

Table of Contents

Part I.	What are the Landscape Conditions in the Offut Lake Subwatershed?	1
Part II.	Characterize Condition of Ecological Processes in Study Area	3
Part III.	Characterize Natural Resource Sites in Study Area	7
Part IV.	Assess Potential Sites within the DAU	7

List of Tables

Table 6.0	Offut Lake Ecological Processes Function	3
Table 6.1	Final DAU Ecological Benefit Rank	4
Table 6.2	Offut Lake Environmental Benefit Ranking of Natural Resource Sites	7
Table 6.3	Combined Ranking Score	8
Table 6.4	Wetland Sites	8
Table 6.5	Riparian Sites	14
Table 6.6	Floodplain Sites	16

Table of Figures

Figure 6.0	Classification Percent Totals for Offut Lake Subwatershed	1
Figure 6.1	Offut Lake Sub-watershed Land Cover	2
Figure 6.2	Offut Lake Sub-watershed Ecological Function	6
Figure 6.3	Offut Lake Sub-watershed Ecological Processes and Site Ranking – Wetlands	13
Figure 6.4	Offut Lake Sub-watershed Ecological Processes and Site Ranking – Riparian	15
Figure 6.5	Offut Lake Sub-watershed Ecological Processes and Site Ranking - Floodplain ..	17

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 Offut 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 three percent of the Offut Lake Subwatershed is covered by the built environment (see Figure 6.0 and 6.1 Classification Percent Totals for Offut Lake Subwatershed). The Off Lake subwatershed has extensive built environment on the north and south side of the lake. Other surrounding land-use includes long-term commercial forestry.

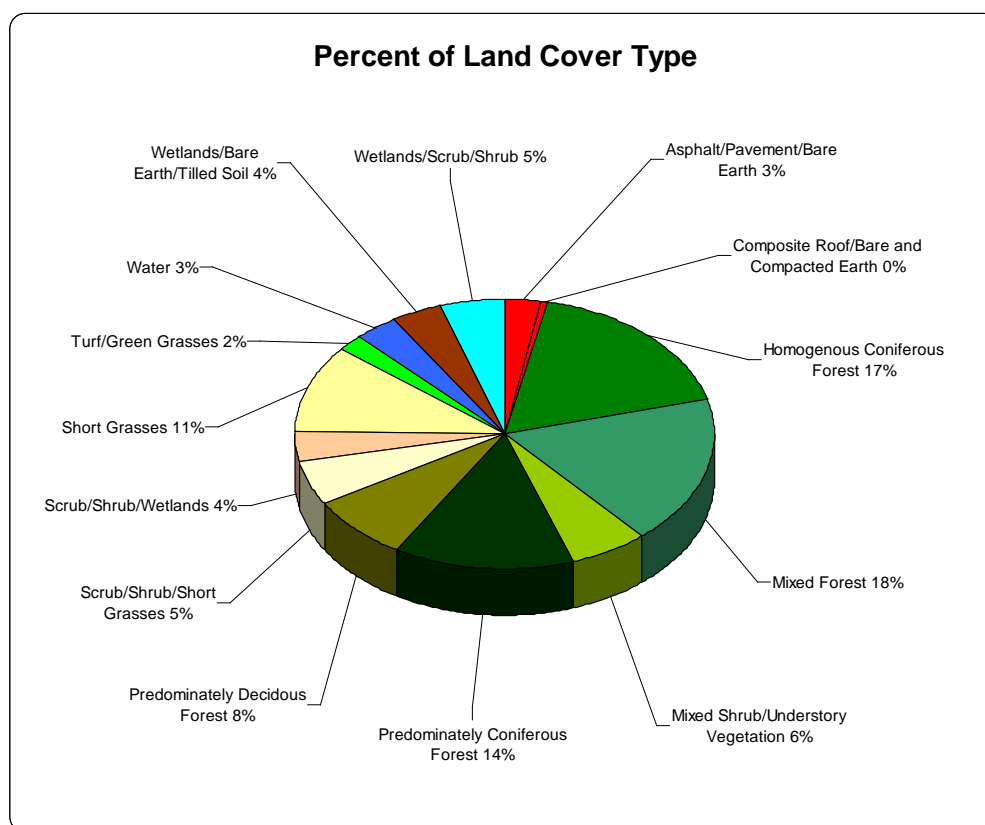


Figure 6.0 Classification Percent Totals for Offut Lake Subwatershed
Land cover data from 2009 SPOT imagery.



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 21 DAUs totaling 9,124 acres (14 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 6.0 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 6.0 Offut Lake Ecological Processes and Biological Elements Function

DAU Id	Acres	Sq Mi	Aquatic Integrity	Habitat Connectivity	Water	Sediment	Wood	Pollutants	Heat
122	448	0.70	N/A	AR	AR	PF	NPF	N/A	AR
124	266	0.42	N/A	AR	AR	PF	NPF	N/A	AR
125	197	0.31	N/A	AR	AR	AR	AR	N/A	AR
131	244	0.38	N/A	AR	AR	AR	AR	N/A	AR
132	1081	1.69	N/A	AR	AR	AR	AR	AR	AR
133	186	0.29	N/A	AR	AR	AR	NPF	N/A	NPF
135	469	0.73	N/A	AR	AR	AR	AR	N/A	AR
137	687	1.07	N/A	PF	AR	PF	PF	N/A	AR
144	439	0.69	N/A	AR	PF	AR	NPF	N/A	NPF
152	498	0.78	N/A	PF	PF	PF	PF	N/A	PF
153	730	1.14	N/A	AR	AR	AR	NPF	N/A	AR
155	736	1.15	N/A	PF	PF	PF	PF	N/A	PF
159	156	0.24	N/A	AR	AR	PF	NPF	N/A	AR

DAU Id	Acres	Sq Mi	Aquatic Integrity	Habitat Connectivity	Water	Sediment	Wood	Pollutants	Heat
161	235	0.37	N/A	PF	PF	PF	PF	N/A	PF
166	369	0.58	N/A	PF	PF	PF	PF	N/A	PF
167	192	0.30	N/A	PF	PF	PF	PF	N/A	PF
170	475	0.74	N/A	AR	PF	AR	AR	PF	AR
172	341	0.53	N/A	AR	AR	AR	NPF	AR	NPF
174	342	0.53	N/A	PF	PF	PF	PF	N/A	PF
175	502	0.78	N/A	AR	PF	AR	AR	AR	AR
177	539	0.84	N/A	PF	PF	PF	PF	N/A	PF

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 6.1 illustrates the final ecological and biological benefit rank of each DAU

Table 6.1 Final DAU Ecological and Biological Benefit Rank

DAU Id	Ecological Processes					Biological Elements		Total Score	Rank
	Water	Sediment	Wood	Pollutants	Heat	Aquatic Integrity	Habitat		
132	3	1	2	1	1	0	1	9	High
125	3	1	2	0	1	0	1	8	High
131	3	1	2	0	1	0	1	8	High
135	3	1	2	0	1	0	1	8	High
153	3	1	0	0	1	0	1	6	Moderate
172	3	1	0	1	0	0	1	6	Moderate
175	0	1	2	1	1	0	1	6	Moderate
122	3	0	0	0	1	0	1	5	Moderate
124	3	0	0	0	1	0	1	5	Moderate
133	3	1	0	0	0	0	1	5	Moderate
159	3	0	0	0	1	0	1	5	Moderate
170	0	1	2	0	1	0	1	5	Moderate
137	3	0	0	0	1	0	0	4	Moderate
144	0	1	0	0	0	0	1	2	Low
152	0	0	0	0	0	0	0	0	Low
155	0	0	0	0	0	0	0	0	Low
161	0	0	0	0	0	0	0	0	Low
166	0	0	0	0	0	0	0	0	Low
167	0	0	0	0	0	0	0	0	Low
174	0	0	0	0	0	0	0	0	Low
177	0	0	0	0	0	0	0	0	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. Offut Lake has 21 DAUs that have restoration potential (Figure 6.2 Offut Lake Subwatershed Ecological Function)

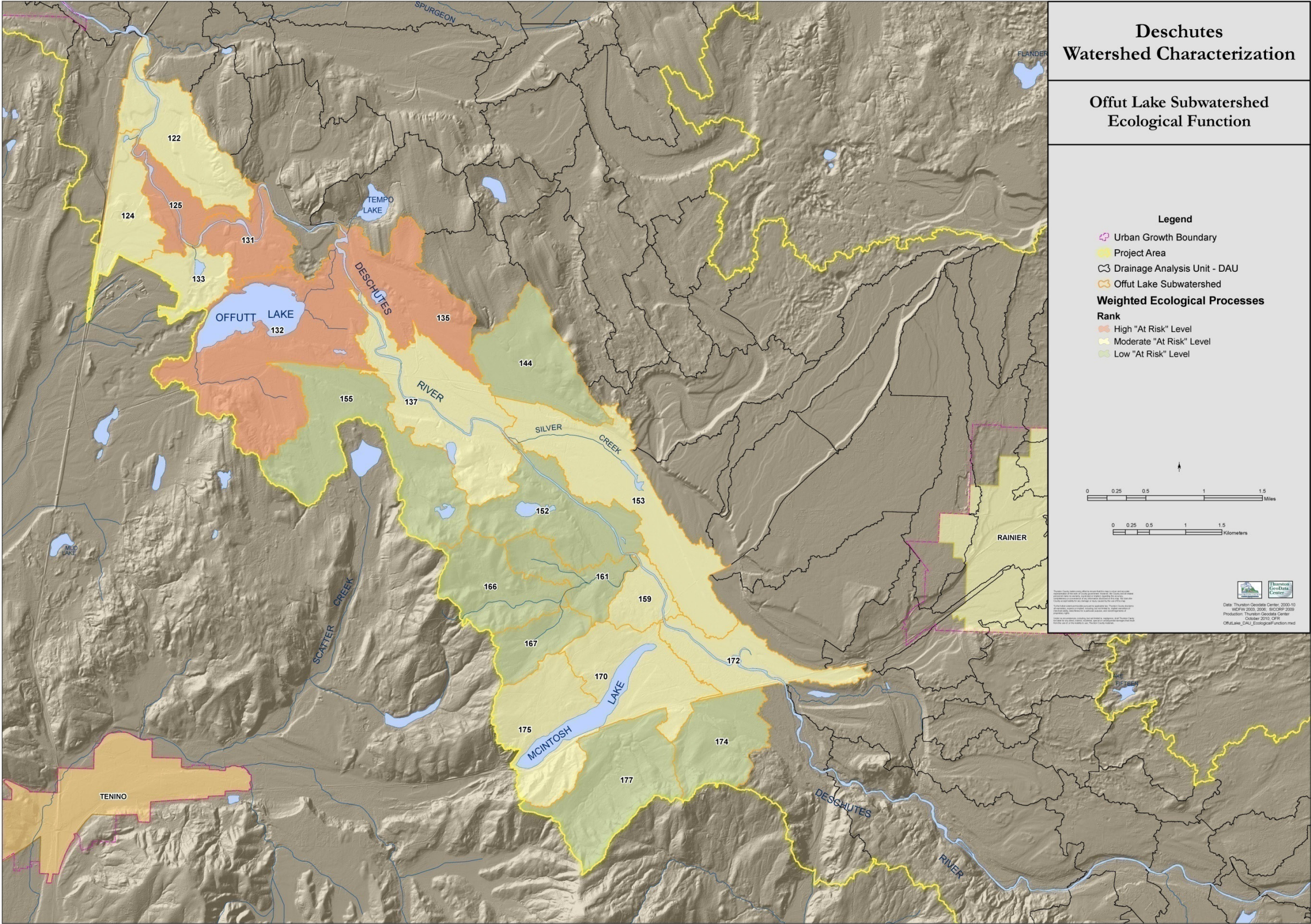


Figure 6.2 Offut Lake Sub-watershed Ecological Function

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

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 447 potential restoration or enhancement sites. Table 6.1 details the results.

Table 6.1 Offut Lake Environmental Benefit Ranking of Natural Resource Sites

Offut Lake Potential Restoration Sites				
Rank	Wetland	Riparian	Floodplain	Total
High	69	17	9	95
Medium	94	21	8	123
Low	202	25	2	229

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 6.2 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 6.2 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 218 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.

Wetland Sites

Table 6.3 presents the results of wetland restoration site ranking taking into account the combined wetland restoration potential and the DAU ranking. Figure 5.3 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 6.3 Wetland Sites

Site ID	Wetlands Rank	Combined DAU Site Score	Acres
Wetland 2804	High	6	11.21
Wetland 1442	High	6	5.60
Wetland 2803	High	6	0.87
Wetland 1478	High	6	10.20
Wetland 1488	High	6	16.39
Wetland 1382	High	6	2.61
Wetland 1462	High	6	2.40
Wetland 1383	High	6	0.29
Wetland 1464	High	6	21.88
Wetland 1355	High	6	18.03
Wetland 1427	High	6	16.56
Wetland 1366	High	6	13.23
Wetland 1401	High	6	6.53
Wetland 2805	High	6	4.05

Site ID	Wetlands Rank	Combined DAU Site Score	Acres
Wetland 1407	High	6	1.94
Wetland 1395	High	6	1.87
Wetland 1389	High	6	1.85
Wetland 2855	High	6	1.10
Wetland 1403	High	6	0.77
Wetland 1368	High	6	1.72
Wetland 1414	High	6	1.25
Wetland 1375	High	6	0.70
Wetland 1410	High	6	0.46
Wetland 1392	High	6	0.28
Wetland 1424	High	6	0.15
Wetland 1507	Moderate	5	9.38
Wetland 1480	Moderate	5	9.26
Wetland 1469	Moderate	5	5.03
Wetland 1444	Moderate	5	4.40
Wetland 1418	Moderate	5	3.12
Wetland 1385	Moderate	5	1.84
Wetland 1358	Moderate	5	0.65
Wetland 1456	Moderate	5	193.99
Wetland 1523	Moderate	5	15.27
Wetland 1499	Moderate	5	1.75
Wetland 1489	Moderate	5	0.66
Wetland 1502	Moderate	5	15.52
Wetland 1428	Moderate	5	6.64
Wetland 1404	Moderate	5	6.23
Wetland 1326	Moderate	5	5.07
Wetland 1425	Moderate	5	3.96
Wetland 1423	Moderate	5	2.80
Wetland 1405	Moderate	5	1.56
Wetland 1408	Moderate	5	1.55
Wetland 1346	Moderate	5	1.30
Wetland 1394	Moderate	5	1.24
Wetland 1537	Moderate	5	1.19
Wetland 1530	Moderate	5	1.11
Wetland 1330	Moderate	5	0.86
Wetland 1470	Moderate	5	0.42
Wetland 1344	High	4	41.95
Wetland 2813	High	4	12.26
Wetland 1561	High	4	9.85
Wetland 1300	High	4	4.22
Wetland 2875	High	4	33.56
Wetland 1659	High	4	8.66
Wetland 1629	High	4	8.38
Wetland 1439	High	4	7.93
Wetland 2812	High	4	6.35
Wetland 1656	High	4	6.05

Site ID	Wetlands Rank	Combined DAU Site Score	Acres
Wetland 1321	High	4	5.84
Wetland 1653	High	4	5.80
Wetland 1627	High	4	3.17
Wetland 1681	High	4	0.26
Wetland 1303	High	4	3.81
Wetland 1515	High	4	3.53
Wetland 1305	High	4	0.87
Wetland 1558	High	4	0.75
Wetland 1354	High	4	9.67
Wetland 1325	High	4	7.17
Wetland 1302	High	4	4.72
Wetland 1293	High	4	2.90
Wetland 1319	High	4	1.27
Wetland 1309	High	4	0.80
Wetland 1316	High	4	0.69
Wetland 1278	High	4	0.23
Wetland 2809	High	4	13.58
Wetland 2799	High	4	5.36
Wetland 1616	High	4	5.33
Wetland 1622	High	4	3.51
Wetland 1301	High	4	3.17
Wetland 1296	High	4	1.57
Wetland 1573	High	4	1.27
Wetland 1625	High	4	1.17
Wetland 1569	High	4	0.78
Wetland 1274	High	4	0.17
Wetland 1813	Moderate	3	114.10
Wetland 1167	Moderate	3	42.44
Wetland 2806	Moderate	3	40.13
Wetland 1441	Moderate	3	14.62
Wetland 1524	Moderate	3	13.11
Wetland 1922	Moderate	3	10.38
Wetland 1460	Moderate	3	2.39
Wetland 1920	Moderate	3	2.01
Wetland 1317	Moderate	3	0.78
Wetland 1318	Moderate	3	0.68
Wetland 1895	Moderate	3	0.54
Wetland 2882	Moderate	3	0.26
Wetland 1872	Moderate	3	0.19
Wetland 1275	Moderate	3	0.19
Wetland 1449	Moderate	3	4.06
Wetland 1430	Moderate	3	3.96
Wetland 2808	Moderate	3	3.16
Wetland 1253	Moderate	3	2.79
Wetland 1380	Moderate	3	0.71
Wetland 1381	Moderate	3	0.40

Site ID	Wetlands Rank	Combined DAU Site Score	Acres
Wetland 1476	Moderate	3	0.12
Wetland 1799	Moderate	3	13.49
Wetland 1854	Moderate	3	8.17
Wetland 1729	Moderate	3	7.21
Wetland 1741	Moderate	3	6.16
Wetland 1875	Moderate	3	5.45
Wetland 1763	Moderate	3	4.71
Wetland 1517	Moderate	3	4.33
Wetland 1504	Moderate	3	1.99
Wetland 1284	Moderate	3	1.88
Wetland 1630	Moderate	3	1.84
Wetland 1812	Moderate	3	1.70
Wetland 1623	Moderate	3	1.19
Wetland 1802	Moderate	3	1.09
Wetland 1393	Moderate	3	0.74
Wetland 1814	Moderate	3	0.71
Wetland 2009	Moderate	3	0.58
Wetland 1280	Moderate	3	0.57
Wetland 1805	Moderate	3	0.29
Wetland 2019	Moderate	3	0.19
Wetland 1877	Moderate	3	0.07
Wetland 1880	Moderate	3	0.07
Wetland 1869	High	2	3.32
Wetland 1506	High	2	3.15
Wetland 1720	High	2	0.94
Wetland 1767	High	2	6.10
Wetland 1495	High	2	0.87
Wetland 1490	High	2	0.84
Wetland 1635	High	2	0.64
Wetland 1589	High	2	0.25
Wetland 1655	Moderate	1	3.21
Wetland 1497	Moderate	1	1.85
Wetland 1567	Moderate	1	0.76
Wetland 1568	Moderate	1	0.62
Wetland 1505	Moderate	1	0.46
Wetland 1571	Moderate	1	0.45
Wetland 1486	Moderate	1	0.19
Wetland 2814	Moderate	1	3.44
Wetland 1899	Moderate	1	2.22
Wetland 1637	Moderate	1	1.41
Wetland 1697	Moderate	1	0.75
Wetland 1555	Moderate	1	0.67
Wetland 1574	Moderate	1	0.48
Wetland 1953	Moderate	1	0.32
Wetland 1711	Moderate	1	4.22
Wetland 1673	Moderate	1	2.26

Site ID	Wetlands Rank	Combined DAU Site Score	Acres
Wetland 1556	Moderate	1	1.22
Wetland 1698	Moderate	1	1.06
Wetland 1708	Moderate	1	1.02
Wetland 1779	Moderate	1	0.95
Wetland 1706	Moderate	1	0.93
Wetland 1647	Moderate	1	0.84
Wetland 1693	Moderate	1	0.38
Wetland 1588	Moderate	1	0.30
Wetland 1719	Moderate	1	0.27
Wetland 2049	Moderate	1	0.24
Wetland 1576	Moderate	1	0.16

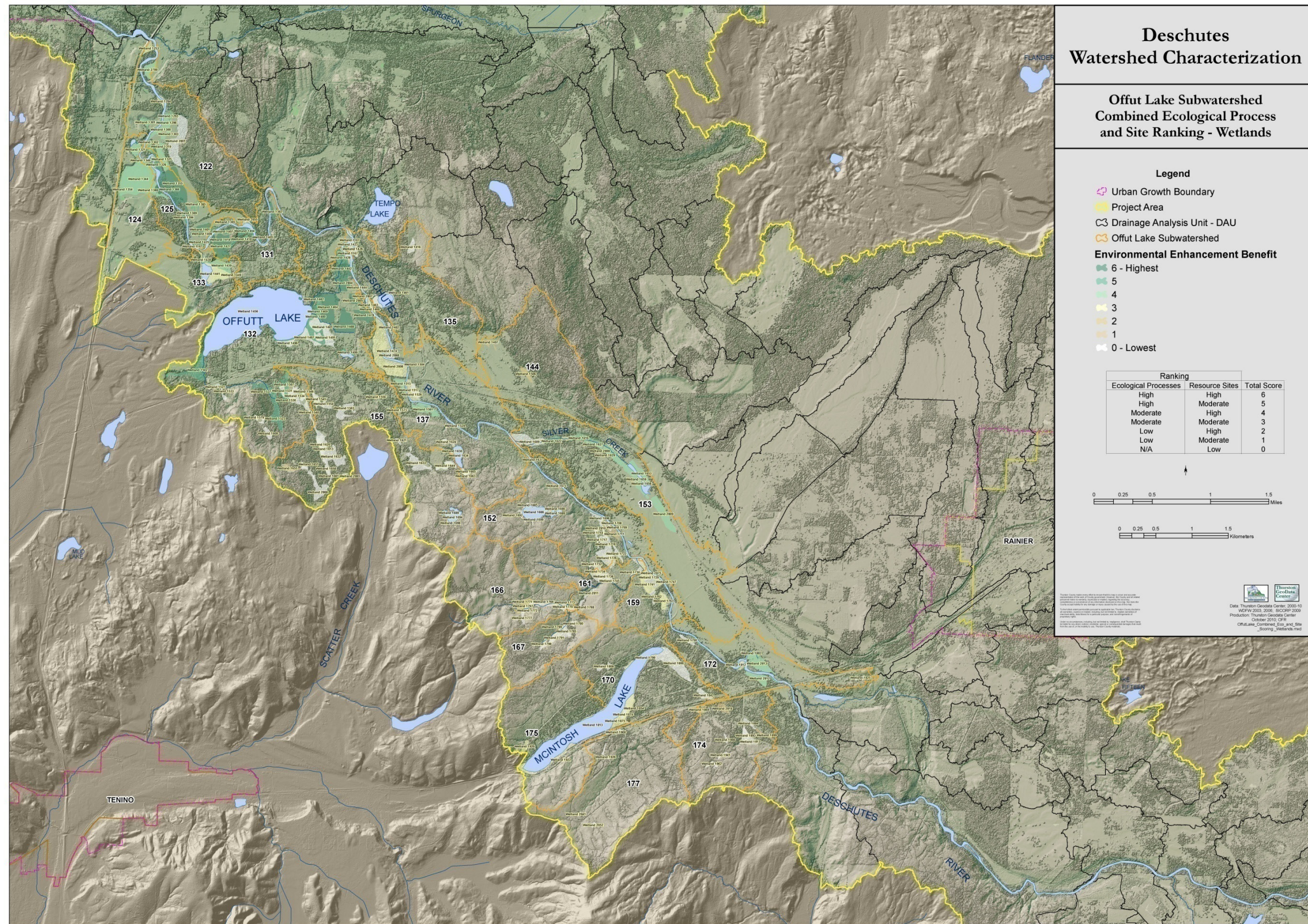


Figure 6.3 Offut Lake Sub-watershed Ecological Processes and Site Ranking – Wetlands

Riparian condition

The resulting combined score of the natural resource site within the context of the DAU were scored and displayed on Figure 6.5 Offut Lake Subwatershed Ecological Processes and Site Ranking – Riparian. Riparian sites ranked Low are not included in the table, but are included in appendix B.

Table 6.5 Riparian Sites

Site ID	Riparian Rank	Combined DAU and Site Score	Acres
Riparian 274	High	4	29.43
Riparian 3264	High	6	41.58
Riparian 284	High	6	61.73
Riparian 410	High	4	12.34
Riparian 3257	High	4	32.53
Riparian 289	High	6	55.97
Riparian 291	High	6	16.88
Riparian 328	High	4	4.65
Riparian 3268	High	6	37.66
Riparian 3269	High	6	14.80
Riparian 267	High	4	46.63
Riparian 299	High	6	202.18
Riparian 300	High	4	77.80
Riparian 393	High	2	30.23
Riparian 415	High	4	12.00
Riparian 429	High	2	63.32
Riparian 3302	High	2	8.09
Riparian 256	Moderate	3	42.49
Riparian 317	Moderate	3	68.00
Riparian 369	Moderate	3	104.42
Riparian 383	Moderate	1	31.93
Riparian 404	Moderate	3	9.33
Riparian 3265	Moderate	5	42.56
Riparian 3454	Moderate	5	0.47
Riparian 3465	Moderate	1	96.45
Riparian 281	Moderate	5	23.39
Riparian 301	Moderate	3	3.66
Riparian 314	Moderate	1	21.44
Riparian 319	Moderate	3	32.70
Riparian 351	Moderate	3	12.21
Riparian 362	Moderate	1	14.26
Riparian 405	Moderate	3	22.63
Riparian 440	Moderate	1	40.40
Riparian 3464	Moderate	3	27.35
Riparian 331	Moderate	3	109.23
Riparian 408	Moderate	3	31.55
Riparian 412	Moderate	3	35.73
Riparian 442	Moderate	3	26.85

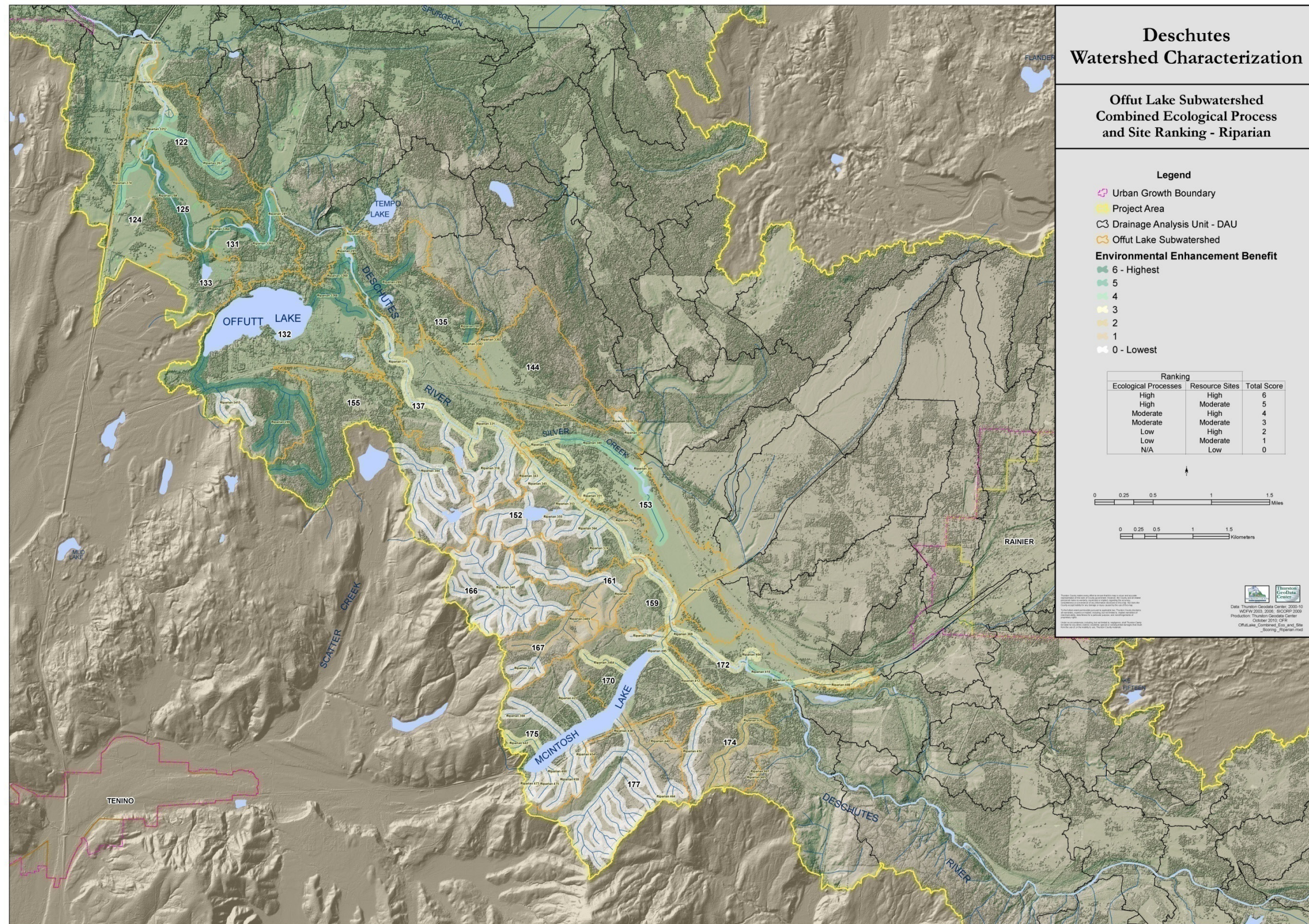


Figure 6.4 Offut Lake Sub-watershed Ecological Processes and Site Ranking – Riparian

Floodplain Condition

The resulting combined score of the natural resource site within the context of the DAU were scored and displayed on Figure 6.6 Offut Lake Subwatershed Ecological Processes and Site Ranking – Floodplain. Floodplain sites ranked Low are not included in the table, but are included in appendix B.

Table 6.6 Floodplain Sites

Site ID	Floodplain Rank	Combined DAU Site Score	Acres
Floodplain 19	High	6	18.75
Floodplain 17	High	6	36.20
Floodplain 16	Moderate	5	57.41
Floodplain 20	Moderate	5	12.28
Floodplain 21	Moderate	5	17.41
Floodplain 28	Moderate	5	0.03
Floodplain 38	Moderate	5	0.27
Floodplain 24	High	4	5.07
Floodplain 13	High	4	22.64
Floodplain 14	High	4	9.59
Floodplain 18	High	4	58.05
Floodplain 22	High	4	8.90
Floodplain 23	High	4	7.93
Floodplain 26	High	4	228.51
Floodplain 12	Moderate	3	6.36
Floodplain 15	Moderate	3	56.55
Floodplain 25	Moderate	3	106.63

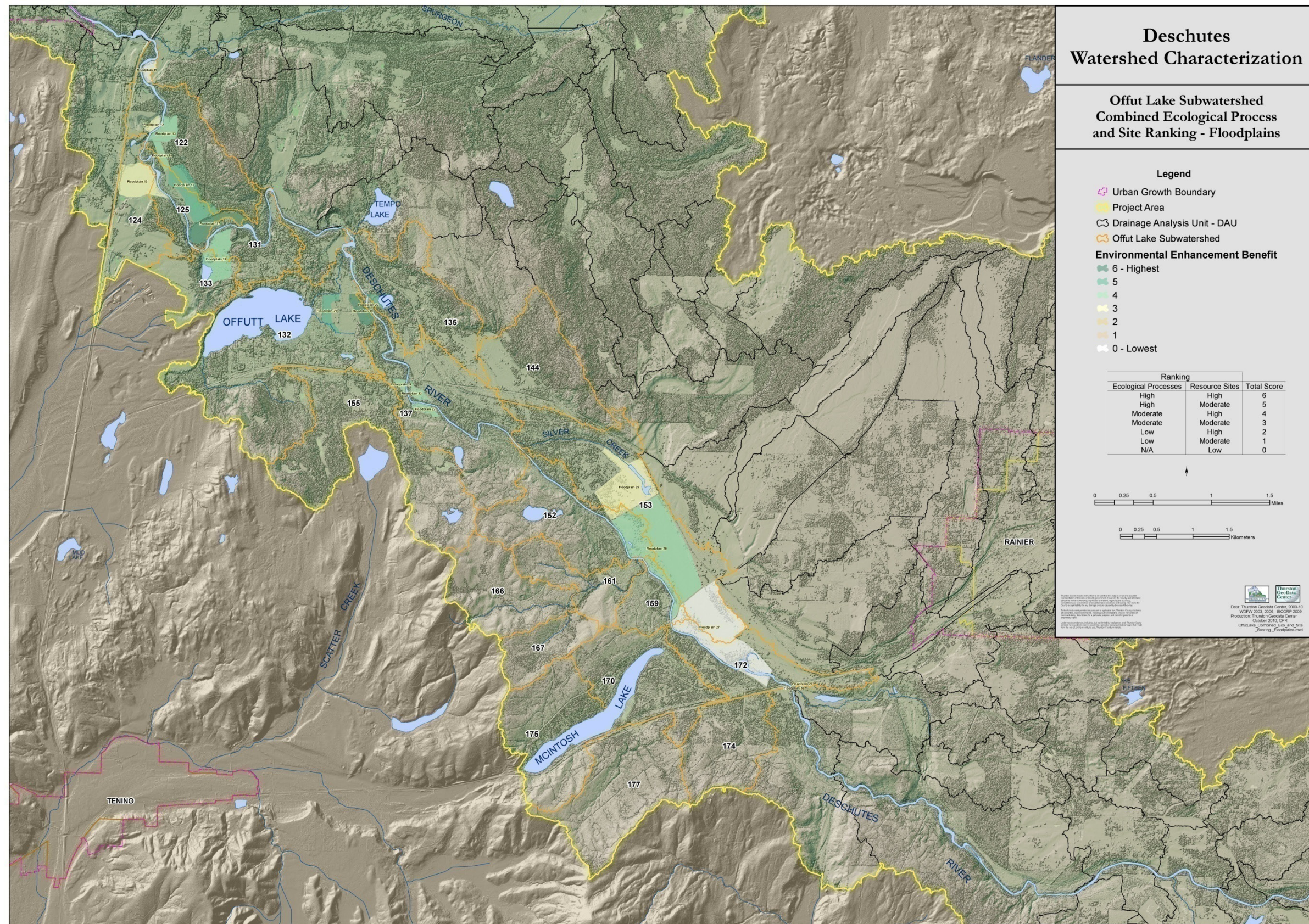


Figure 6.5 Offut Lake Sub-watershed Ecological Processes and Site Ranking - Floodplain