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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. 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 subwatershed.

Part I. What are the Landscape Conditions in the Pattison Lake Subwatershed?

Current conditions

Current land-use within the Offut lake sub-watershed was determined by processing Aerial photography and SPOT 10 meter satellite imagery captured in 2009. Approximately 25% of the Pattison Lake Subwatershed is covered by the built environment (see Figure 8.0 and 8.1 Classification Percent Totals for Pattison Lake Subwatershed). The Pattison Lake subwatershed is highly altered by residential development. In addition, there is extensive agricultural land-use south of the lake.

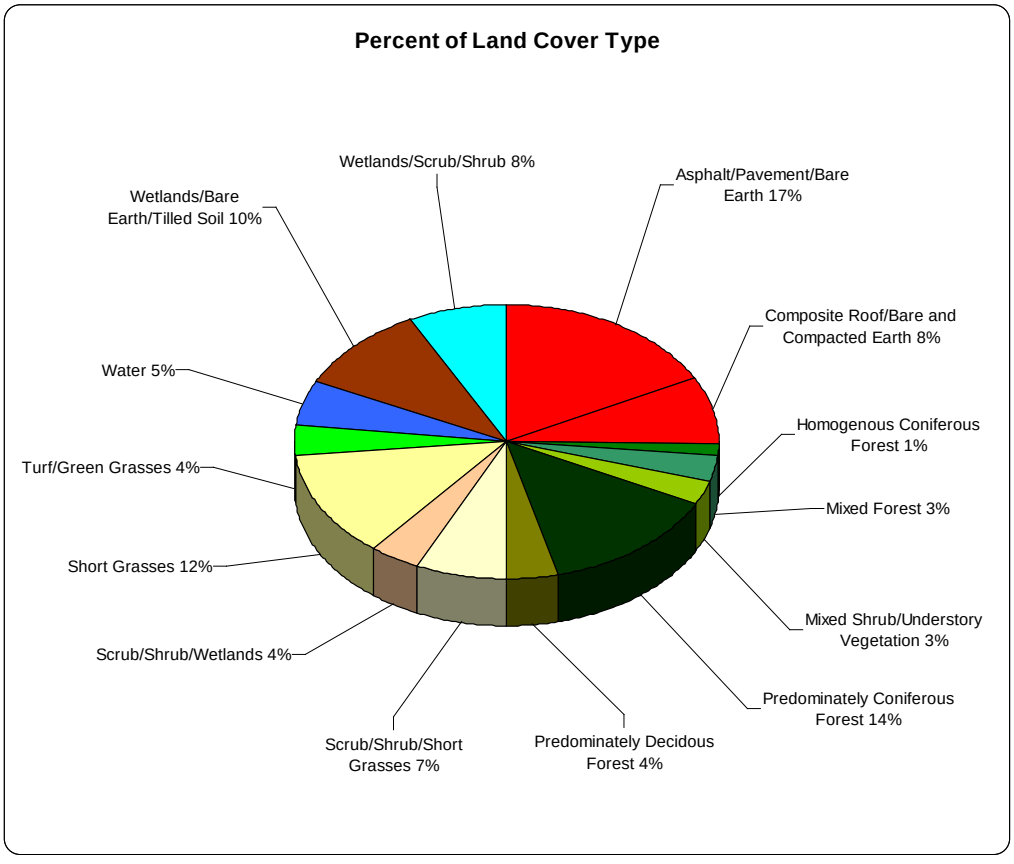

Figure 8.0 Classification Percent Totals for Pattison Lake Subwatershed
Land cover data from 2009 SPOT imagery.

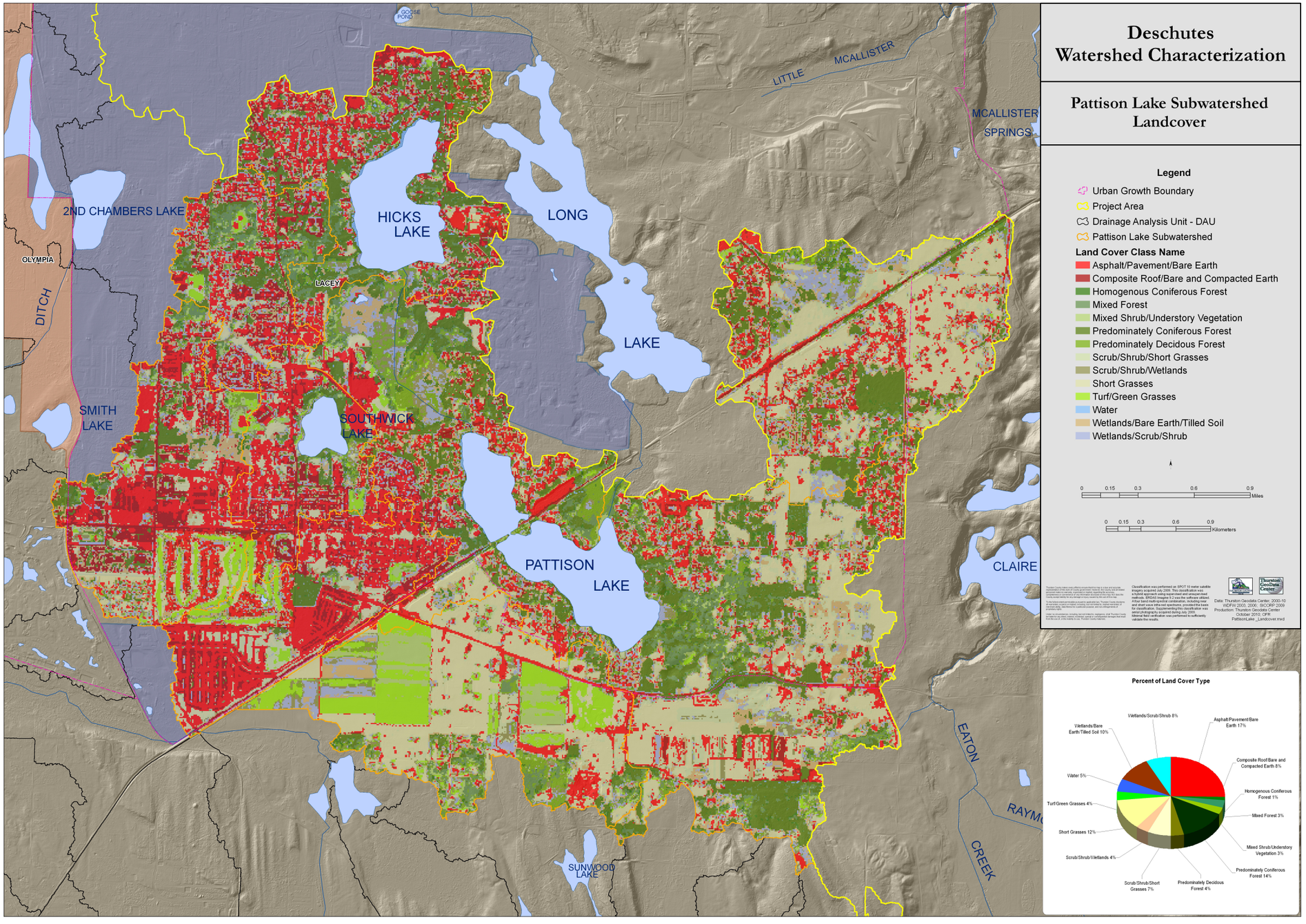

Figure 8.1 Pattison Lake Subwatershed Land Cover

Part II. Characterize Condition of Ecological Processes in Study Area

Five ecological processes and two biological elements were assessed: the delivery and movement of water, sediment, wood, pollutants, and heat. The biological elements include aquatic integrity and habitat connectivity. 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 biological element, Rules and Assumptions (Tables 8-14 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 7 in the Methods document. For complete details of the Rules and Assumptions, please consult Tables 8 through 14 in the Methods document. Appendix A of this document contains the Methods document.

There are 9 DAUs totaling 7,527 acres (12 sq miles) in the subwatershed.

Determine the Ecological Benefit of the DAU

Following the assessment of each individual ecological process and biological elements using the indicators above and the application of the Rules and Assumptions, the resulting final ranking of each DAU yields a baseline condition of ecological health for each DAU. All DAUs within the study area having ecological processes that are considered "At Risk" under current land use conditions 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.

Table 8.0 includes each ecological process and biological element with the resulting function level. Subsequently, an aggregation of these processes and elements are used to provide an overall function level and ranking of the DAU.

Table 8.0 Pattison Lake Ecological and Biological Function

DAU Id	Acres	Sq Mi	Aquatic Integrity	Habitat Connectivity	Water	Sediment	Wood	Pollutants	Heat
56	421	0.66	N/A	AR	NPF	AR	PF	N/A	AR
62	1096	1.71	N/A	NPF	AR	AR	NPF	AR	AR
63	1017	1.59	N/A	AR	AR	AR	N/A	N/A	N/A
75	400	0.62	N/A	AR	NPF	AR	NPF	AR	AR
76	712	1.11	N/A	NPF	NPF	AR	N/A	N/A	N/A
83	1634	2.55	N/A	AR	AR	AR	NPF	AR	AR
86	535	0.84	N/A	NPF	NPF	AR	NPF	N/A	AR
87	929	1.45	N/A	AR	AR	AR	PF	N/A	AR
57	794	1.24	N/A	AR	NPF	AR	NPF	AR	AR

Once the DAU ecological processes and biological function levels are ascertained, the function levels are translated to a ranking scheme. Ecological processes and biological elements which have been identified as "At Risk" are scored higher based upon the potential for enhancement

from restored/rehabilitated marginal function levels. The ecological process scores are then ranked according to the weight criteria, and converted to a High, Moderate, or Low process rank.

Table 8.1 illustrates the final ecological benefit rank of each DAU

Table 8.1 Final DAU Ecological and Biological Benefit Rank

	Ecological Processes					Biological Elements			
DAU Id	Water	Sediment	Wood	Pollutants	Heat	Aquatic Integrity	Habitat	Total Score	Rank
83	3	1	0	1	1	0	1	7	High
62	3	1	0	1	1	0	0	6	Moderate
87	3	1	0	0	1	0	1	6	Moderate
63	3	1	0	0	0	0	1	5	Moderate
57	0	1	0	1	1	0	1	4	Moderate
75	0	1	0	1	1	0	1	4	Moderate
56	0	1	0	0	1	0	1	3	Moderate
86	0	1	0	0	1	0	0	2	Low
76	0	1	0	0	0	0	0	1	Low

The final rank is used in the identification of potential restoration and enhancement sites when the DAUs and resource sites are combined to provide a final list of natural resource sites. Pattison Lake subwatershed has 28 DAUs that have restoration potential (Figure 8.2 Pattison Lake Creek Subwatershed Ecological Function).

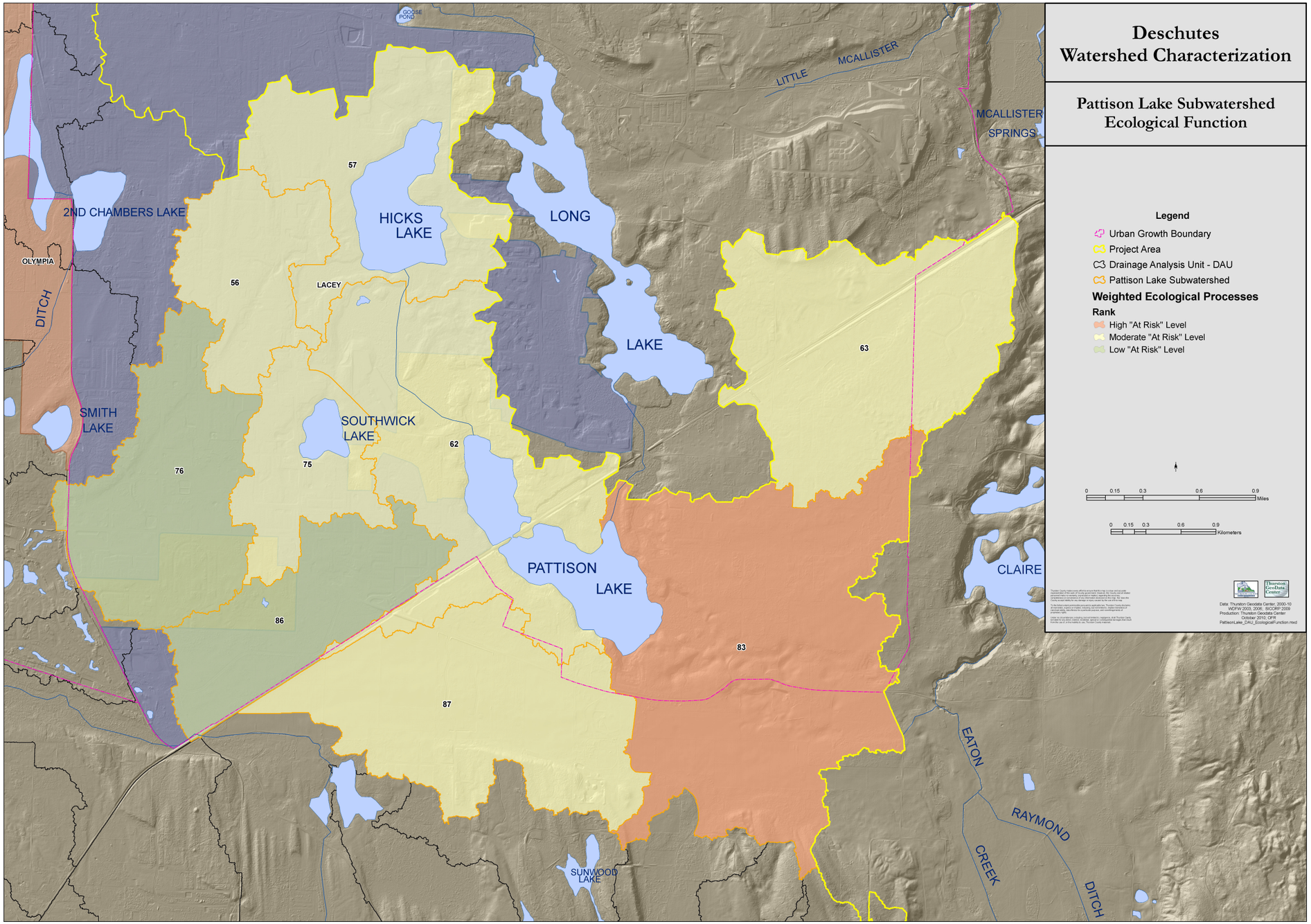

Figure 8.2 Pattison Lake Subwatershed Ecological Function

Part III. Characterize Natural Resource Sites in Study Area

This section evaluates natural resource sites within the study area. The purpose is to determine natural resource sites that can be restored or enhanced in the surrounding landscape that will provide the greatest ecological benefit. This analysis is conducted concurrently with the analyses of the ecological processes. Upon completion of the DAU analysis and the natural resource site analysis, the sites identified are ranked in the context of the DAU and subwatershed landscape

Determine the Environmental Benefit of the Resource Sites

The natural resource sites are evaluated based on the attributes assigned during site assessment using Tables 22 to 24 in the Methods document to assign an environmental benefit final score. Once all the attributes have been evaluated, the following ranking criteria are used to rank the sites High, Moderate, and Low.

Following the conversion of natural resource sites from a score to Low, Moderate, or High rank, there were a total of 144 potential restoration or enhancement sites for their environmental benefit if restored. Table 8.1 details the results.

Table 8.1 Pattison Lake Environmental Benefit Ranking of Natural Resource Sites

Pattison Lake Potential Restoration Sites				
Rank	Wetland	Riparian	Floodplain	Total
High	12	2	0	14
Moderate	52	3	0	55
Low	71	4	0	75

Part IV. Assess Potential Sites within the DAU

This section presents the results of a ranking process for all potential natural resource restoration sites. The ranking of a natural resource restoration site is based on the ranking of each site individually combined with the ranking of the DAU within which the restoration site is located. The result is a final combined score from 0 to 6, with a score of 6 representing those sites with the greatest potential for environmental benefit if restored.

Table 8.2 is used to score the natural resource sites in the context of the DAU. A site with a Low environmental benefit is a preservation site or completely degraded site that would provide a minimal environmental benefit if restored.

Table 7.2 Combined Ranking Score

Ecological Benefit (DAU)	Environmental Benefit (Resource Site)	Total Score
High	High	6
High	Moderate	5
Moderate	High	4
Moderate	Moderate	3
Low	High	2
Low	Moderate	1
N/A	Low	0

Thus, the Ecological Benefit (DAU) and the Environmental Benefit (Resource Sites) are ranked to provide a final score from 0 to 6. Following evaluation, a total of 69 sites were ranked within the corresponding DAU.

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

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

Wetlands

Table 7.3 presents the results of wetland restoration site ranking taking into account the combined wetland restoration potential and the DAU ranking. Figure 7.4 shows the location of each wetland restoration site. Wetland sites ranked Low and less than one acre are not included in the table, but are ranked and available in appendix B.

Table 8.3 Wetland Sites

Site ID	Wetlands Rank	Combined DAU Site Score	Acres
Wetland 929	Moderate	5	6.09
Wetland 844	Moderate	5	1.72
Wetland 1097	Moderate	5	2.53
Wetland 936	Moderate	5	1.31
Wetland 386	High	4	0.54
Wetland 838	High	4	0.14
Wetland 387	High	4	142.84
Wetland 516	High	4	9.00
Wetland 548	High	4	7.08
Wetland 399	High	4	2.02
Wetland 870	High	4	1.02
Wetland 408	High	4	1.02
Wetland 543	High	4	0.64
Wetland 810	Moderate	3	22.74

Site ID	Wetlands Rank	Combined DAU Site Score	Acres
Wetland 753	Moderate	3	7.02
Wetland 662	Moderate	3	2.88
Wetland 375	Moderate	3	1.98
Wetland 1055	Moderate	3	1.17
Wetland 659	Moderate	3	0.68
Wetland 794	Moderate	3	0.66
Wetland 871	Moderate	3	0.62
Wetland 777	Moderate	3	0.55
Wetland 551	Moderate	3	0.51
Wetland 860	Moderate	3	0.32
Wetland 683	Moderate	3	15.85
Wetland 565	Moderate	3	3.33
Wetland 556	Moderate	3	2.04
Wetland 823	Moderate	3	1.70
Wetland 849	Moderate	3	1.22
Wetland 582	Moderate	3	0.99
Wetland 652	Moderate	3	0.87
Wetland 818	Moderate	3	0.84
Wetland 1022	Moderate	3	0.51
Wetland 822	Moderate	3	0.47
Wetland 1012	Moderate	3	0.34
Wetland 994	Moderate	3	0.31
Wetland 981	Moderate	3	0.27
Wetland 989	Moderate	3	0.22
Wetland 583	Moderate	3	0.13
Wetland 991	Moderate	3	0.13
Wetland 993	Moderate	3	0.11
Wetland 853	Moderate	3	178.13
Wetland 566	Moderate	3	47.94
Wetland 673	Moderate	3	32.34
Wetland 739	Moderate	3	1.68
Wetland 555	Moderate	3	1.13
Wetland 857	Moderate	3	0.83
Wetland 570	Moderate	3	0.71
Wetland 718	Moderate	3	0.49
Wetland 640	Moderate	3	0.34
Wetland 880	Moderate	3	0.23
Wetland 634	Moderate	3	0.08
Wetland 372	Moderate	3	0.05
Wetland 931	High	2	0.58
Wetland 827	High	2	0.03
Wetland 941	High	2	0.03
Wetland 920	Moderate	1	0.10
Wetland 848	Moderate	1	1.24
Wetland 1044	Moderate	1	0.47
Wetland 824	Moderate	1	0.27
Wetland 1042	Moderate	1	0.20

Site ID	Wetlands Rank	Combined DAU Site Score	Acres
Wetland 889	Moderate	1	0.07
Wetland 856	Moderate	1	0.05
Wetland 894	Moderate	1	0.03

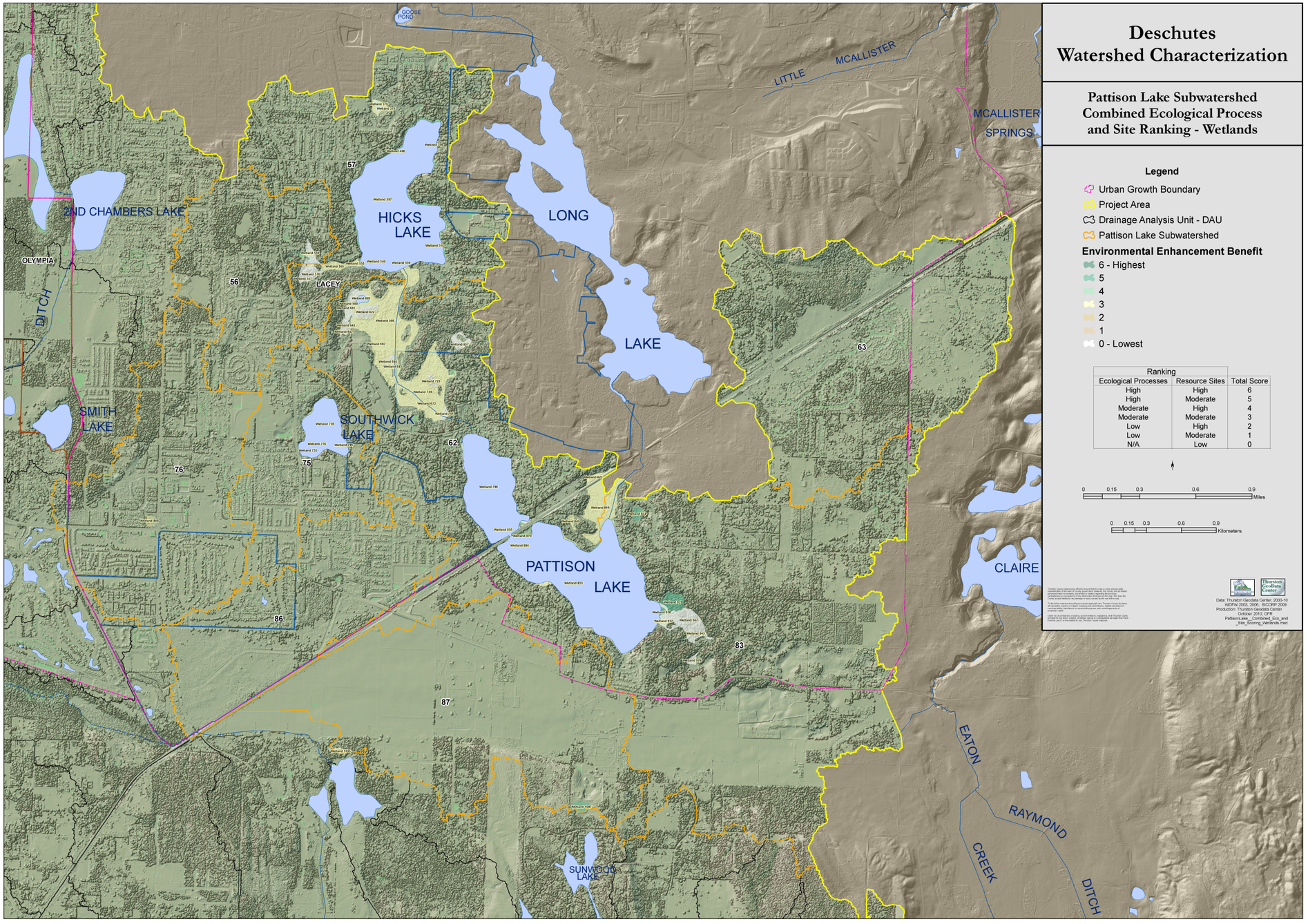

Figure 8.3 Pattison Lake Subwatershed Ecological Processes and Site Ranking - Wetlands

Riparian condition

The resulting combined score of the natural resource site within the context of the DAU were scored and displayed on the map Figure 8.4 Pattison Lake Subwatershed Ecological Processes and Site Ranking - Riparian. Riparian sites ranked Low are not included in the table, but are ranked and available in appendix B.

Table 8.4 Riparian Sites

Site ID	Riparian Rank	Combined DAU and Site Score	Acres
Riparian 230	High	4	0.41
Riparian 3462	High	2	0.31
Riparian 185	Moderate	3	12.21
Riparian 224	Moderate	3	3.76
Riparian 198	Moderate	5	20.69

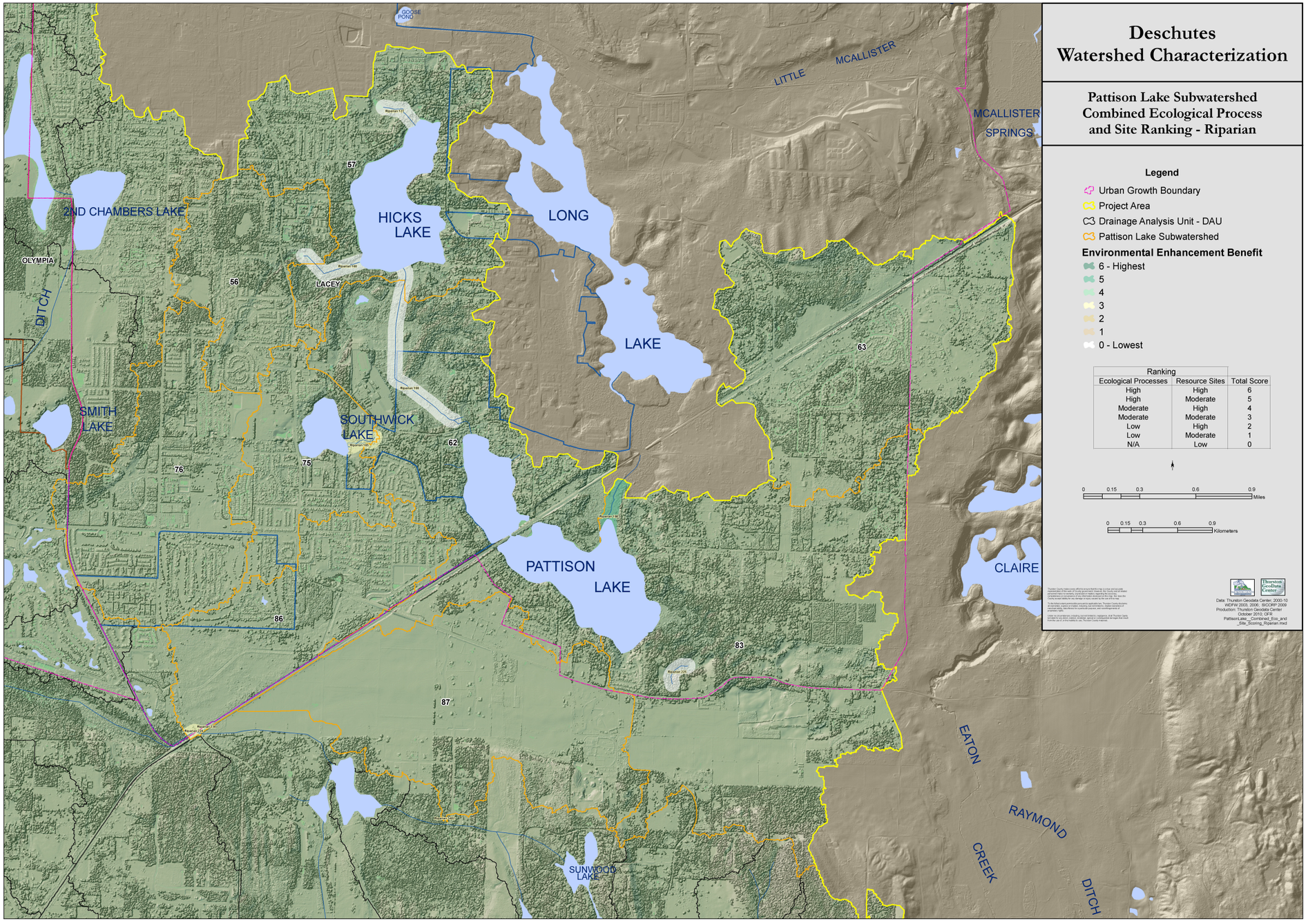

Figure 8.4 Pattison Lake Subwatershed Ecological Processes and Site Ranking - Riparian

Floodplain Condition

There is no regulated floodplain in the Pattison Lake Subwatershed.