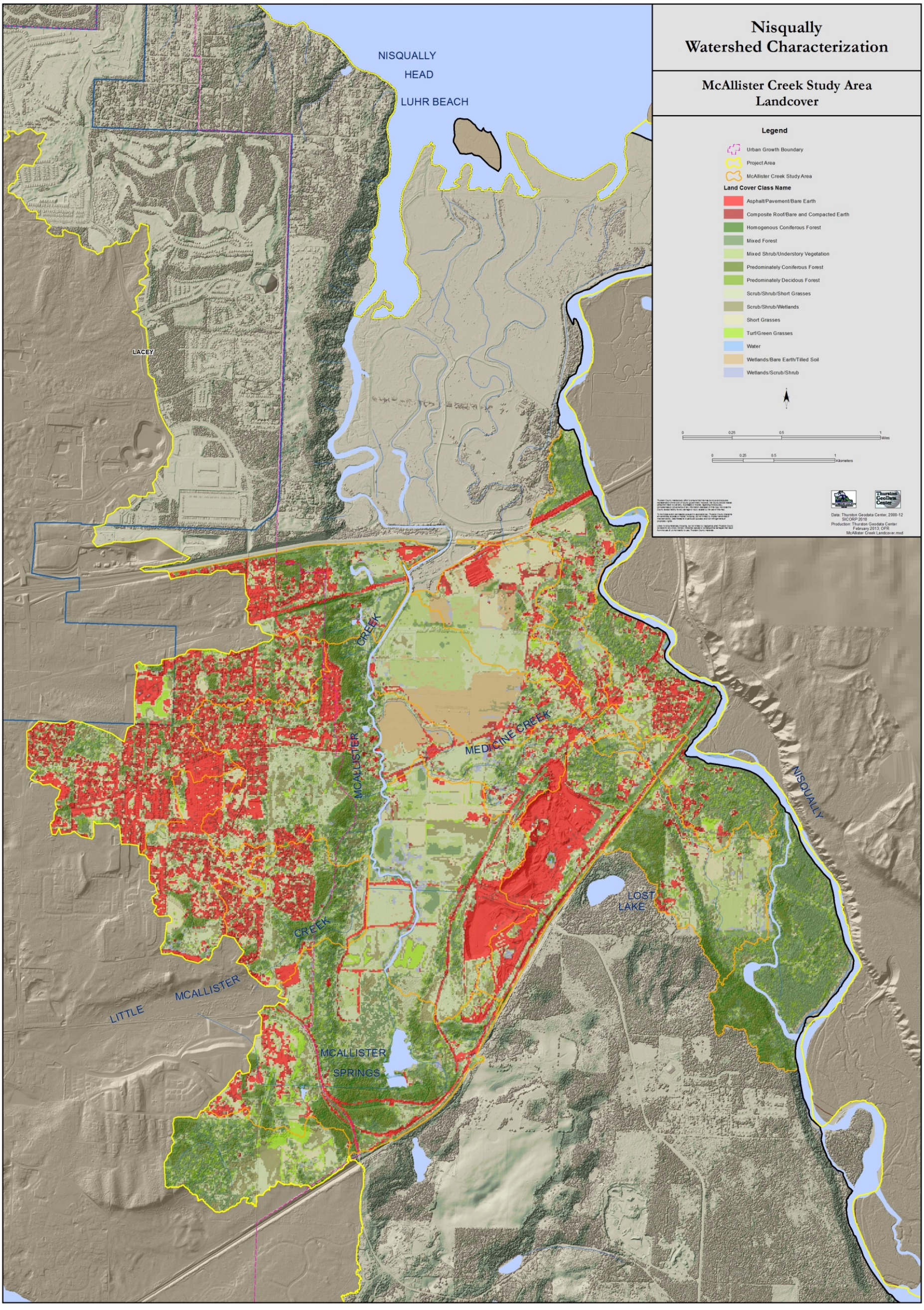

Figure 7.1. McAllister Creek Study Area Land Cover

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 are 16 DAUs totaling 4,992 acres (8 sq miles) in the 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 7.0 describes the function level of five ecological process and habitat connectivity as PF, AR, or NPF.

Table 7.0 McAllister Ecological Processes and Biological Element Function

			Biological Processes					Biological Element
DAU Id	Acres	Sq Mi	Water	Wood	Sediment	Pollutants	Heat	Habitat Connectivity
39	204.43	0.32	AR	AR	AR	AR	AR	AR
35	281.27	0.44	AR	NPF	AR	AR	AR	AR
25	261.91	0.41	AR	NPF	AR	NPF	AR	NPF
22	239.20	0.37	AR	NPF	AR	AR	NPF	NPF
24	244.98	0.38	NPF	AR	AR	AR	AR	NPF
36	331.00	0.52	PF	NPF	AR	AR	AR	PF
31	275.55	0.43	NPF	NPF	AR	AR	AR	NPF
33	231.35	0.36	NPF	NPF	AR	AR	NPF	NPF
32	405.48	0.63	NPF	NPF	AR	NPF	AR	NPF
28	228.23	0.36	NPF	NPF	AR	NPF	AR	NPF
27	453.71	0.71	NPF	N/A	AR	N/A	AR	NPF
23	210.99	0.33	NPF	N/A	AR	NPF	AR	NPF
30	336.03	0.53	NPF	NPF	AR	AR	NPF	NPF

			Biological Processes					Biological Element
DAU Id	Acres	Sq Mi	Water	Wood	Sediment	Pollutants	Heat	Habitat Connectivity
34	629.09	0.98	NPF	NPF	AR	NPF	N/A	NPF
29	203.74	0.32	NPF	N/A	AR	N/A	PF	NPF
26	455.36	0.71	NPF	NPF	AR	NPF	NPF	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 7.1.

Table 7.1 Final DAU Ecological and Biological Benefit Rank

	Ecological Processes					Biological Element		
DAU Id	Water	Wood	Sediment	Pollutants	Heat	Habitat Connectivity	Total Score	Weighted Rank
39	3	1	1	1	1	1	8	High
35	3	1	1	1	0	1	7	High
25	3	1	0	1	0	0	5	Moderate
22	3	1	1	0	0	0	5	Moderate
24	0	1	1	1	1	0	4	Moderate
36	0	1	1	1	0	0	3	Moderate
31	0	1	1	1	0	0	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 7.1 and Figure 7.2, the McAllister Creek Study Area has seven DAUs that have restoration potential (weighted rank of high or moderate). DAUs ranked Low are listed in Appendix B.

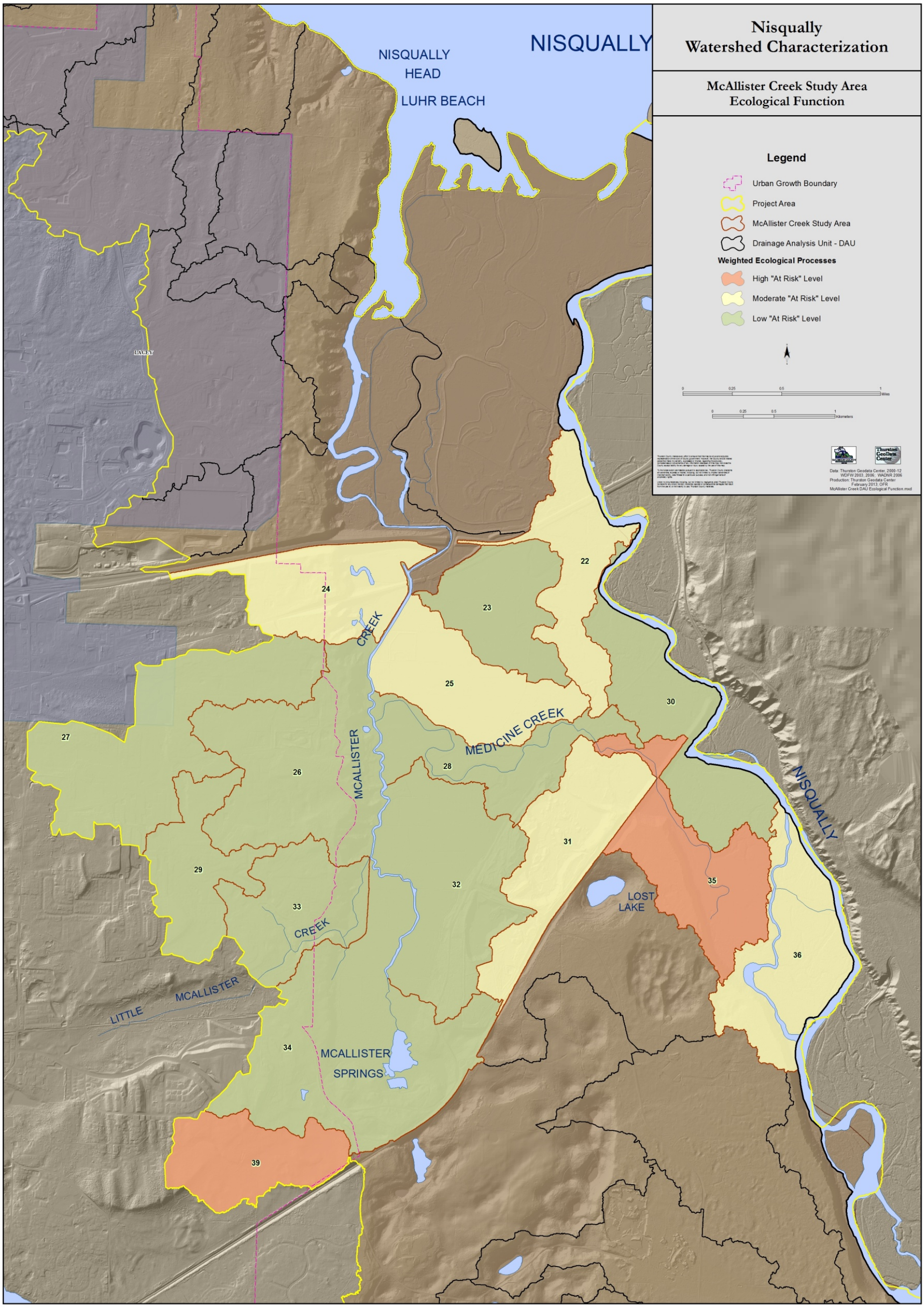

Figure 7.2 McAllister Creek Study Area Ecological Function

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 162 potential restoration or enhancement sites. Table 7.2 details the results.

Table 7.2 McAllister Environmental Benefit Ranking of Natural Resource Sites

McAllister **Potential Restoration Sites**				
Rank	Wetland	Riparian	Floodplain	Total
High	31	9	0	40
Moderate	47	8	1	56
Low	85	7	4	96

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 192 sites in the McAllister Creek Study Area were ranked within their corresponding DAU. Of those 192 sites, there were 96 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

Table 7.3 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 108 sites that ranked high or moderate.

Wetland sites ranked Low or less than one acre are not included in Table 7.3. However, they have been ranked and are listed in Appendix C. Figure 7.3 shows the location of each wetland restoration site.

Table 7.3 Wetland Sites

Site ID	Wetlands Rank	Combined DAU and Site Score	Acres
Wetland339	High	6	3.07
Wetland447	High	6	22.59
Wetland301	High	4	1.55
Wetland302	High	4	2.58
Wetland303	High	4	1.78
Wetland304	High	4	1.70
Wetland305	High	4	3.11
Wetland311	High	4	20.18
Wetland313	High	4	10.31
Wetland322	High	4	4.50
Wetland299	High	2	1.16
Wetland306	High	2	3.01
Wetland316	High	2	22.16
Wetland353	High	2	2.08
Wetland362	High	2	6.60
Wetland374	High	2	165.16
Wetland378	High	2	95.33
Wetland388	High	2	8.56
Wetland400	High	2	5.50
Wetland401	High	2	3.21
Wetland416	High	2	47.85
Wetland448	High	2	14.19
Wetland287	Moderate	3	2.26
Wetland290	Moderate	3	4.54
Wetland295	Moderate	3	1.42

Site ID	Wetlands Rank	Combined DAU and Site Score	Acres
Wetland377	Moderate	3	3.05
Wetland430	Moderate	3	1.34
Wetland324	Moderate	1	1.17
Wetland328	Moderate	1	3.09
Wetland336	Moderate	1	1.49
Wetland337	Moderate	1	1.76
Wetland349	Moderate	1	1.05
Wetland379	Moderate	1	7.58
Wetland394	Moderate	1	2.28
Wetland405	Moderate	1	4.50
Wetland412	Moderate	1	41.31
Wetland450	Moderate	1	7.50
Wetland442	Moderate	1	1.43
Wetland445	Moderate	1	2.85

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

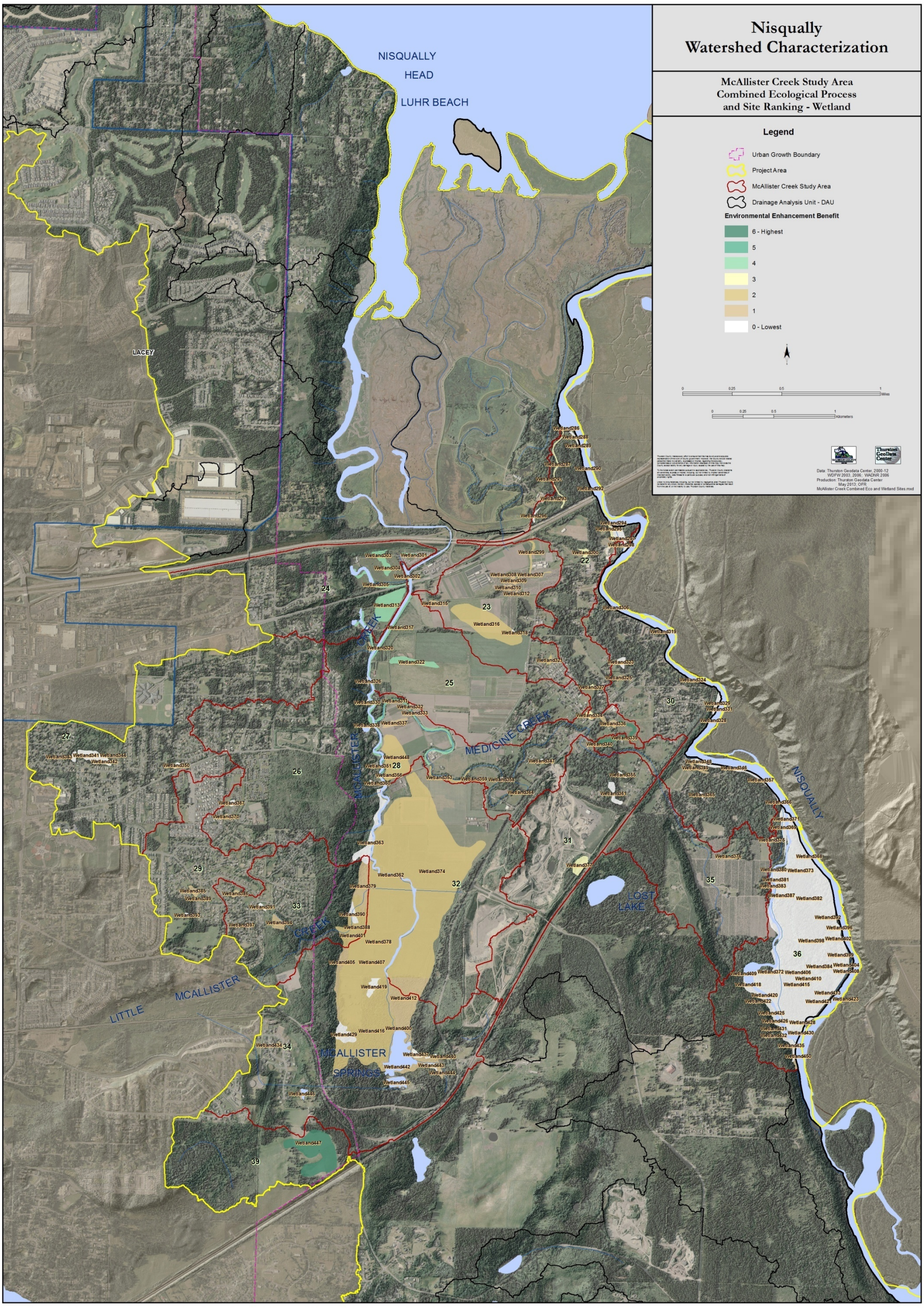

Figure 7.3 McAllister Creek Study Area Ecological Processes and Site Ranking – Wetlands

Riparian condition

Table 7.4 presents the results of riparian restoration site ranking taking into account the combined riparian restoration potential and the DAU ranking. There are 17 riparian sites that ranked high or moderate. The resulting combined score of the natural resource sites within the context of the DAU are shown in Figure 7.4.

Riparian sites ranked Low are not included in Table 7.4. However, they have been ranked and are listed in Appendix C.

Table 7.4 Riparian Sites

Site ID	Riparian Rank	Combined DAU and Site Score	Acres
Riparian1	High	2	97.02
Riparian132	High	4	47.52
Riparian139	High	6	27.69
Riparian141	High	2	15.14
Riparian143	High	2	49.19
Riparian144	High	2	69.44
Riparian145	High	6	20.97
Riparian148	High	2	19.61
Riparian149	High	4	53.90
Riparian133	Moderate	3	17.32
Riparian138	Moderate	3	8.21
Riparian140	Moderate	1	38.48
Riparian146	Moderate	1	24.39
Riparian147	Moderate	5	20.89
Riparian165	Moderate	1	66.14
Riparian166	Moderate	3	73.81
Riparian167	Moderate	1	0.58

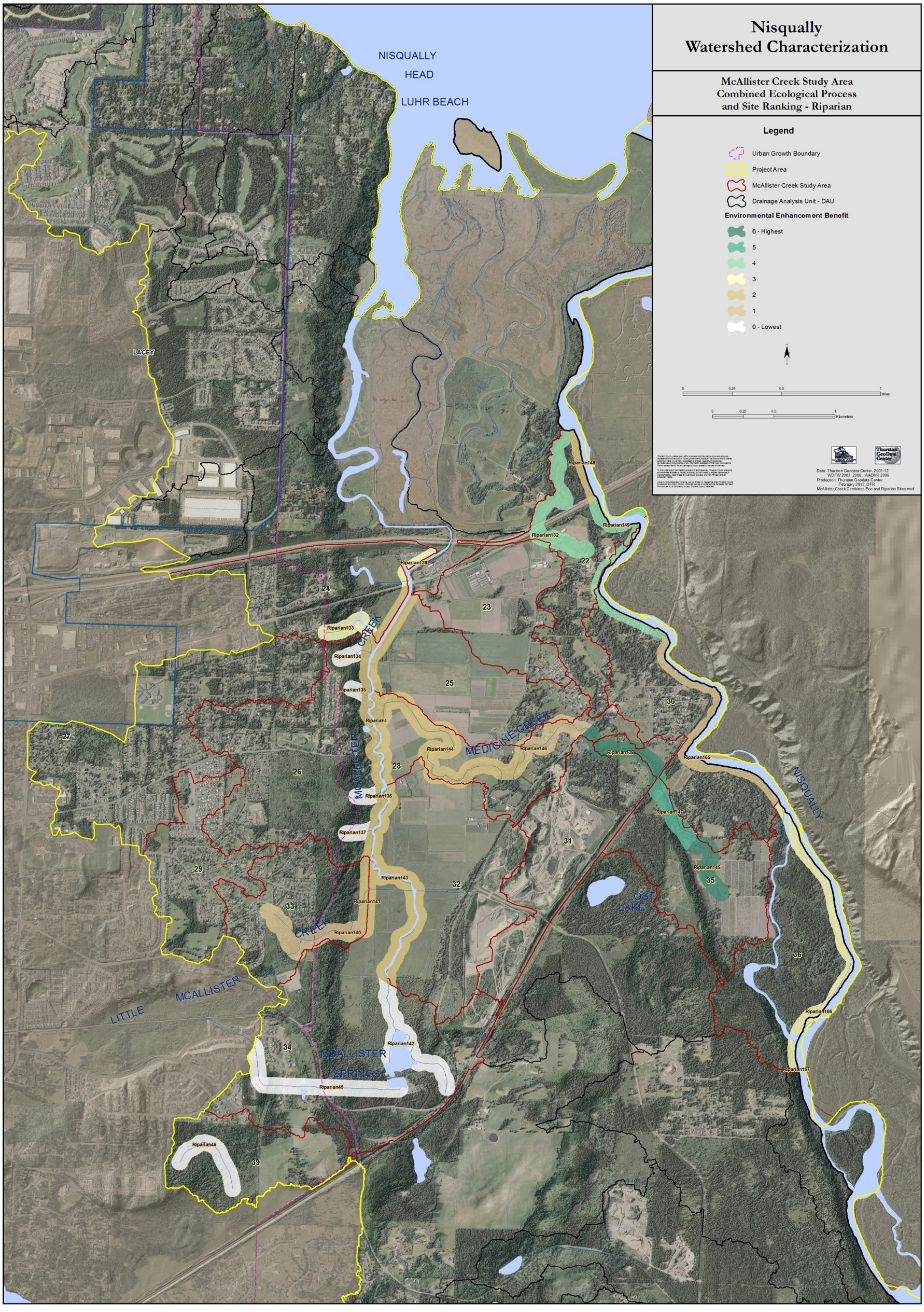

Figure 7.4 McAllister Creek Study Area Ecological Processes and Site Ranking - Riparian.

Floodplain Condition

There were a total of five sites, with only one site ranked Moderate. Sites ranked Low are included in Appendix C.

Figure 7.5 illustrates the resulting combined score of the Floodplain natural resource sites within the context of the DAU.

Table 7.5 Floodplain Sites

Site ID	Floodplain Rank	Combined DAU and Site Score	Acres
Floodplain6	Moderate	5	299.05

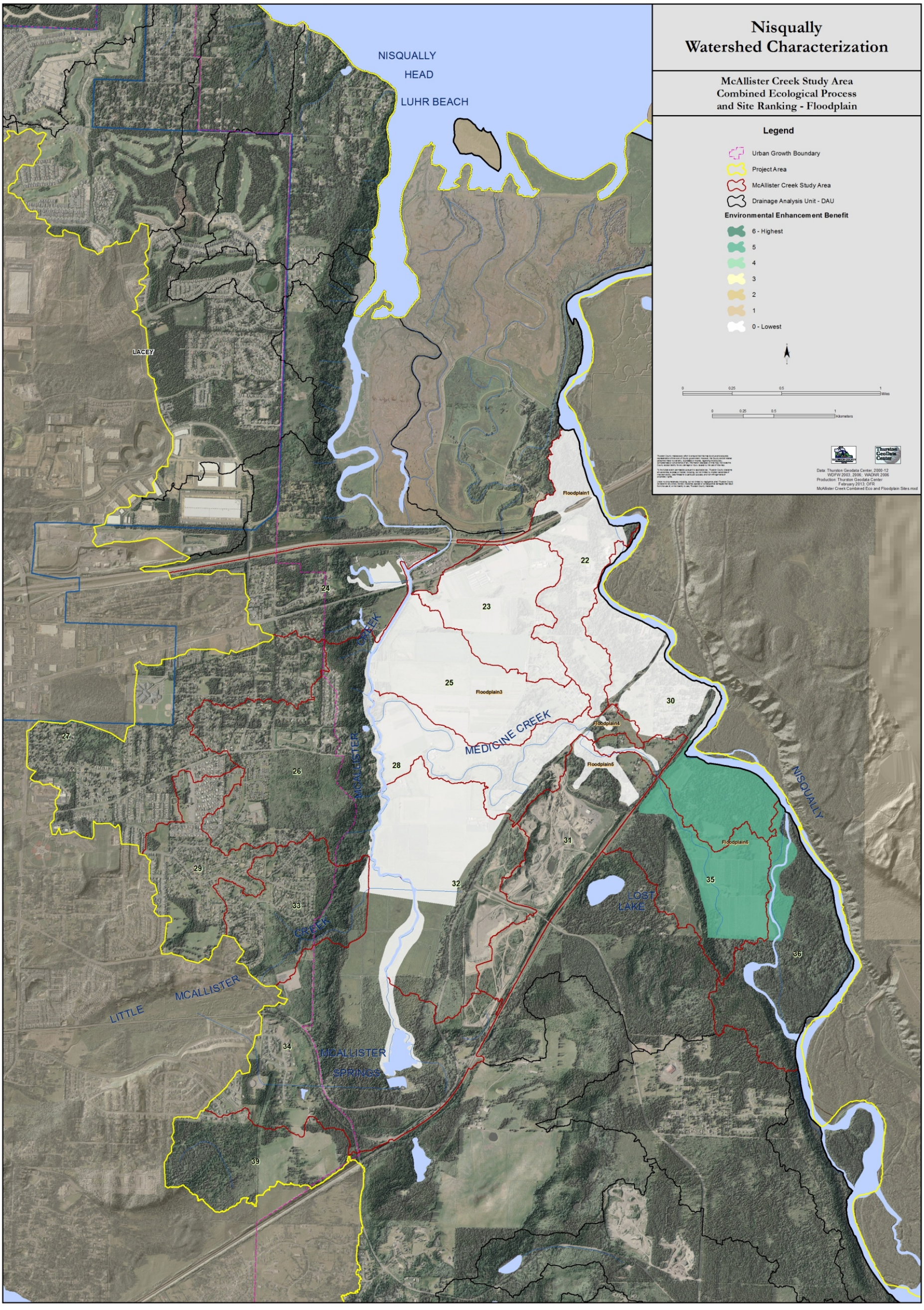

Figure 7.5 McAllister Creek Study Area Ecological Processes and Site Ranking - Floodplain.