

LUMMI NATION
WETLAND INVENTORY UPDATE
YEAR 1 SYNTHESIS REPORT
2005



December 2005

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2005

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Prepared by:

**Water Resources Division
Lummi Natural Resources Department**

Primary Author:

Lee First - LIBC Water Resources Planner II

Primary Contributors:

**Jeremy Freimund, P.H. – Water Resources Manager
Ann Stark, GISP – GIS Coordinator**

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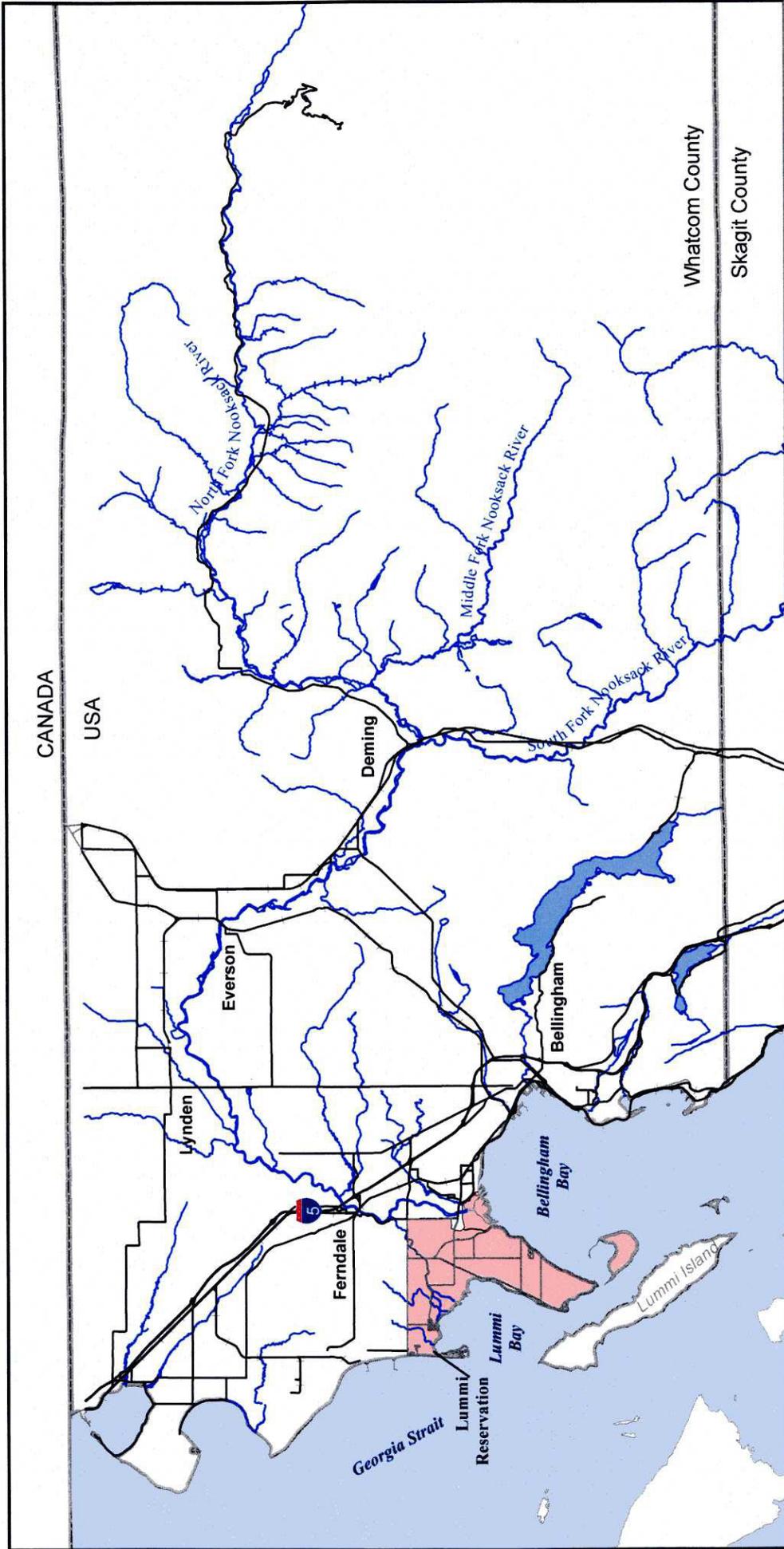
1. BACKGROUND/INTRODUCTION

The Lummi Indian Reservation (Reservation, see Figure 1) is located along the western boundary of Whatcom County, Washington and includes the mouth of the Nooksack and Lummi rivers. Both the Nooksack and Lummi river watersheds are under environmental pressures from rapid regional growth. The Lummi Nation has also entered a period of rapid economic development under self-governance. Growth on and near the Reservation requires that the Nation's core environmental program prioritize the development of a regulatory infrastructure that allows for responsible growth while protecting tribal resources and the Reservation environment. This regulatory infrastructure supports both the tribal goal and the Environmental Protection Agency (EPA) policy of tribal self-governance and recognition of sovereignty.

Previous EPA and other funding sources have supported the Lummi Nation's assessment of priority water resource needs and the identification of unmet needs. Environmental planning intended to protect the Nation's water resources has included development of a Storm Water Management Program (LWRD 1998), a Wellhead Protection Program (LWRD 1997, LWRD 1998), a Wetland Management Program (LWRD 2000), a Non-Point Source Management Program (LWRD 2001, LWRD 2002), and draft Water Quality Standards for surface waters (LWRD 1997). These programs are components of a comprehensive water resources management program (CWRMP) being developed and implemented pursuant to Lummi Indian Business Council (LIBC) resolutions No. 90-88 and No. 92-43.

In January 2004, the Lummi Nation Water Resources Protection Code (Title 17 of the Lummi Code of Laws [LCL]) was adopted. Based on a Reservation-wide wetland inventory completed in 1999 (Harper 1999) and as described in Chapter 17.06 (Stream and Wetland Management) of the Code, different types of wetlands that vary in their quality and importance occur on the Reservation. In order to establish appropriate levels of protection, pursuant to LCL Chapter 17.06 the Reservation wetlands must be classified into one of four categories. Category 1 wetlands are considered Critical Value Wetlands that have a high and irreplaceable level of importance for fisheries, Lummi culture, and/or water quality on the Reservation. Category 4 wetlands have minimum habitat value and are suitable for restoration or enhancement efforts.

The purpose of the 1999 Reservation-wide wetland inventory was to identify wetland locations and to collect information on the characteristics and functions of the Reservation wetlands. The 1999 Reservation-wide wetland inventory (Harper 1999) relied largely on remotely sensed data (i.e., color and infra-red aerial photographs), generalized mapping (i.e., USDA soil survey), and limited field verification to identify wetland locations and sizes. In addition to identification and mapping, the 1999 inventory collected general wetland information including Cowardin classification (Cowardin et al. 1979),



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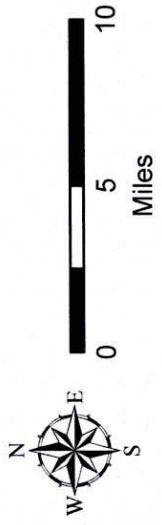


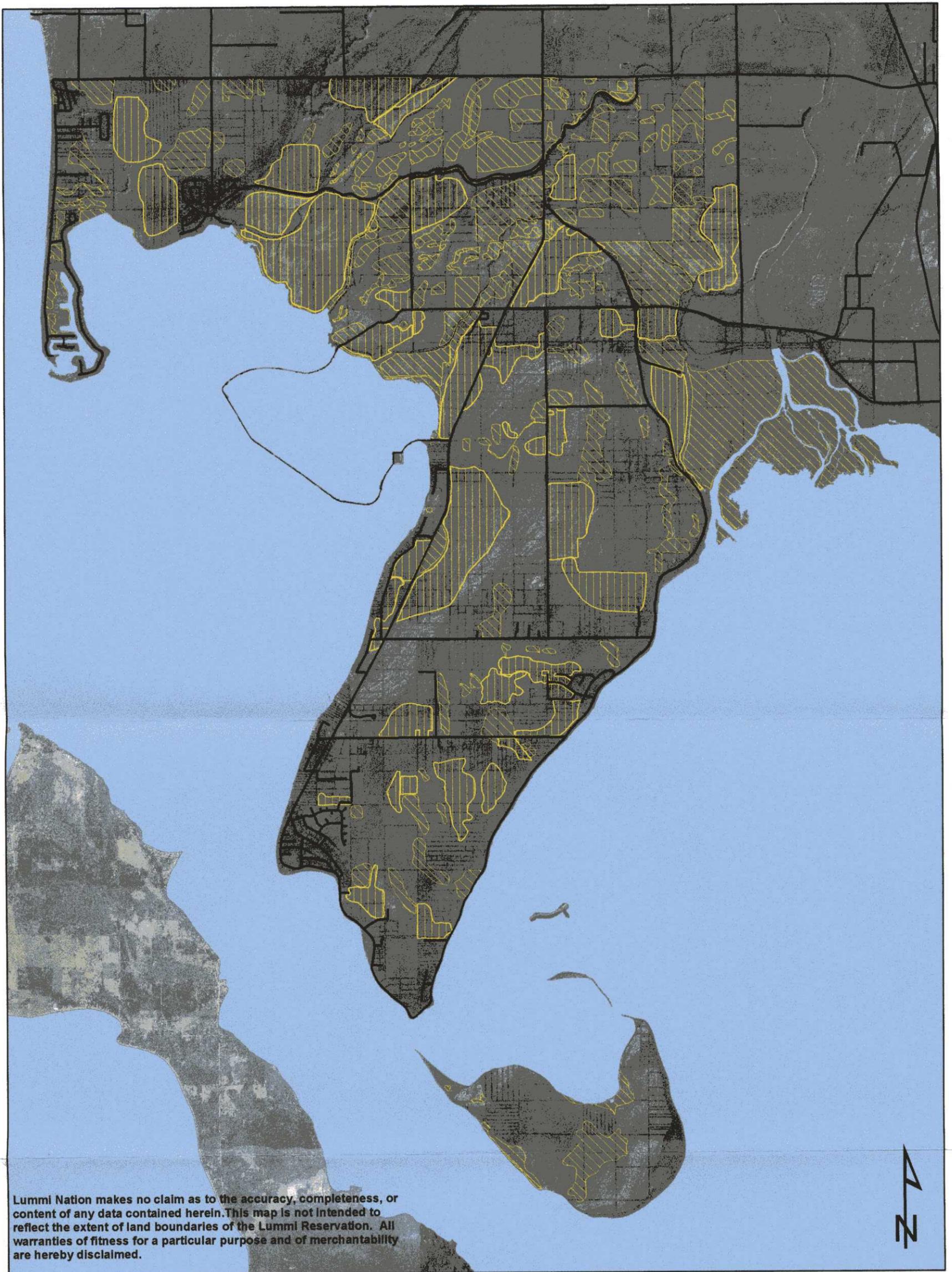
Figure 1 - Regional Location of the Lummi Indian Reservation, Washington

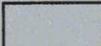
water source, and soil type. The Washington State Function Assessment Method was applied to 12 assessment units (AUs) in nine selected wetlands on the Reservation. The 1999 inventory identified and mapped a total of 214 wetlands and wetland complexes on the Reservation (Figure 2). These wetland areas totaled 5,432 acres, or roughly 43 percent of the land area of the Reservation, excluding tidelands. Approximately 60 percent of these mapped wetland areas are located in the flood plains of the Lummi and Nooksack rivers.

Although the 1999 inventory represents an important planning tool and a significant improvement over the previously available information, which was largely from the National Wetlands Inventory (USFWS 1987), the 1999 inventory has proven to be too general for more detailed level planning efforts. The 1999 inventory either did not map some wetlands or generally shows larger wetland areas than are surveyed in the field or identified using Global Positioning System (GPS) technology. Refining the spatial resolution of the wetland mapping, performing function assessments, and classifying the wetlands into the regulatory categories identified in Title 17 is intended to support efforts to protect these wetland resources and the important ecological, hydrological, and water quality protection functions that they provide. Because of the large number of wetland areas on the Reservation, the effort to refine the spatial resolution of the wetland mapping, to perform function assessments, and to classify the Reservation wetlands is projected to require several years to complete. This report summarizes the results of the first year of this inventory update effort.

For the purposes of this inventory update, a wetland evaluation consists of conducting site visit(s), performing at least a reconnaissance level delineation, using the GPS to map the identified wetland boundaries, performing a function assessment largely using the Washington State Wetland Function Assessment Project (Hruby et al. 1999) methodology, and classifying the wetlands into one of four categories. Although approximately 65 separate wetland areas were identified and mapped during this initial inventory update effort, some of the separate wetland boundaries exist within wetland mosaics and were thus considered as one assessment unit due to their similar characteristics and/or connectedness in the landscape. Pursuant to Hruby (1999), only one function assessment was conducted if the wetland being categorized met the definition of a mosaic of wetlands or met other criteria of wetlands with several classes or subclasses. This approach to identifying function assessment units resulted in the complete evaluation of 36 wetlands during this first year of the inventory update (approximately half of the number anticipated for one year and about 17 percent of the total number of wetlands identified during the 1999 inventory). Based on this experience and assuming the same evaluation rate, approximately five more years will be required to complete an evaluation of all of the Reservation wetlands.

Figure 2 - 1999 Wetland Inventory Results



	Estimated Parcel Boundaries		Estimated Wetlands - 1999
			
			Wetland
			Wetland Complex



This wetland inventory update synthesis report is divided into the following sections:

- Section 1 is this background/introduction section.
- Section 2 describes the methods used to conduct the mapping, function assessments, and categorization of Reservation wetlands.
- Section 3 summarizes the results of the wetland inventory update.
- Section 4 provides a discussion the first year results.
- Section 5 lists the references cited in the report.

Appendix A contains a map of each wetland mapped during this initial year of the inventory update. The field notes and function assessment worksheets for each wetland are on file with the Lummi Water Resources Division. In Appendix B, an example of the field notes and function assessment worksheets completed for each wetland is provided.

2. METHODS FOR WETLAND INVENTORY UPDATE

The methods used to update and refine the spatial resolution of the 1999 Inventory are described below. Ms. Lee First, a Water Resources Planner II in the Lummi Water Resources Division, applied the described methods. Ms. First has a Professional Certificate in Wetlands Science and Management (University of Washington 2001) and a Bachelors of Science in Environmental Studies (Western Washington University 1987). Ms. First also received additional training from the consulting firm Sheldon & Associates and from the Washington State Department of Ecology. Sheldon & Associates conducted a training session in the application of the Methods of Assessing Wetland Functions in July 2003 and Dr. Tom Hruby (Senior Ecologist, Washington State Department of Ecology) conducted two training sessions on the application of the *Revised Washington State Wetland Rating System in Western Washington* during May and August 2005. Field data were collected for the results summarized in this update beginning in August 2003 and ending in October 2005.

Five inter-related methods were used to update and refine the 1999 inventory. The different methods were used for wetland mapping/boundary determination, for wetland function assessment, for wetland rating/classification, for updating the Lummi Nation GIS wetland inventory/database, and for quality control.

2.1 Method for Wetland Mapping/Boundary Determination

Because of property access issues, and the remoteness and size of some of the Reservation wetlands, it was not practical to undertake a geography-based approach (i.e., watershed by watershed) to selecting the wetlands evaluated during the first phase of this study. Instead, the locations of the wetlands evaluated during this first phase of the inventory update were based on areas where development actions were contemplated and/or on parcels for which Lummi Land Use Permit Applications were submitted to the Lummi Planning Department. In several areas, small and moderate sized wetland areas were discovered that had not been identified in the 1999 inventory.

During the planning stages for this update effort, it was estimated that approximately 70 wetlands could be evaluated during one year (approximately 3 days per wetland). This estimate proved to be overly optimistic due to a number of factors including property access issues and the remoteness and size of some of the wetlands. There were also seasonal considerations including long periods of flooding, frozen ground, and snow that limited and/or prevented wetland boundary determination during portions of the winter season. During the summer season, mapping forested wetland areas was problematic because GPS satellite signals were often difficult to obtain through the dense tree canopy. Of the 214 wetlands on the Reservation that were mapped during the 1999 inventory, function assessments were conducted on 36 wetland areas comprised of 65 separate wetlands during this initial year of the update (approximately 17 percent

of the total number of inventoried wetlands). In several cases these function assessment units were a mosaic of wetlands that were in close proximity to each other. Although separate wetland boundaries exist within some of these wetland mosaics, they were considered as one assessment unit due to their similar characteristics and/or connectedness in the landscape. Only one function assessment was conducted if the wetland being categorized met the definition of a mosaic of wetlands or met other criteria of wetlands with several classes or subclasses (Hruby 1999). For example, the delineated wetlands in the Northern Lummi River Distributary Channel Area included approximately 20 separately mapped wetland areas. These wetlands were divided into three separate function assessment units because there were contiguous wetland areas on both sides of a river where the bank-to-bank distance was greater than 15 meters. Several of these wetlands (such as in the Lummi Delta Function Assessment Units A, B, and C) contained up to 14 separate wetland areas. As a result, although only 36 function assessments were conducted, approximately 65 separate wetland areas were identified and mapped during this initial inventory update effort.

In several cases, development actions were planned on a parcel of land where the 1999 inventory indicated that large wetlands or wetland complexes were located over contiguous parcels. Because acquiring landowner permission is time consuming – particularly for undivided parcels in trust status that may have in excess of 100 landowners, in many cases only a portion of the wetland boundary on the particular parcel where the development action was planned was mapped. As a result, there are numerous fragments of wetland areas that have been mapped by Water Resources staff during the last several years. These fragments are mapped and appear on Figure 3 and in Figure 4, but function assessments and classification/ratings have not been performed yet since the entire wetland needs to be considered to conduct these assessments. Instead, these fragmented maps have been archived in GIS so that mapping, function assessments, and categorization can be finalized in the future as this wetland inventory update is completed.

Once a wetland from the 1999 inventory or a land parcel was selected for evaluation, the methodology used to reliably identify and map the wetland boundaries was the following:

1. Prior to conducting a field visit, available remotely sensed data including high resolution aerial photography collected during 2004 and high-resolution (approximately 0.5 feet accuracy) topographic information acquired in 2005 using Light Detection and Ranging (LIDAR) technology were reviewed. Maps developed as part of the USDA soil survey for the area (USDA 1992) were also reviewed.
2. Information developed during the 1999 wetland inventory, including watershed name and size, wetland size, Cowardin classes present, association with streams or other water resources, and USDA soil units in the vicinity was reviewed.

3. During the field visit(s), one of the following two methods for determining wetland boundaries were used:
 - If development activities were planned that would potentially impact wetlands, or a jurisdictional determination of the wetland boundary was required, the wetland boundary was determined in the field using the criteria and methodology of the Wetland Delineation Manual (Manual) issued by the U.S. Army Corps of Engineers (COE 1987). This manual requires examination of three parameters: vegetation, soils, and hydrology. For an area to be classified as a wetland, hydrophytic vegetation, hydric soils, and wetland hydrology must be exhibited. The specified criteria are mandatory and must all be present, except under circumstances when a wetland is considered a disturbed area or a problem wetland. Once delineated, the wetland boundaries were recorded using a handheld Trimble GeoXT GPS unit, and downloaded into ArcMap9 GIS software. The horizontal accuracy of the Trimble GeoXT is +/- 2 feet once the collected data are post-processed.
 - If development activities were not planned, and or other conditions made locating the boundary difficult (i.e., lack of satellite configuration for the GPS unit, lack of permission to access property, or other reason), a “reconnaissance-level” boundary determination was made instead of a jurisdictional determination. Much more time would have been required if jurisdictional determinations were made on all the wetlands because wetland data plots along regularly spaced transects would have been required. For the reconnaissance-level of determination, the same criteria were applied, but in a less formal manner, or in some cases, only a portion of the wetland edge was recorded using a GPS unit, and the rest of the wetland boundary estimated using a combination of other methods (i.e., aerial photography and LIDAR). In some cases, portions of the wetland boundaries were recorded using a combination of an on-the-ground reconnaissance, GPS data, soil mapping, LIDAR data, and recent aerial photography.

For wetlands 38N1E23-06, 38N1E23-07, 37N1E02-06, and 38N2E07-02A and B (the “Haas Property,” the Lummi Nation K-12 School, and wetlands in the vicinity of the Northwest Indian College, respectively), the Lummi Nation contracted environmental consulting firms to delineate wetland boundaries, perform function assessments, and determine wetland rating/classification. Portions of the boundaries of these wetlands were surveyed by a licensed land surveyor. Wetland 37N1E02-05 (south of the Lummi Nation K-12 School) and a wetland area west of the Lummi Nation K-12 School were partially delineated by a consulting firm and partially delineated by Lummi Natural Resources Staff. For wetland areas that were surveyed by a licensed land surveyor, survey data were downloaded in AutoCad software into ArcMap9 GIS software, and are included in this report.

2.2 Method for Wetland Function Assessment

The *Methods for Assessing Wetland Functions, Volume 1* by the Washington State Wetland Function Assessment Project (Hruby et al. 1999) were used to assess functions of wetlands on the Lummi Reservation. The Washington State Method (commonly called WAFAM) is based on the nationally recognized Hydrogeomorphic (HGM) approach (Brinson 1993), which classifies wetlands based on landscape position and water regime, and provides guidance on arriving at technical assumptions on which assessments of performance of functions are based. The HGM method proposes the following classes of wetlands: Depressional, Fringe, Slope, Riverine, and Flats (Brinson 1993). The Washington State technical committee has thus far developed assessment methods only for depressional and riverine wetlands. Most of the wetlands on the Lummi Reservation fall into these two categories, although estuarine fringe and flats are also clearly present.

The Washington State approach (Hruby et al. 1999) relies on indicators of functions to assess potential performance, rather than direct measurements. Indicators are usually physical characteristics of the wetland or its surrounding area that can be correlated to a specific function. For example, rather than trying to directly sample aquatic mammals, the presence of steep banks in the wetland can be used as an indicator of the suitability of the wetland habitat for aquatic mammals. After collecting detailed data on indicators, mechanistic models (mathematical equations) are applied to the data to arrive at a numeric indexed score. This step is based on the assumption that the relationship between indicators and the actual performance level for a function can be defined by a simple mathematical expression. Different models were developed for each subclass of wetland and for each function category (Hruby et al. 1999).

The first step in assessing wetland functions is to divide the wetland into an assessment unit (AU). Wetlands are divided into AUs based on differences in water regime. The AU boundary occurs where the volume, flow, or velocity of the water changes rapidly, whether created by natural or artificial features. An entire wetland may be uniform in its water regime and would therefore be comprised of a single AU.

As noted above, the WAFAM method relies on indicators of functions to assess potential performance rather than direct measurements. A total of 15 categories of functions are assessed for each wetland under the WAFAM method. The indices that result for each wetland function represent an assessment of performance relative to reference standard wetlands identified as having the highest level of performance within that wetland subclass.

The index of performance reflects the level of performance per unit area of the wetland being assessed. Another calculation must be made to factor in the size of the assessment unit to get a final performance index for that function of a

particular assessment unit. The index denotes the assessed potential performance or habitat suitability based on the structural characteristic present in and around the assessment unit. The index does not denote the actual performance, as that would require detailed monitoring. It is assumed that the assessment unit will perform the function if the appropriate structural components are present and if the opportunity exists. A low index (i.e., 1,2,3) for a function does not necessarily mean the wetland is “unimportant.” It may be the only wetland in the area providing certain functions.

For the Reservation wetlands that were evaluated by environmental consultants, wetland functions were evaluated using the “Wetland and Buffer Functions Semi-Quantitative Assessment Methodology” (Cooke 2000). This method identifies and quantifies the potential of various functions operating within a wetland. The determination is based on the physical characteristics of the wetland. Results from this method are in a different format than results from the WAFAM, and are indicated with a “SC” on Table 2.

2.3 Method for Wetland Rating/Classification

There is currently no tribal or federal rating system to categorize wetlands based on functions and values. As a result, the Washington State Department of Ecology’s *Wetland Rating System for Western Washington – Revised* (Hruby 2004) was used to classify Reservation wetlands according to the Washington State Department of Ecology’s Wetland Rating System. This document is a revision of the *Washington State Wetland Rating System for Western Washington*, published by the Department of Ecology in 1991. Because some of the wetlands rated in this report were visited before the revised version of the rating system was available, the earlier version of the rating system was used for a portion of the wetlands inventoried for this report.

The current version of the wetland classification system was designed to differentiate between wetlands based on their sensitivity to disturbance, their significance, their rarity, the ability to replace them, and the functions they provide. The classification system results in rating wetlands into one of the following four categories:

- Category 1 wetlands are those that represent a unique or rare wetland type, or are more sensitive to disturbance than most wetlands, or are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime, or provide a high level of functions (scores > 70 points).
- Category 2 wetlands are difficult, though not impossible to replace, and provide high levels of some functions (scores between 51 – 69 points). These wetlands occur more commonly than Category 1 wetlands, but still need a relatively high level of protection.
- Category 3 wetlands are wetlands with a moderate level of functions (scores between 30 – 50 points). They have been disturbed in some

- ways, and are often less diverse or more isolated from other natural resources in the landscape than Category 2 wetlands.
- Category 4 wetlands have the lowest levels of functions (scores less than 30 points) and are often heavily disturbed. These are wetlands that could be replaced, and in some cases, improved. These wetlands may provide some important ecological functions, and also need to be protected.

The “rating” categories are intended as the basis for developing standards for protecting and managing the wetlands to reduce further loss of their value as a resource. Some decisions that can be made based on the rating include the width of buffers needed to protect the wetland from adjacent development, the ratios needed to compensate for impacts to the wetland, and permitted uses in the wetland. The rating is the basis for requiring wetland buffers as mandated in Title 17 of the Lummi Code of Laws.

As a component of the rating process, a classification key was used to determine whether the wetland was riverine, depressionnal, slope, lake-fringe, tidal fringe or flats according to the HGM classification system.

2.4 Method for Updating the Lummi Nation GIS Wetland Inventory/Database

As described in Section 2.1, the updated wetland boundaries were recorded using a Trimble GeoXT GPS unit, and downloaded into ArcMap9 GIS software. Once entered into the GIS, any newly identified wetland areas were assigned an identification number based on the Public Land Survey System (i.e., Township, Range, Section) information. If a new wetland area essentially replaced an existing wetland, the original identification number was retained. If a wetland boundary was for a wetland that had not been previously identified, a new number was assigned. Other data that were entered into the GIS database for new wetlands included wetland area in acres and hectares, comments about location or other unique features of the wetland, wetland rating/classification, hydrogeomorphic classification, the date the wetland was mapped, and watershed name.

2.5 Method for Quality Control

The Lummi Water Resources Manager performed periodic quality control checks of the data collection and mapping effort. The quality control checks performed by the Water Resources Manager included reviewing the field forms for the inventoried wetlands and the WAFAM forms for thoroughness, consistency, and accuracy. Having the Water Resources Planner II participate in two separate courses where her derived wetland ratings/classifications were compared with those of other experts controlled the quality of the wetland rating/classification process. In addition, once mapped in the GIS, the wetland boundaries identified

with the GPS unit were compared with the 2004 high-resolution aerial photographs and the LIDAR data.

3. WETLAND INVENTORY UPDATE RESULTS

The results from the wetland inventory update are summarized below. Detailed field forms for each wetland are maintained on file at the Lummi Water Resources Division office and an example of the documentation is included as Appendix B of this synthesis report.

3.1 Results of Wetland Mapping and Boundary Determination

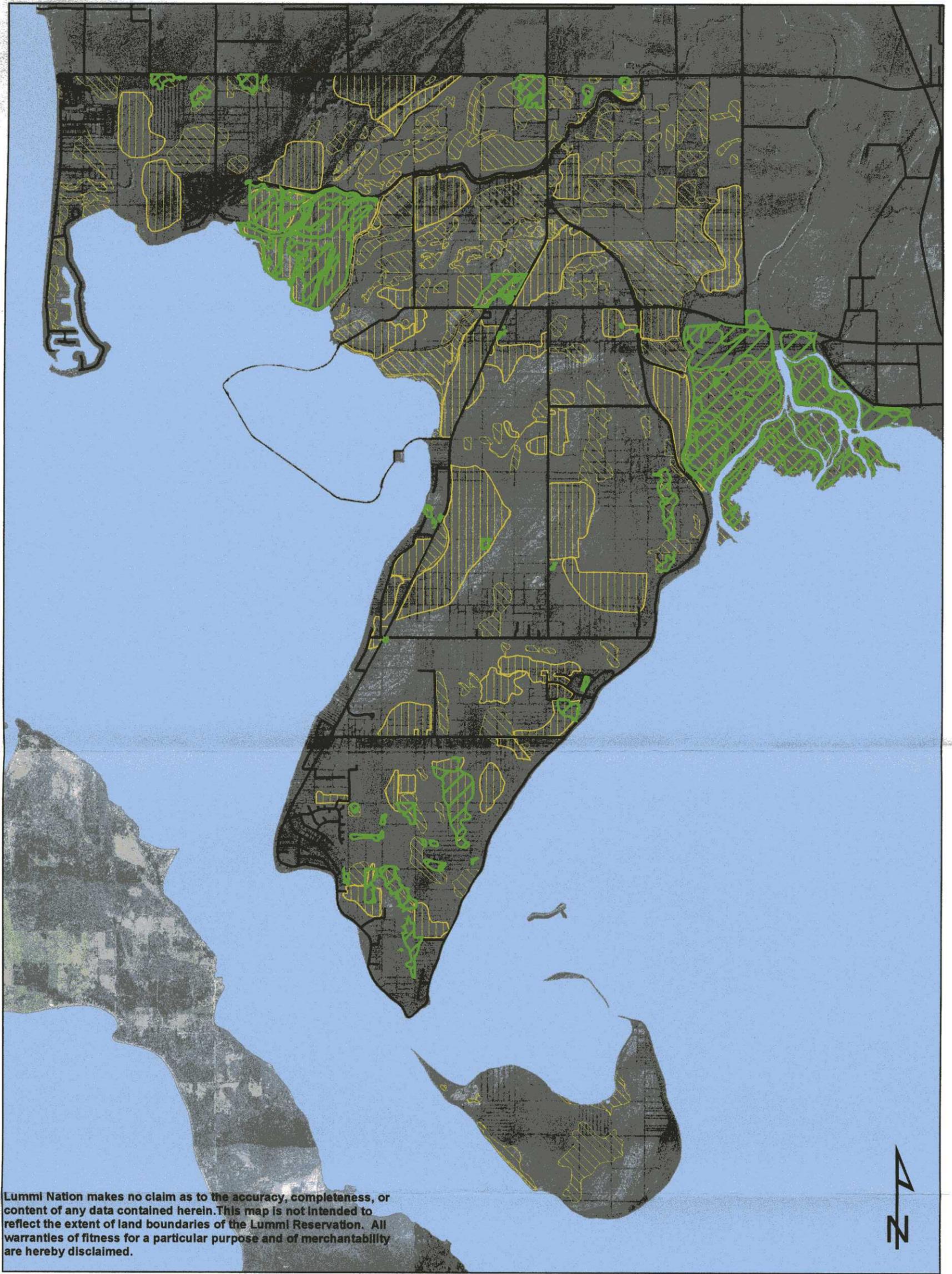
The 36 wetland areas (which contain approximately 65 separate wetlands) on the Lummi Reservation that were field verified and mapped during this initial wetland inventory update effort are shown in Figure 3. Detailed maps of each of these wetland areas are presented in Appendix A. Figure 3 and each of the detailed maps presented in Appendix A show the wetland boundary identified as part of this inventory update in green hatch and the estimated wetland boundaries from the 1999 inventory in yellow hatch. In some cases, where wetland areas are small and/or wetlands were very close together, several wetlands are shown on the same map in Appendix A. As summarized in Table 1, a total of approximately 1,104 acres of wetlands were mapped during this first year of effort.

As evident in Figure 3 and the higher resolution mapping presented in Appendix A, the boundaries of all of the evaluated wetlands changed to some extent. Some of the wetlands were found to be smaller than mapped in the 1999 inventory, some were found to be larger than indicated in the 1999 inventory, some were found to be approximately the same size but in a slightly different location, and 16 were newly identified wetlands. The wetland mapping and boundary determinations made during this initial update effort and the associated wetland sizes are compared with the 1999 inventory results in Table 1.

As shown in Table 1, there were 16 wetland areas inventoried and mapped as part of this update that were not identified in the 1999 inventory. The area of these newly identified wetlands was approximately 36.70 acres. Including these 16 newly identified wetland areas, a total of 20 wetland areas have larger areas than identified during the 1999 inventory for a 53.13 acre total increase in wetland area. Nine of the wetland areas inventoried and mapped as part of this update were smaller than the areas mapped in the 1999 inventory for a 87.93 acre total decrease in wetland area. Overall, of the 36 wetland areas evaluated, the total acreage of wetlands relative to the 1999 inventory decreased by 34.80 acres.

Because of property access limitations and other circumstances, it was not practical to calculate differences in seven wetland areas relative to the 1999

Figure 3 - Updated Wetland Boundaries and Estimated Wetland Locations



	Estimated Parcel Boundaries		Estimated Wetlands - 1999
	Updated Wetland Boundaries		Wetland
			Wetland Complex



Table 1 – Wetland Size Comparison Results

Wetland ID Number	Watershed Identification	1999 Inventory Wetland Size (Acres)	Inventory Update Wetland Size (Acres)	Difference in Wetland Size (Acres)
37N1E02-08	C	0 ¹	1.37	+1.37
37N1E02-07	C	0 ¹	0.08	+0.08
37N1E02-05	D	0 ¹	17.05	+17.05
37N1E02-06	D	17.03	22.77	+ 5.74
38N1E02-07	D	0 ¹	0.36	+0.36
38N1E35-04	E	65.14	53.83	- 11.31
38N1E35-07*	E	0 ¹	0.16	+0.16
38N1E25-05	G	35.91	10.77	- 25.14
38N1E25-12	G	0 ¹	1.50	+1.50
38N1E26-07	H	0 ¹	0.48	+0.48
38N1E23-06	I	0.78	2.18	+ 1.40
38N1E23-07*	I	0 ¹	0.64	+0.64
38N1E24-03*	I	0 ¹	0.26	+0.26
38N1E12-06	K	56.21	28.10	Not applicable²
38N1E12-16	K	0 ¹	0.56	+0.56
38N1E13-14	K	0 ¹	0.41	+0.41
38N1E13-15	K	0 ¹	0.12	+0.12
38N2E19-05	K	18.31	25.54	+ 7.23
38N2E19-06	K	0 ¹	4.57	+4.57
38N2E07-02A	K	22.58	0.28	- 22.30
38N2E07-02B	K	0 ¹	0.17	+0.17
38N1E01-18	L	1.82	3.88	+ 2.06
38N2E06-01	L	3.23	2.00	- 1.23
38N2E06-02	L	4.43	0.54	- 3.89
38N1E10-01*	N	67.61	65.55	Not applicable³
38N1E10-02*	N	278.08	155.36	Not applicable³
38N1E01-06	O	32.55	25.47	Not applicable⁴
38N1E03-06	P	19.71	9.08	- 10.63
38N1E03-07	P	3.32	0.25	- 3.07
38N1E03-10	Q	0 ¹	0.40	+0.40
38N1E04-02	Q	15.62	6.52	- 9.10
38N1E04-03	Q	8.55	7.29	- 1.26
38N2E41-01	S	0 ¹	8.57	+8.57
38N2E17-01	S	469.05	192.00	Not applicable⁵
38N2E17-02	S	91.45	124.80	Not applicable⁶
38N2E18-04	S	287.89	331.50	Not applicable⁶
Total Wetland Acreage Included in Inventory Update Year 1: 1,104.41 Acres				

Notes:

¹ Wetland not identified in 1999 Inventory.

² Only the southern portion of this wetland boundary was updated for this report due to property access and other issues.

³ Some of the wetlands identified and mapped during the 1999 Inventory were wetland complexes that included uplands interspersed with wetlands and intermittent non-fish bearing streams. Wetlands 38N1E10-01 and 38N1E10-02 were delineated on the ground. Riverine wetland areas were excluded from the wetland complex areas in the 1999 Inventory but were included in the updated size, it was impractical to calculate the difference in area.

⁴ Wetlands were delineated on parcel 380101200466, and not on adjacent parcels, so it was impractical to calculate the difference in area.

⁵ Estuarine intertidal wetland areas were included in the 1999 Inventory Report, but were not included within the WAFAM AU for this inventory update, so it was impractical to calculate the difference in area.

⁶ A more extensive area was evaluated and mapped for the inventory update than for the 1999 Inventory Report, so a comparison with the 1999 inventoried area was not feasible.

inventory. These 7 wetland areas were excluded from the area calculations because of the reasons explained in Table 1. The largest increase in wetland area was 37N1E02-05, which is a relatively large wetland that was not identified in the 1999 inventory. The largest decrease in wetland area was wetland 38N2E25-05.

3.2 Results of Function Assessment

The Washington State Function Assessment Method was applied to 34 wetland Assessment Units, and the Sarah Cooke method was applied to 2 Assessment Units on the Reservation. Table 2 and Table 3 present the indices for each AU for the functions that were assessed as part of the study. The general locations of the wetlands that were evaluated are shown in Figure 3, the specific locations shown on individual maps in Appendix A, and a sample of field notes and function assessment worksheets are provided in Appendix B. The Sarah Cooke assessment method does not allow for calculating an overall function index for the wetland. As demonstrated by the results summarized in Table 2, a particular AU may vary significantly in its relative performance of one function to another. The WAFAM methodology was not designed to lump functions into group scores or to rank functions hierarchically by importance. Therefore, AUs are not compared using an overall index. Rather, the potential performance levels (the index) for each function are compared among the AUs of the same HGM category. Since different models were developed for each subclass, it is not meaningful to compare across categories. That is, riverine flow-through wetlands cannot be reasonably compared to depressional outflow wetlands. Each function index in the WAFAM is essentially a comparison of the assessed wetland to a large pool of reference wetlands.

As summarized in Table 2, 31 of the evaluated wetlands met the definition of depressional wetlands and five met the definition of riverine wetlands under the HGM system.

Table 2: Summary of Function Assessments by Wetland ID number, Watershed, and HGM Classification

Wetland Name: Assessment Unit ID Number	37N1E02-08	37N1E02-07	37N1E02-05	37N1E02-06	38N1E02-07	38N1E35-04	38N1E35-07	38N1E25-05	38N1E25-12	38N1E26-07	38N1E23-06	38N1E23-07
Watershed ID	C	C	D	D	D	E	E	G	G	H	I	I
Hydrogeomorphic Classification	DC	DO	DC	DC	DC	DC						
Water Quality Functions												
Removing Sediment	10	10	10	5	10	10	10	6	10	10	10	10
Removing Nutrients	5	5	6	3	5	5	8	4	8	8	10	5
Removing Heavy Metals and Toxic Organics	3	4	5	4	3	3	7	4	5	5	7	3
Water Quantity Functions												
Reducing Peak Flows	10	10	10	3	10	10	10	4	10	10	10	10
Reducing Downstream Erosion	10	10	10	8	10	10	10	5	10	10	10	10
Recharging Ground Water	6	2	7	6	1	5	6	3	7	7	4	5
Habitat Suitability Functions												
General Habitat Suitability	4	4	7	6	6	7	5	7	4	5	4	4
Suitability for Invertebrates	3	3	5	4	5	5	5	5	5	3	2	2
Suitability for Amphibians	2	2	4	4	3	4	4	3	3	2	2	2
Suitability for Anadromous Fish	NA	NA	NA	3	NA	NA	NA	1	NA	NA	NA	NA
Suitability for Resident Fish	NA	NA	NA	3	NA	NA	NA	2	NA	NA	NA	NA
Suitability for Wetland Associated Birds	4	4	4	4	6	4	3	6	3	3	5	2
Suitability for Wetland Associated Mammals	3	2	5	3	5	6	2	4	2	3	3	4
Native Plant Richness	5	2	8	6	7	7	5	7	4	6	4	5
Primary Production and Export	NA	NA	NA	10	NA	NA	NA	8	NA	NA	NA	NA

Notes:

- The numeric index represents the potential level of performance of a function on a scale of 0 to 10. Depressional closed wetlands always score a "10" for removing sediment, reducing peak flows, and reducing downstream erosion because they are closed systems with no outlets and are performing at their maximum because no sediment can leave the wetland. A "NA" indicator for anadromous fish or for production and export indicates that no outlets or flow through streams are present.
- Key for Hydrogeomorphic identification: DC = Depressional Closed, DO = Depressional Open, RIV = Riverine Impounding.
- A "SC" indicates that wetland functions were evaluated using the "Wetland and Buffer Functions Semi-Quantitative Assessment Methodology" by Sarah Spear Cooke (2000).

Table 2: Summary of Function Assessments by Wetland ID number, Watershed, and HGM Classification

Wetland Name: Assessment Unit ID Number	38N1E24-03	38N1E12-06	38N1E12-16	38N1E13-14	38N1E13-15	38N2E19-05	38N2E19-06	38N2E07-02A	38N2E07-02B	38N1E01-18	38N2E06-01	38N2E06-02
Watershed ID	I	K	K	K	K	K	K	K	K	L	L	L
Hydrogeomorphic Classification	DC	DC	DC	DC	DC	DC	RIV	DC	DC	DC	DC	DC
Water Quality Functions												
Removing Sediment	10	10	10	10	10	10	6	SC	SC	10	10	6
Removing Nutrients	5	8	5	5	5	10	5	SC	SC	4	5	5
Removing Heavy Metals and Toxic Organics	2	6	4	4	4	7	3	SC	SC	5	6	6
Water Quantity Functions												
Reducing Peak Flows	10	10	10	10	10	10	6	SC	SC	10	10	4
Reducing Downstream Erosion	10	10	10	10	10	10	7	SC	SC	10	10	4
Recharging Ground Water	7	5	7	7	7	6	2	SC	SC	5	6	9
Habitat Suitability Functions												
General Habitat Suitability	5	9	3	5	4	10	6	SC	SC	1	1	1
Suitability for Invertebrates	4	9	3	4	4	7	4	SC	SC	1	0	0
Suitability for Amphibians	2	7	2	2	2	9	4	SC	SC	1	1	1
Suitability for Anadromous Fish	NA	NA	NA	NA	NA	NA	2	SC	SC	NA	NA	2
Suitability for Resident Fish	NA	NA	NA	NA	NA	NA	3	SC	SC	NA	NA	1
Suitability for Wetland Associated Birds	5	9	4	5	5	8	4	SC	SC	2	2	3
Suitability for Wetland Associated Mammals	4	8	4	4	4	8	3	SC	SC	2	2	4
Native Plant Richness	5	7	5	7	6	8	6	SC	SC	1	1	1
Primary Production and Export	NA	NA	NA	NA	NA	NA	7	SC	SC	NA	NA	8

Notes:

- The numeric index represents the potential level of performance of a function on a scale of 0 to 10. Depressional closed wetlands always score a "10" for removing sediment, reducing peak flows, and reducing downstream erosion because they are closed systems with no outlets and are performing at their maximum because no sediment can leave the wetland. A "NA" indicator for anadromous fish or for production and export indicates that no outlets or flow through streams are present.
- Key for Hydrogeomorphic identification: DC = Depressional Closed, DO = Depressional Open, RIV = Riverine Impounding.
- A "SC" indicates that wetland functions were evaluated using the "Wetland and Buffer Functions Semi-Quantitative Assessment Methodology" by Sarah Spear Cooke (2000).

Table 2: Summary of Function Assessments by Wetland ID number, Watershed, and HGM Classification

Wetland Name: Assessment Unit ID Number	38N1E10-01	38N1E10-02	38N1E01-06	38N1E03-06	38N1E03-07	38N1E03-10	38N1E04-02	38N1E04-03	38N2E41-01	38N2E17-01	38N2E17-02	38N2E18-04
Watershed ID	N	N	O	P	P	Q	Q	Q	S	S	S	S
Hydrogeomorphic Classification	DO	DO	DC	DO	DC	DC	DO	DO	RIV	RIV	RIV	RIV
Water Quality Functions												
Removing Sediment	7	6	10	4	10	10	2	3	5	7	5	5
Removing Nutrients	6	4	5	3	5	5	2	3	4	7	5	6
Removing Heavy Metals and Toxic Organics	5	4	6	3	2	3	2	2	4	4	5	7
Water Quantity Functions												
Reducing Peak Flows	NA	NA	10	6	10	10	3	4	7	10	6	6
Reducing Downstream Erosion	NA	NA	10	9	10	10	5	7	8	10	10	10
Recharging Ground Water	4	3	6	6	4	6	2	4	7	10	6	6
Habitat Suitability Functions												
General Habitat Suitability	6	4	1	6	4	4	7	6	7	10	9	10
Suitability for Invertebrates	6	5	1	4	3	4	5	4	6	8	7	9
Suitability for Amphibians	3	2	1	4	2	2	5	6	4	10	6	8
Suitability for Anadromous Fish	3	3	NA	2	NA	NA	4	4	3	8	7	8
Suitability for Resident Fish	5	4	NA	3	NA	NA	3	3	5	9	8	9
Suitability for Wetland Associated Birds	6	5	3	4	3	3	5	3	5	10	7	8
Suitability for Wetland Associated Mammals	7	5	2	4	4	0	3	4	8	10	9	10
Native Plant Richness	5	4	2	6	6	6	8	6	7	9	8	9
Primary Production and Export	7	6	NA	7	NA	NA	4	5	7	7	7	5

Notes:

- The numeric index represents the potential level of performance of a function on a scale of 0 to 10. Depressional closed wetlands always score a "10" for removing sediment, reducing peak flows, and reducing downstream erosion because they are closed systems with no outlets and are performing at their maximum because no sediment can leave the wetland. A "NA" indicator for anadromous fish, or for production and export indicates that no outlets or flow through streams are present.
- Key for Hydrogeomorphic identification: DC = Depressional Closed, DO = Depressional Open, RIV = Riverine Impounding.
- A "SC" indicates that wetland functions were evaluated using the "Wetland and Buffer Functions Semi-Quantitative Assessment Methodology" by Sarah Spear Cooke (2000).

Table 3. Existing Wetland Functions for Wetlands 38N2E07-02A and 38N2E07-02B Using the Sarah Cooke Method

Function	38N2E07-02A	38N2E07-02B
Flood/Storm Water Control	Moderate	Moderate
Base Flow/Ground Water Support	Moderate	Moderate
Water Quality Improvement	High	Moderate
Natural Biological Support	Moderate	High
Overall Habitat Functions	Moderate	High
Specific Habitat Functions	Moderate	Moderate
Invertebrate	Moderate	Moderate
Amphibian	Moderate	High
Mammal	Low	Moderate
Bird	Low	Moderate
Cultural/Socioeconomic	Moderate	Moderate

3.3 Results of Wetland Classification

The Washington State Wetland Rating system was applied to 33 of the 36 assessment units on the Reservation (wetlands in the Nooksack River Delta area were not rated). Table 4 presents the ratings for each AU.

Although none of the wetlands evaluated during this initial inventory update effort were rated as Category 1 wetlands, it is anticipated that Category 1 wetlands will be encountered during future installments of this study. About half of the evaluated wetlands (19 wetlands) were Category 3 wetlands and the remaining wetlands were either Category 2 (8 wetlands) or Category 4 (6 wetlands).

As summarized in Table 4, under the hydrogeomorphic classification system, 31 of the Reservation wetlands rated for this study were depressional wetlands, and 5 wetlands were depressional open or riverine impounding wetlands.

Table 4 – Wetland Rating and HGM Classification

Wetland ID Number	Watershed Identification	Wetland Rating	HGM Classification
37N1E02-08	C	3	Depressional
37N1E02-07	C	4	Depressional
37N1E02-05	D	2	Depressional
37N1E02-06	D	2	Depressional
38N1E02-07	D	3	Depressional
38N1E35-04	E	2	Depressional
38N1E35-07*	E	3	Depressional
38N1E25-05	G	3	Depressional
38N1E25-12	G	4	Depressional
38N1E26-07	H	3	Depressional
38N1E23-06	I	3	Depressional
38N1E23-07*	I	3	Depressional
38N1E24-03*	I	4	Depressional
38N1E12-06	K	3	Depressional
38N1E12-16	K	3	Depressional
38N1E13-14	K	4	Depressional
38N1E13-15	K	3	Depressional
38N2E19-05	K	2	Depressional
38N2E19-06	K	3	Riverine
38N2E07-02A	K	3	Depressional
38N2E07-02B	K	2	Depressional
38N1E01-18	L	3	Depressional
38N2E06-01	L	3	Depressional
38N2E06-02	L	3	Depressional
38N1E10-01*	N	2	Depressional
38N1E10-02*	N	2	Depressional
38N1E01-06	O	4	Depressional
38N1E03-06	P	3	Depressional
38N1E03-07	P	4	Depressional
38N1E03-10	Q	3	Depressional
38N1E04-02	Q	3	Depressional
38N1E04-03	Q	3	Depressional
38N2E41-01	S	2	Riverine
38N2E17-01	S	Not rated	Riverine
38N2E17-02	S	Not rated	Riverine
38N2E18-04	S	Not rated	Riverine

* Wetlands marked with an “*” are wetland mosaics

4. DISCUSSION

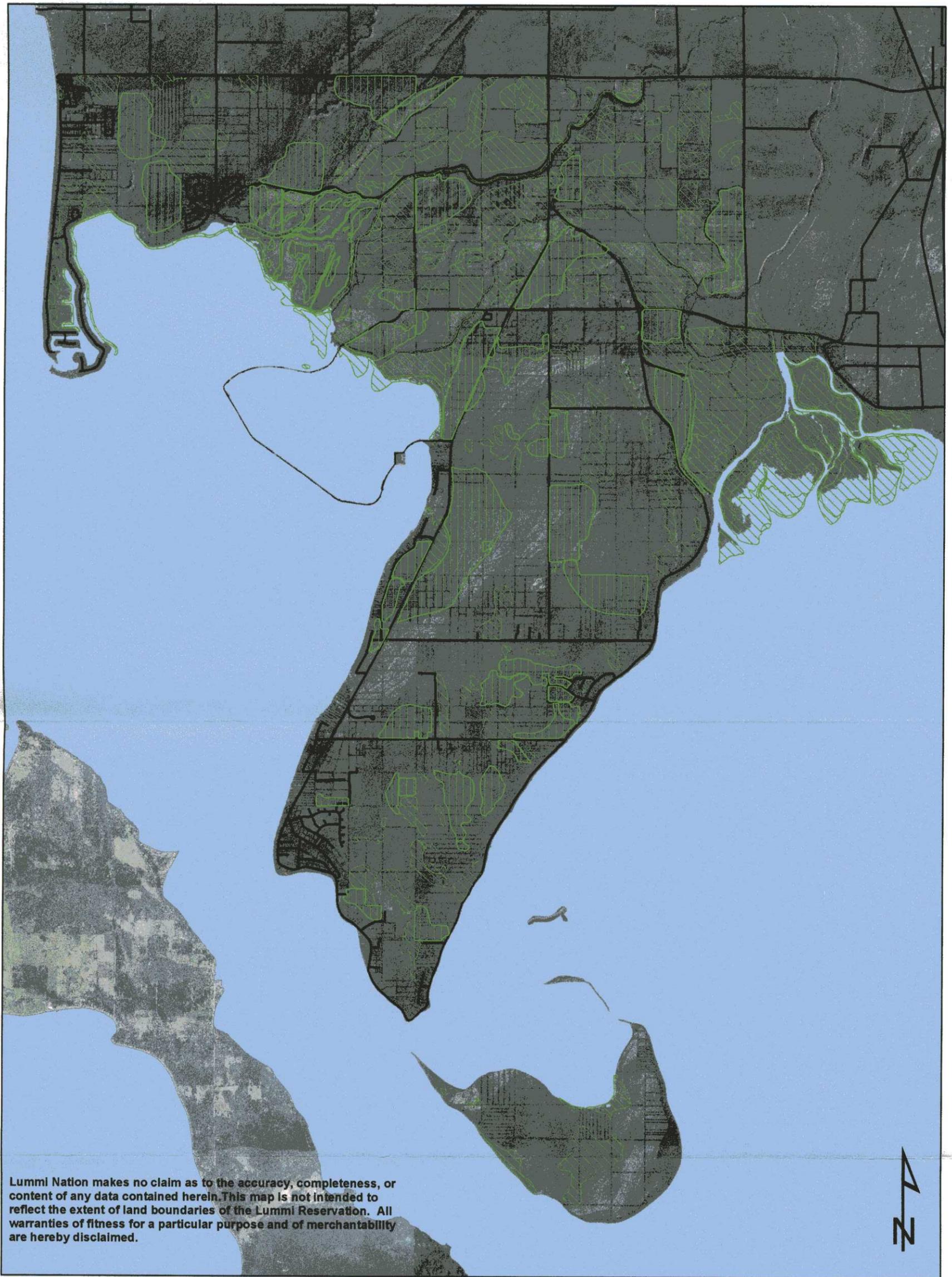
Accurate information on the locations, functions, and wetland category is needed in order to effectively manage Reservation wetlands pursuant to the Lummi Nation Water Resources Protection Code (Title 17 of the Lummi Code of Laws [LCL]). Although the 1999 inventory represents an important planning tool and a significant improvement over the previously available information, it has proven to be too general for more detailed level planning efforts. Refining the spatial resolution of the wetland mapping, performing function assessments, and classifying the wetlands into the regulatory categories identified in Title 17 is intended to support efforts to protect these wetland resources and the important ecological, hydrological, and water quality protection functions that they provide. Because of the large number of wetland areas on the Reservation, the effort to refine the spatial resolution of the wetland mapping, to perform function assessments, and to classify the Reservation wetlands is projected to require several years to complete. This report summarizes the results of the first year of this inventory update effort.

The overall result of the inventory update effort will be a more accurate GIS data layer and an associated database that contains the classification and other summary information on each wetland on the Reservation. Hard copies of field notes (e.g., function assessment work sheets, wetland rating worksheets, location maps) are maintained in binders in the Lummi Water Resources Division office. Until the update effort is completed, the GIS data layer and associated database will be a work in progress. The current version of the Lummi Reservation Wetland Map is shown in Figure 4. Figure 4 shows the information in Figure 3 except that the previous wetland locations that were revised during this update effort have been removed.

As described previously, this inventory update resulted in revising the locations and extent of 36 wetland assessment units (approximately 65 separate wetlands), collecting additional information on the functions of Reservation wetlands, and classifying the wetlands into one of four categories. Based on the changes to the spatial locations and the utility of the collected information on wetland function and category, the inventory update should continue until it is completed.

Future phases of this study will include estuarine wetlands, which are Category 1 wetlands if they are relatively undisturbed and are larger than 1 acre. Estuarine wetlands are not currently included in the classes of wetlands that are covered by the WAFAM method at this time, so a different method will need to be used, or the evaluation of these wetlands delayed until the methodology is developed.

Figure 4 - Best Available Wetland Inventory Map (October 2005)



Estimated Parcel Boundaries **Best Available Wetland Inventory**

-  Wetland
-  Wetland Complex



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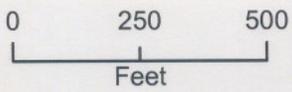
Washington State Department of Ecology. (Ecology) 1991. Washington State Wetlands Rating System for Western Washington. Olympia, WA Publ. #91-57

APPENDIX A – INDIVIDUAL WETLAND MAPS

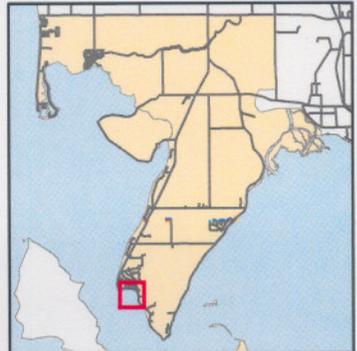
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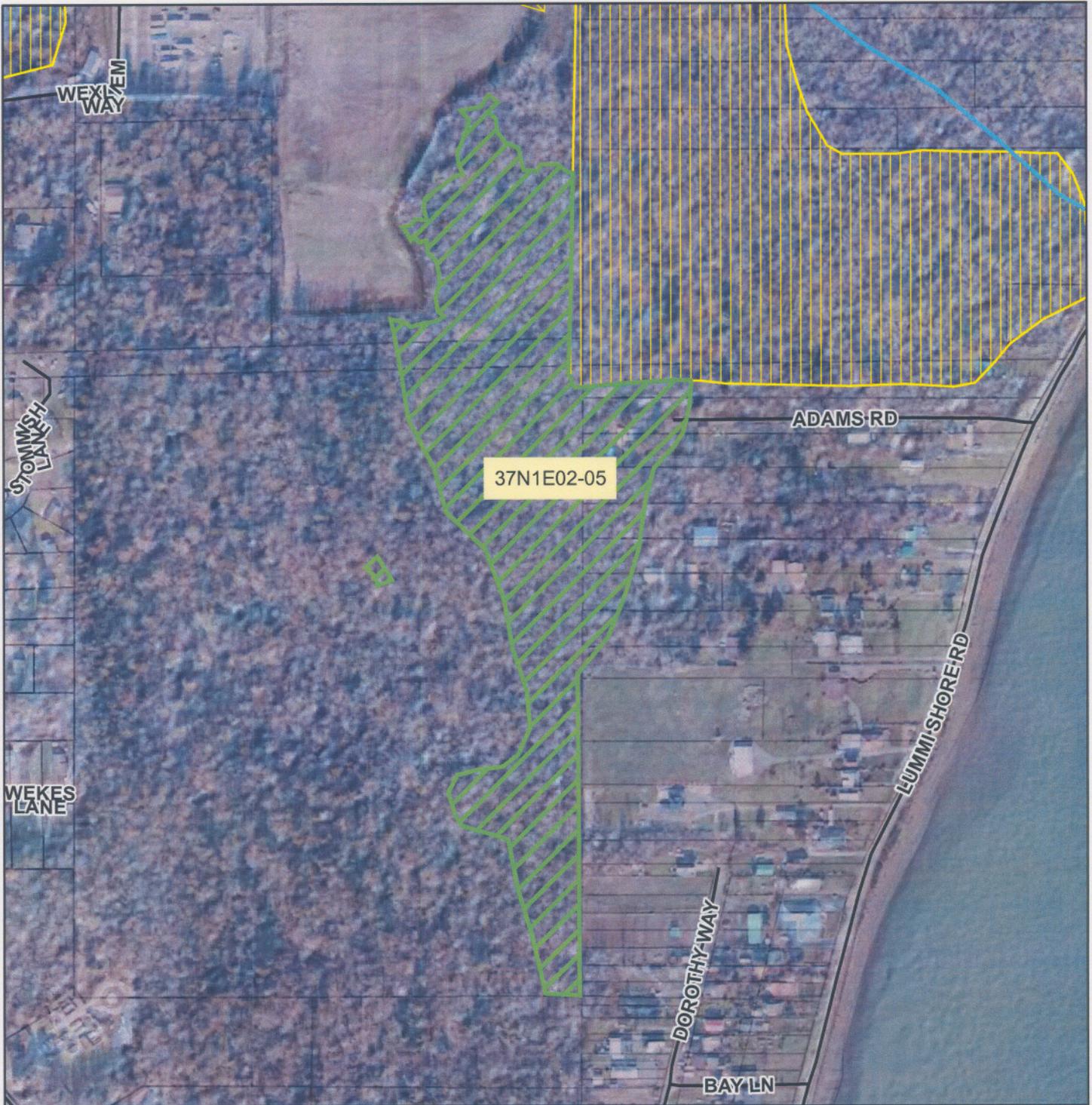
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	 Wetland		 Wetland Complex



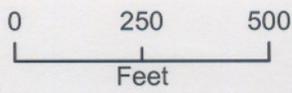
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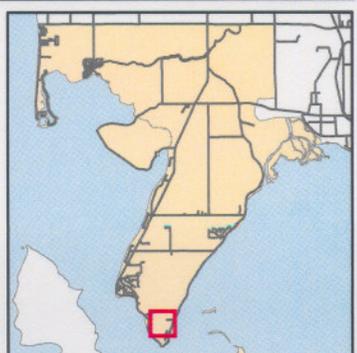
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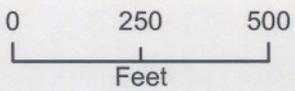
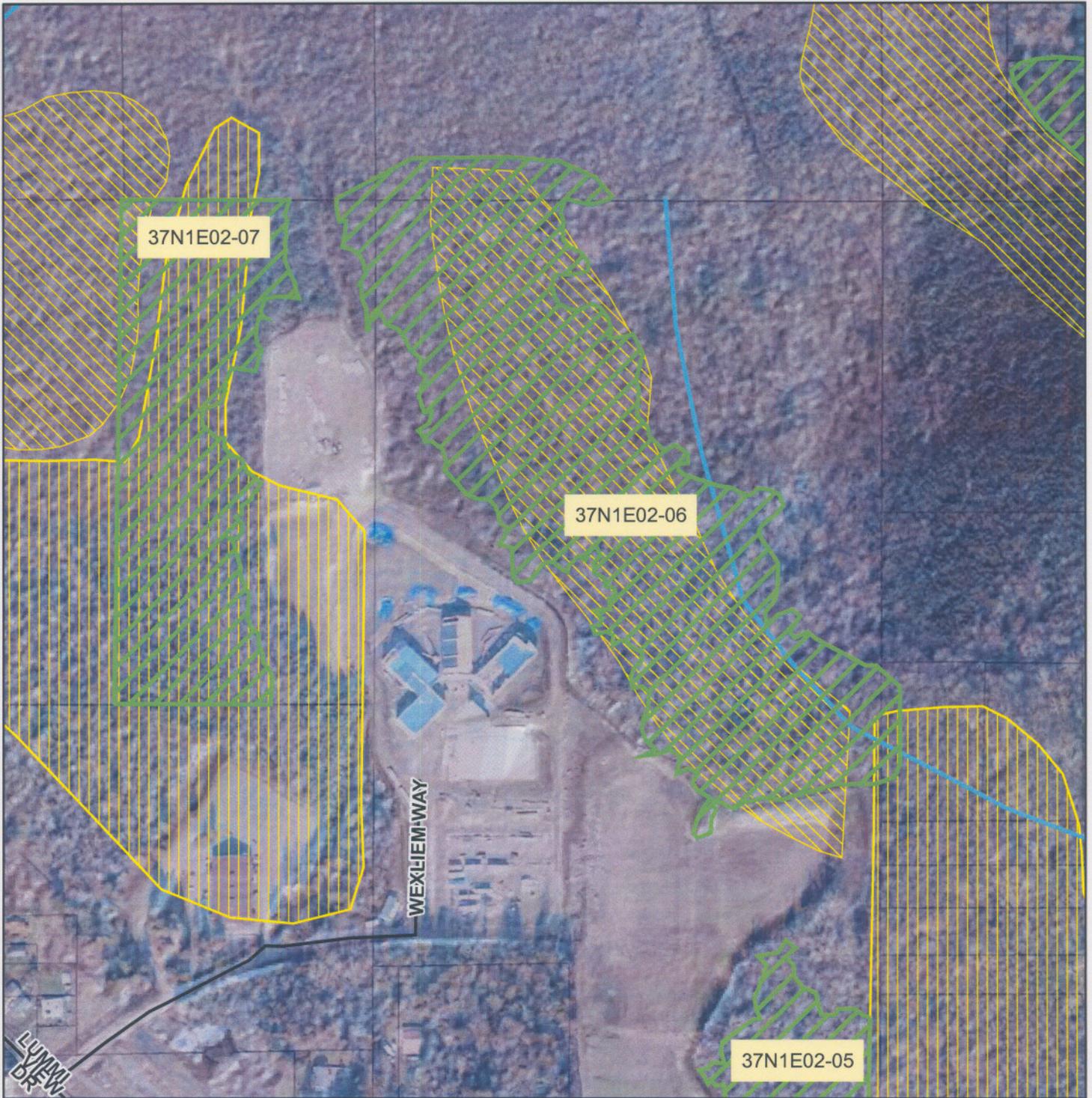
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|----------------------------------|--------------------------|------------------------------|---------|-----------------|
| Parcels | Updated Wetland Boundary | Approximate Channel Location | Wetland | Wetland Complex |
| Estimated Wetlands - 1999 | | | | |



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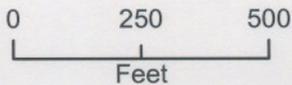


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|------------------------------|--------------------------|----------------------------------|---------|
| Parcels | Updated Wetland Boundary | Estimated Wetlands - 1999 | Wetland |
| Approximate Channel Location | Wetland Complex | | |

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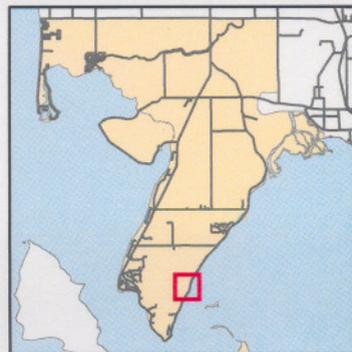


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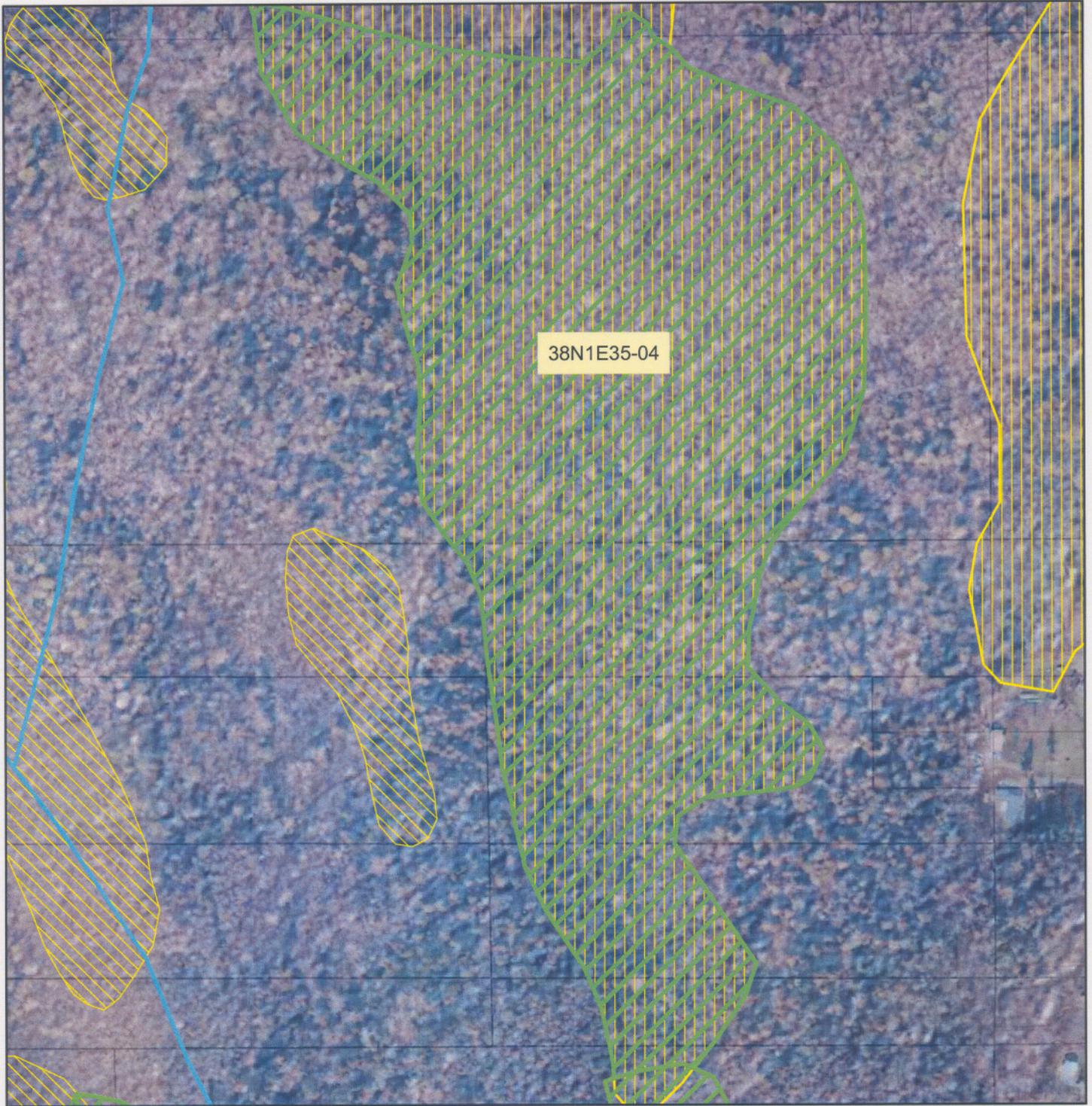


- | | | |
|------------------------------|--------------------------|---------|
| Parcels | Updated Wetland Boundary | Wetland |
| Approximate Channel Location | Wetland Complex | |

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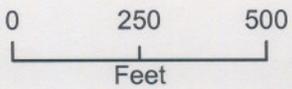
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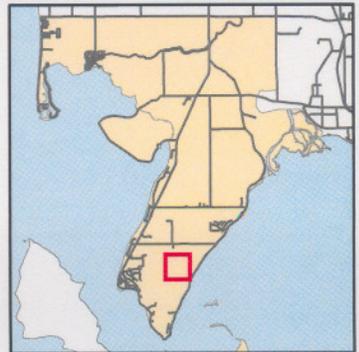
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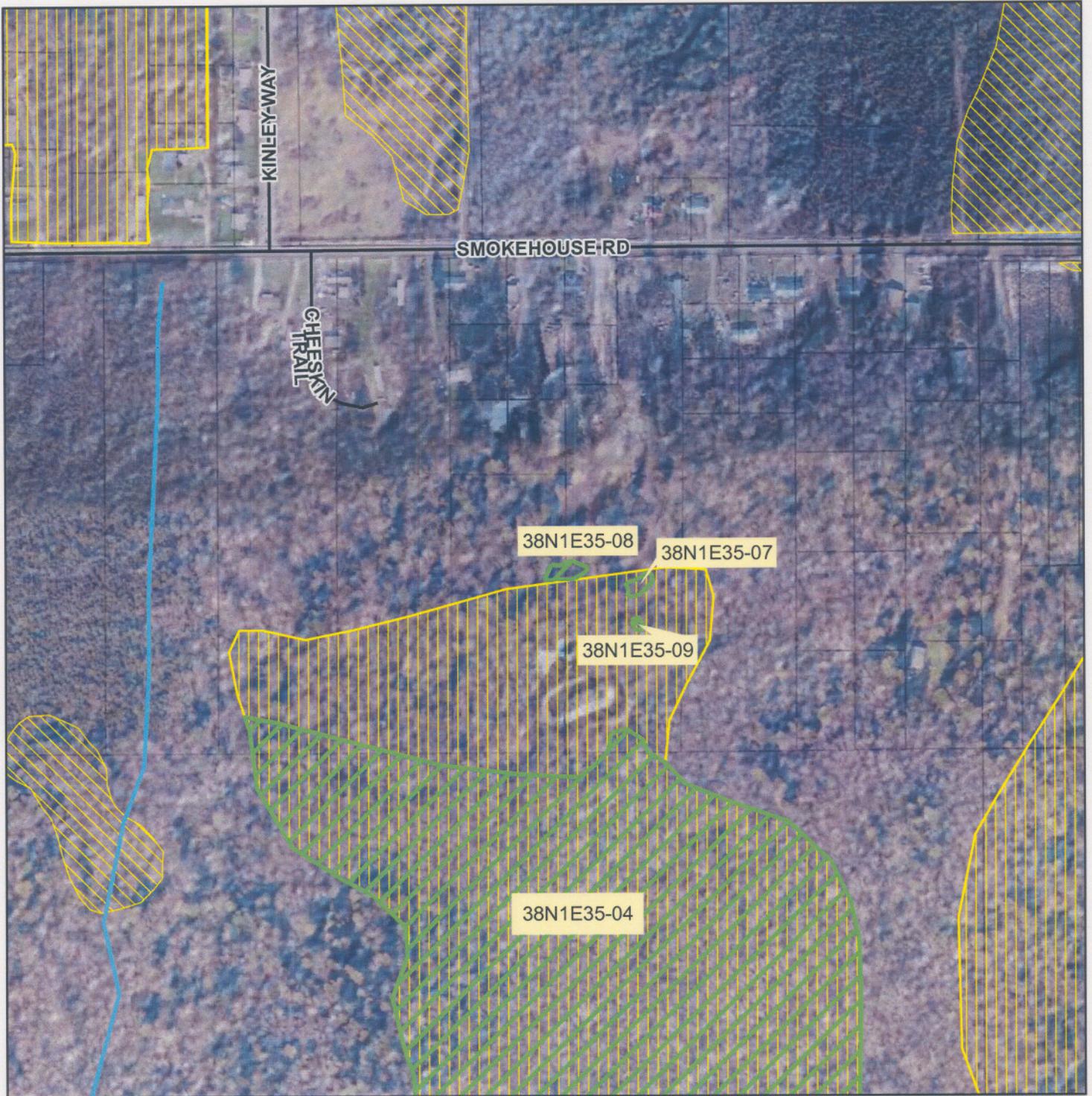
 Parcels	Estimated Wetlands - 1999
 Updated Wetland Boundary	 Wetland
 Approximate Channel Location	 Wetland Complex



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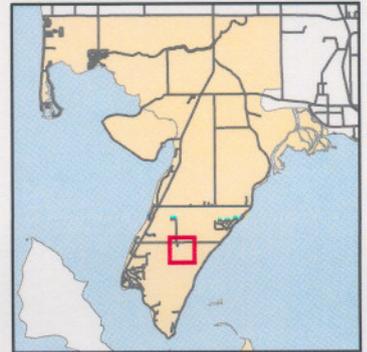


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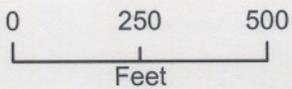


Parcels	Updated Wetland Boundary	Wetland
Approximate Channel Location	Wetland Complex	

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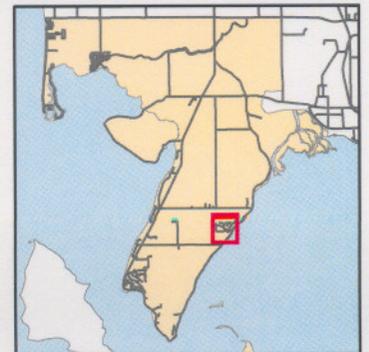
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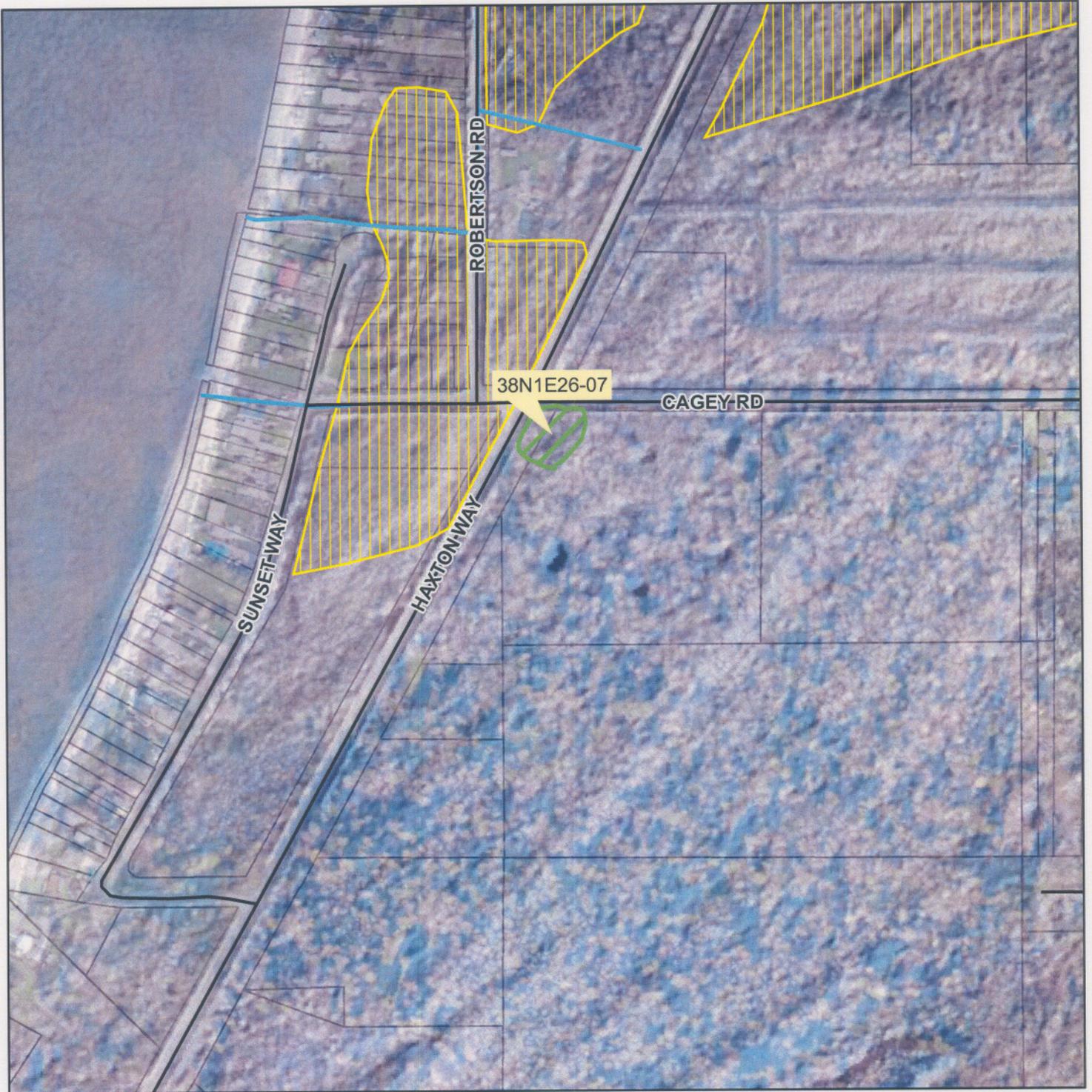
Parcels	Updated Wetland Boundary	Wetland
Approximate Channel Location	Wetland Complex	

Estimated Wetlands - 1999

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38N1E26-07



Parcels



Updated Wetland Boundary



Approximate Channel Location

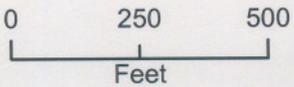
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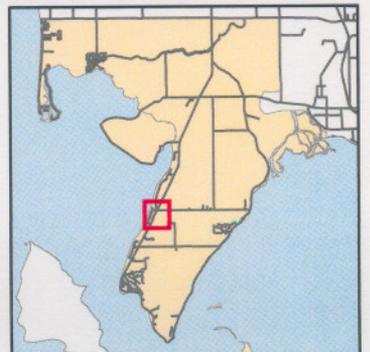
Wetland



Wetland Complex



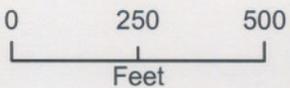
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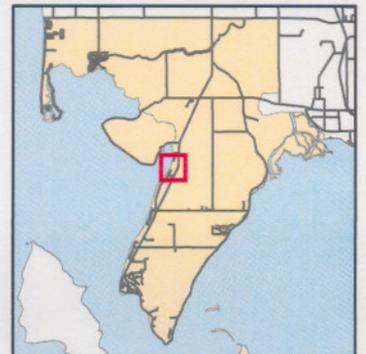
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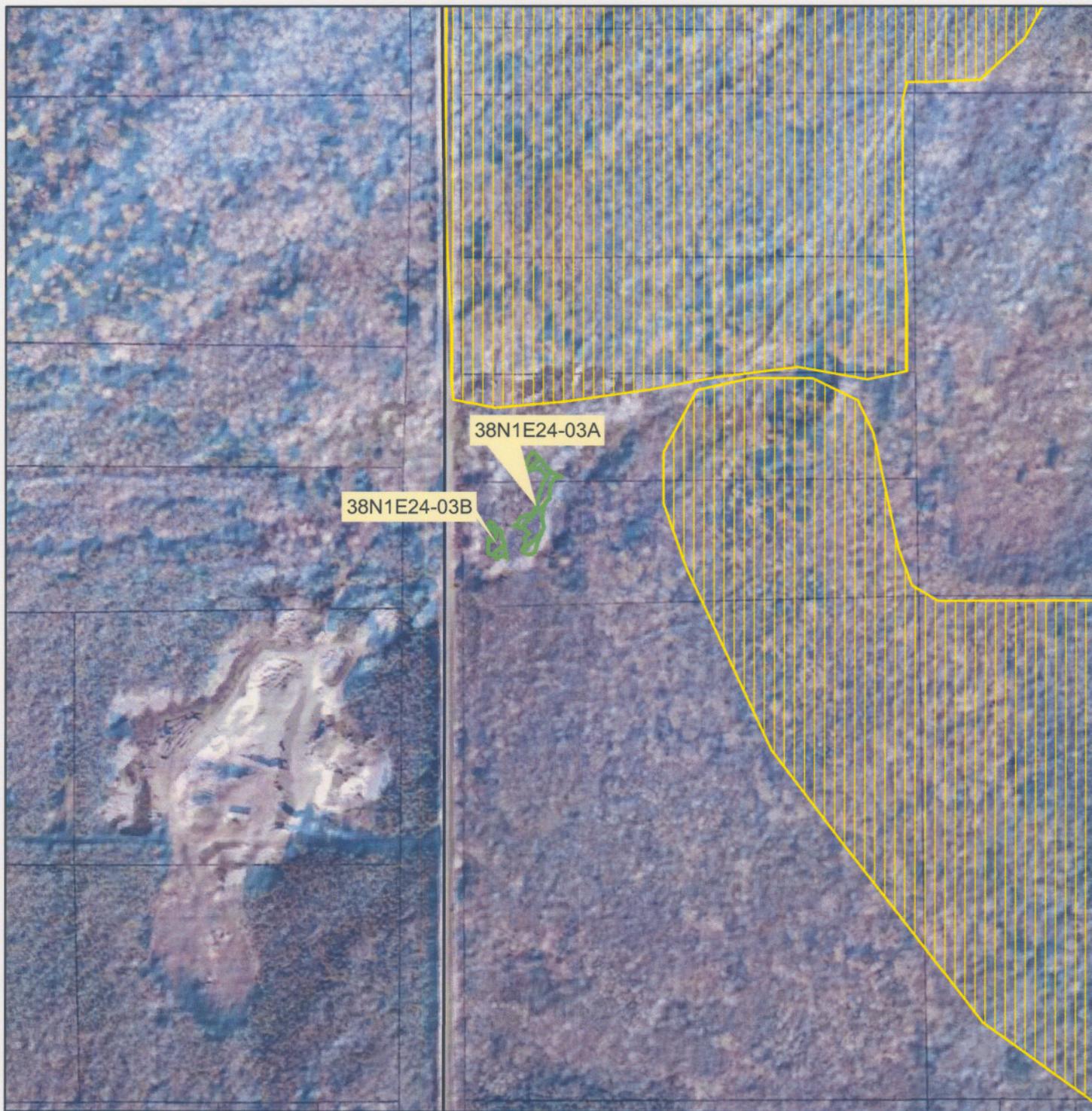


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|------------------------------|--------------------------|---------|
| Parcels | Updated Wetland Boundary | Wetland |
| Approximate Channel Location | Wetland Complex | |

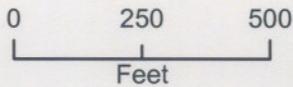


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Parcels	Estimated Wetlands - 1999
Updated Wetland Boundary	Wetland
Approximate Channel Location	Wetland Complex

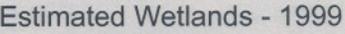


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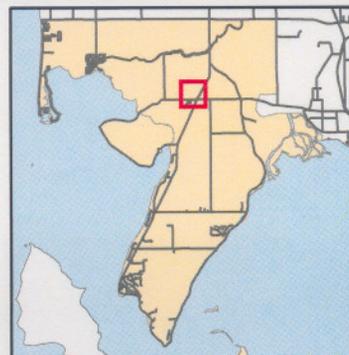


38N1E12-06 and 38N1E12-16

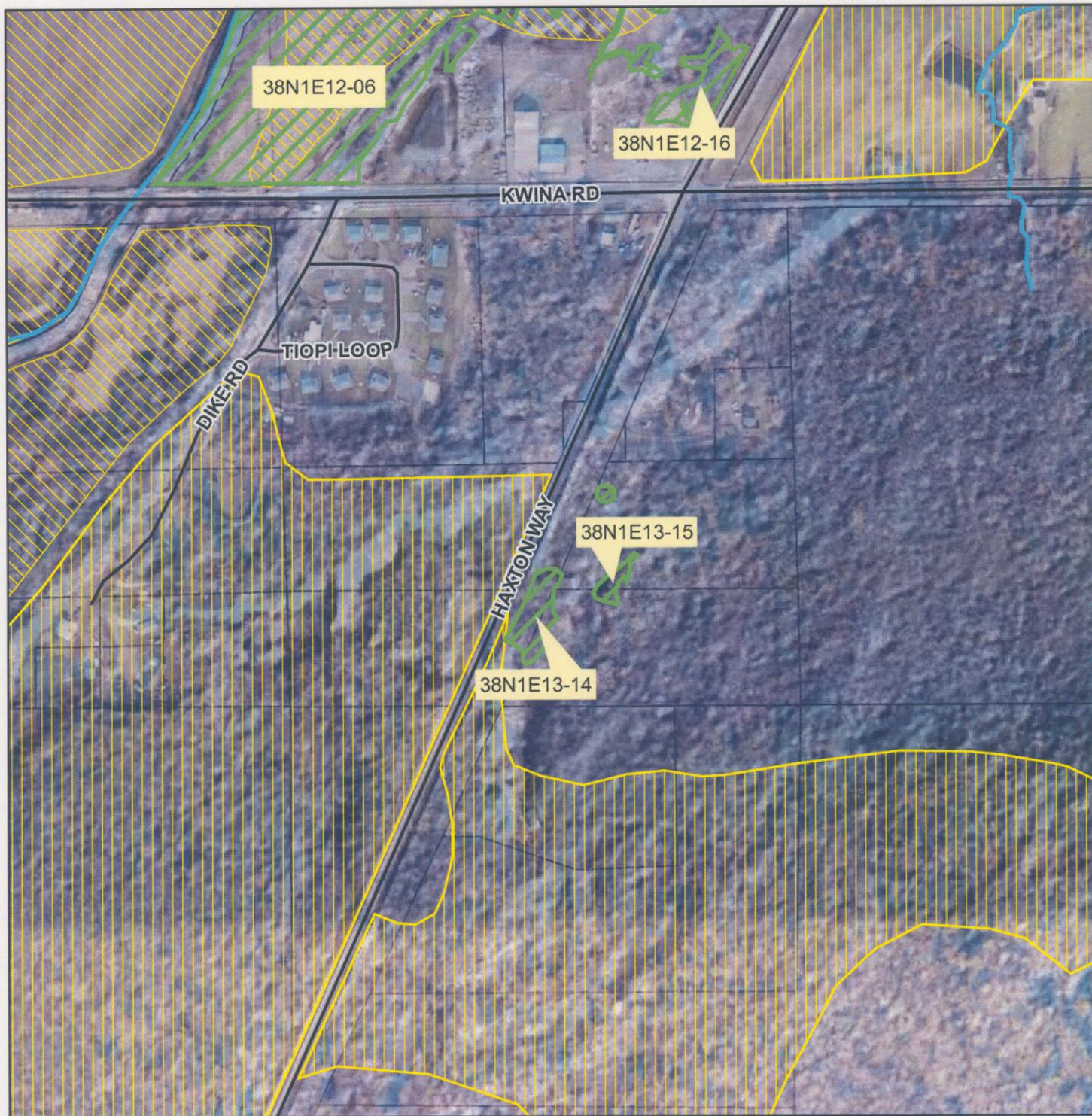


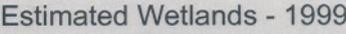
 Parcels	 Estimated Wetlands - 1999
 Updated Wetland Boundary	 Wetland
 Approximate Channel Location	 Wetland Complex

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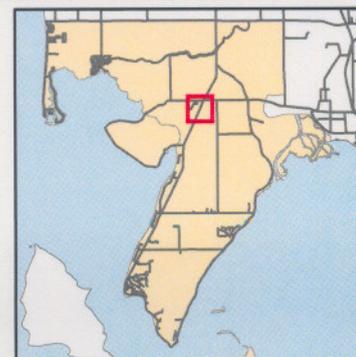
38N1E13-14 and 38N1E13-15



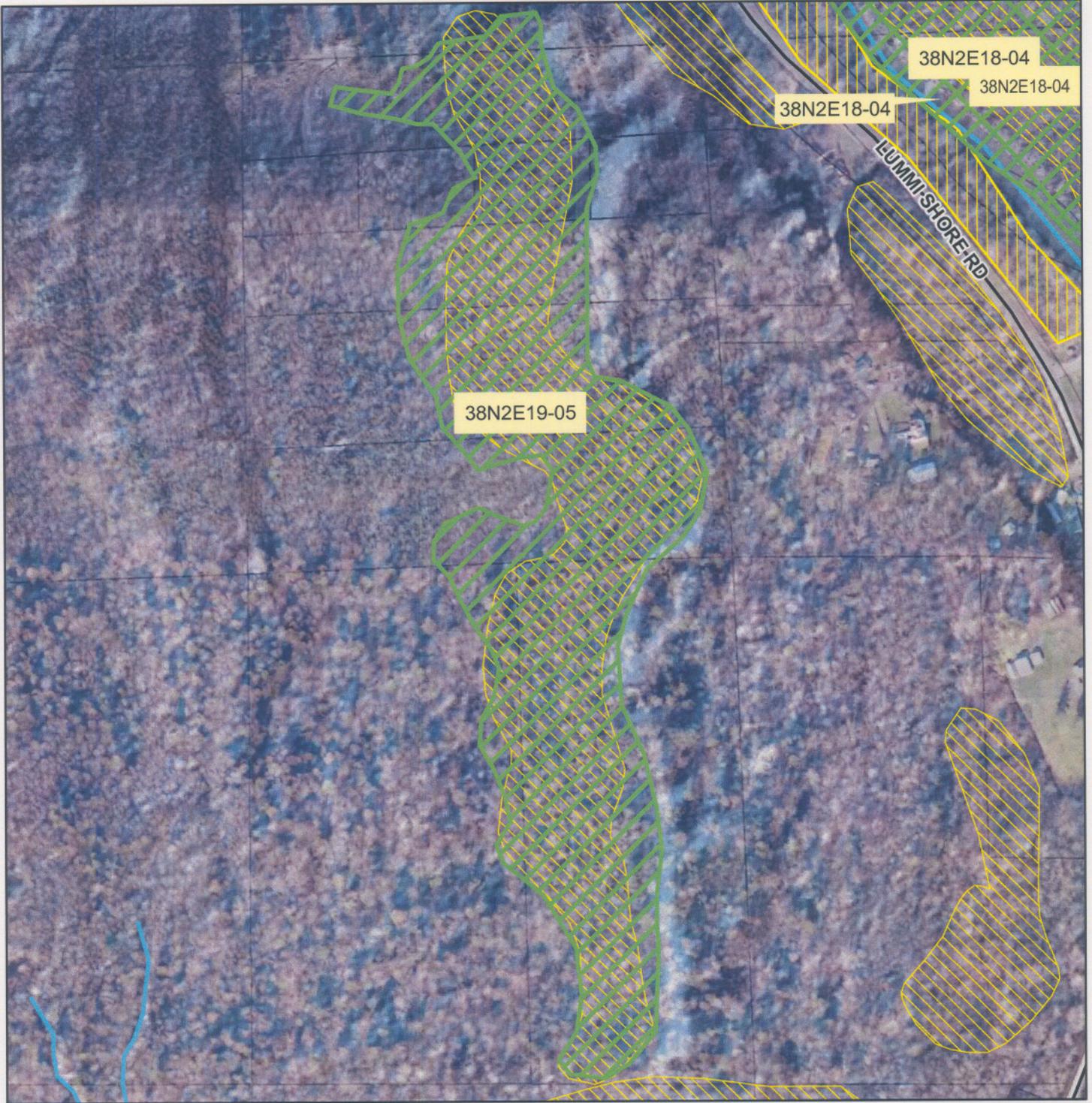
- | | |
|--|--|
|  Parcels |  Estimated Wetlands - 1999 |
|  Updated Wetland Boundary |  Wetland |
|  Approximate Channel Location |  Wetland Complex |



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38N2E19-05



Parcels



Updated Wetland Boundary



Approximate Channel Location

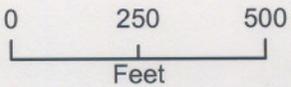
Estimated Wetlands - 1999



Wetland

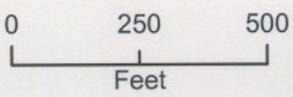
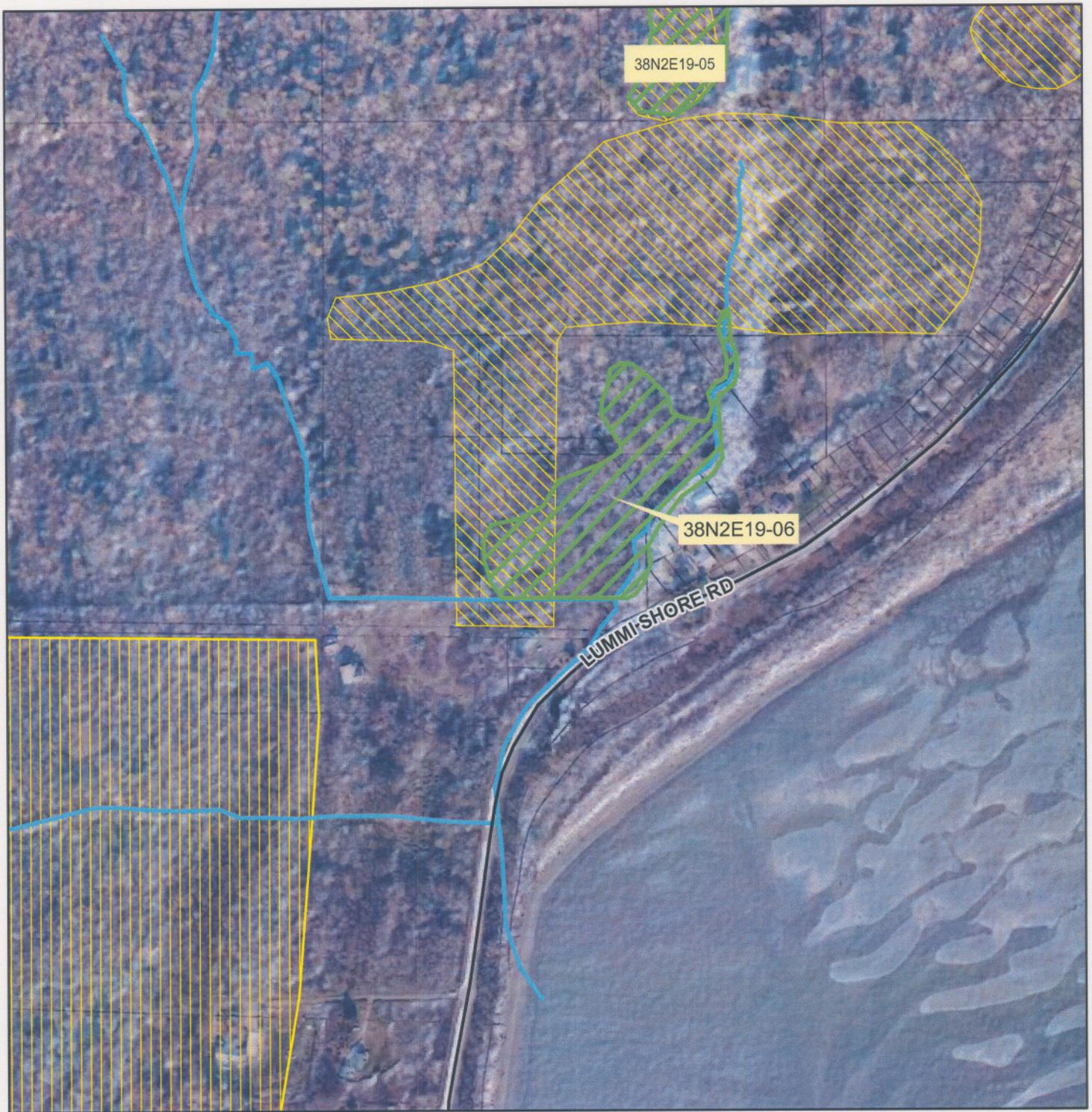


Wetland Complex



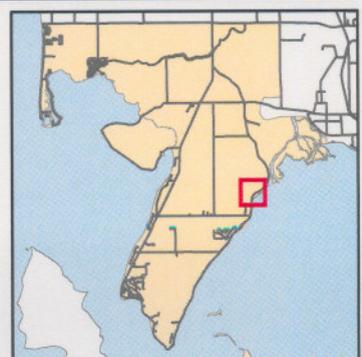
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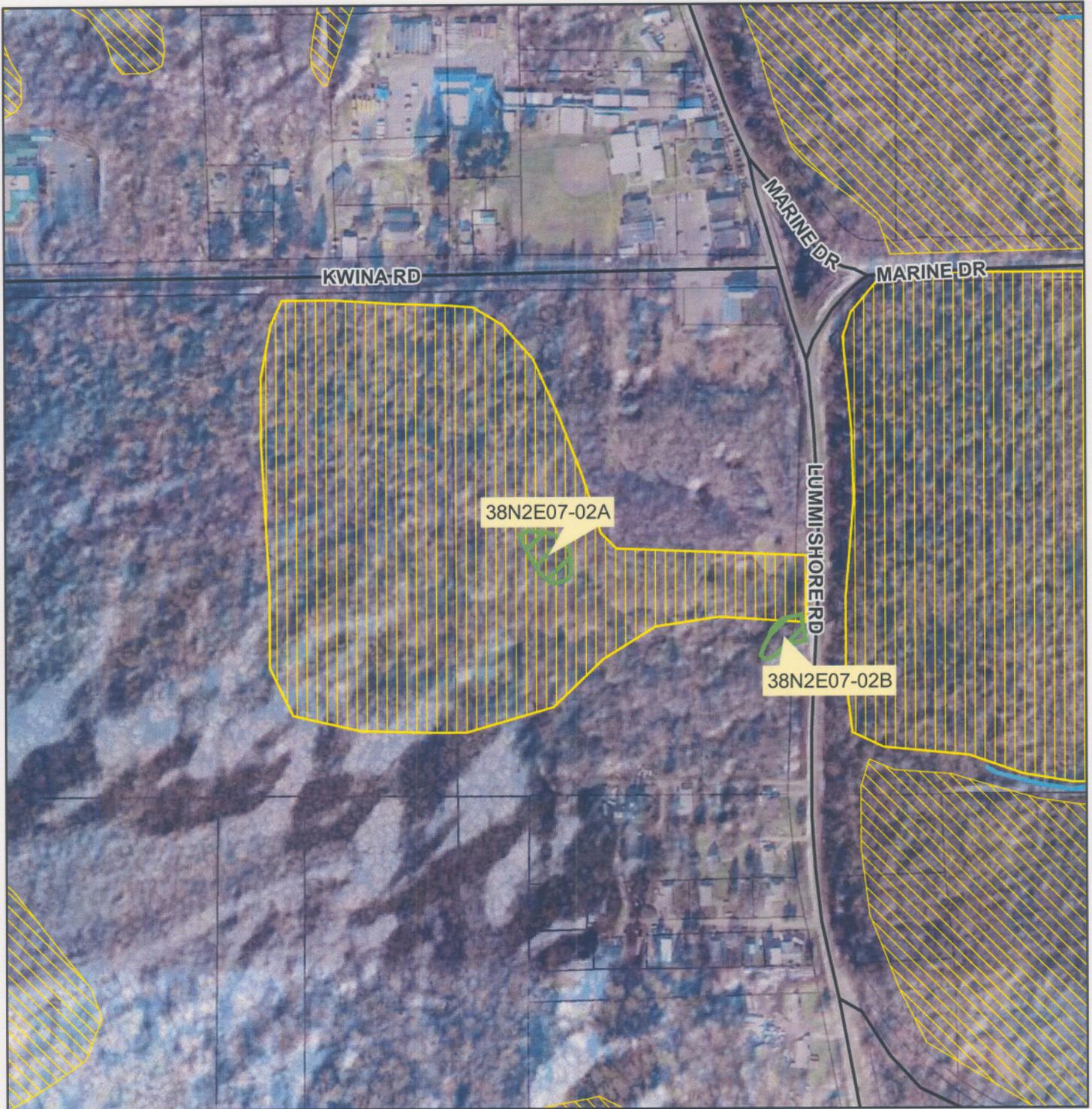


- | | | |
|--|--|---|
|  Parcels |  Updated Wetland Boundary |  Wetland |
|  Approximate Channel Location |  Wetland Complex |  Wetland Complex |

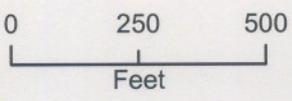
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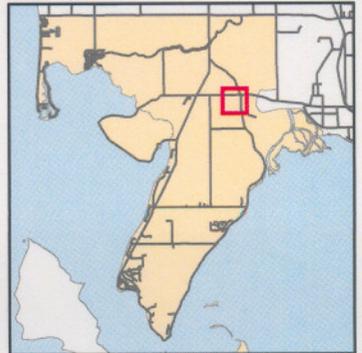
38N2E07-02A and 38N2E07-02B



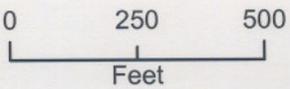
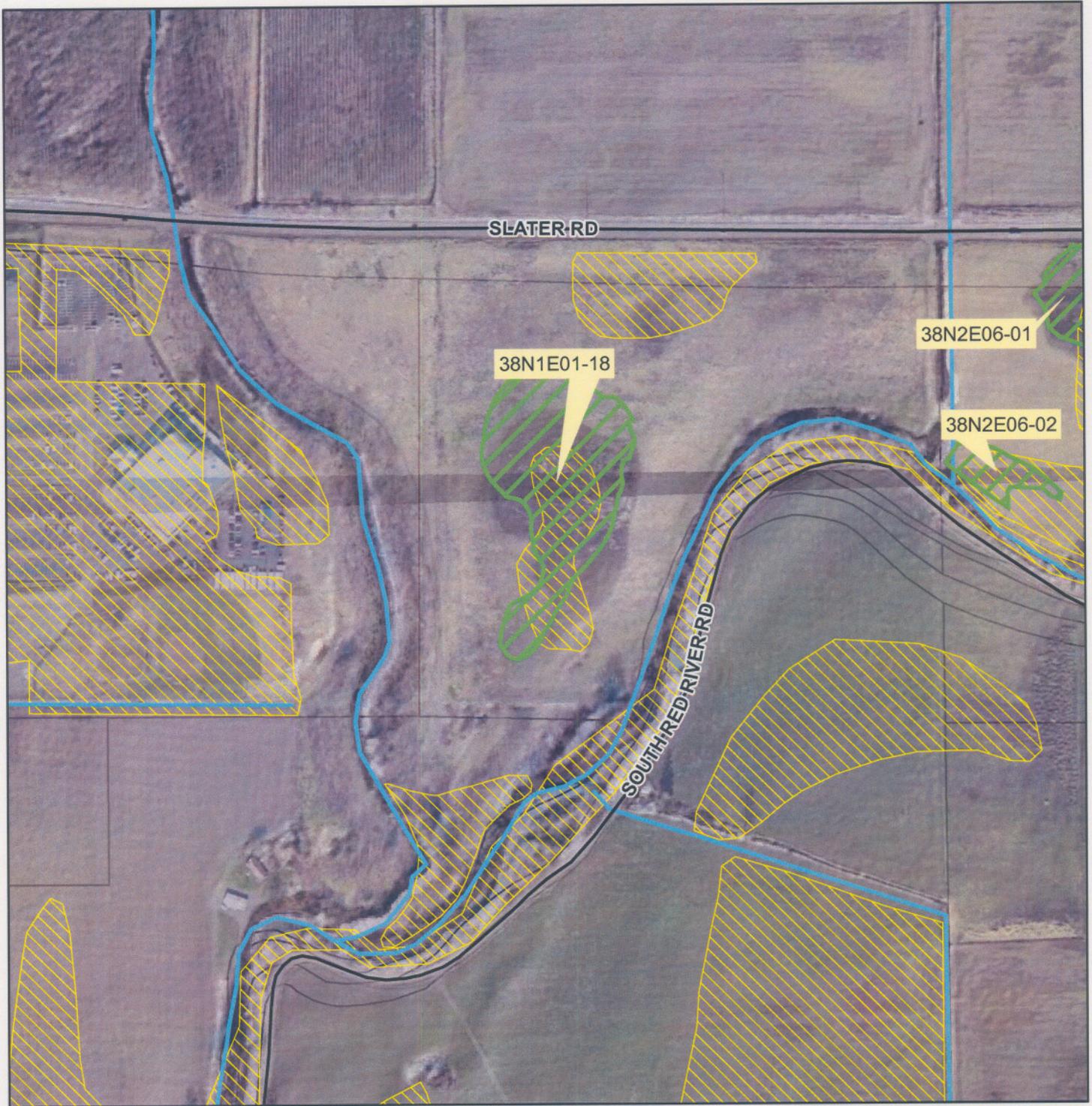
 Parcels	 Updated Wetland Boundary	 Wetland
 Approximate Channel Location	 Wetland Complex	



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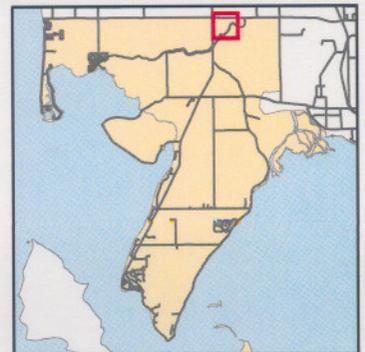


38N1E01-18



- | | | | |
|------------------------------|--------------------------|---------|-----------------|
| Parcels | Updated Wetland Boundary | Wetland | Wetland Complex |
| Approximate Channel Location | | | |
- Estimated Wetlands - 1999

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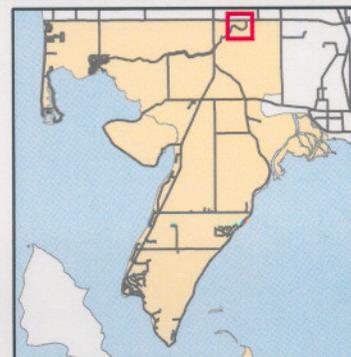
38N2E06-01 and 38N2E06-02



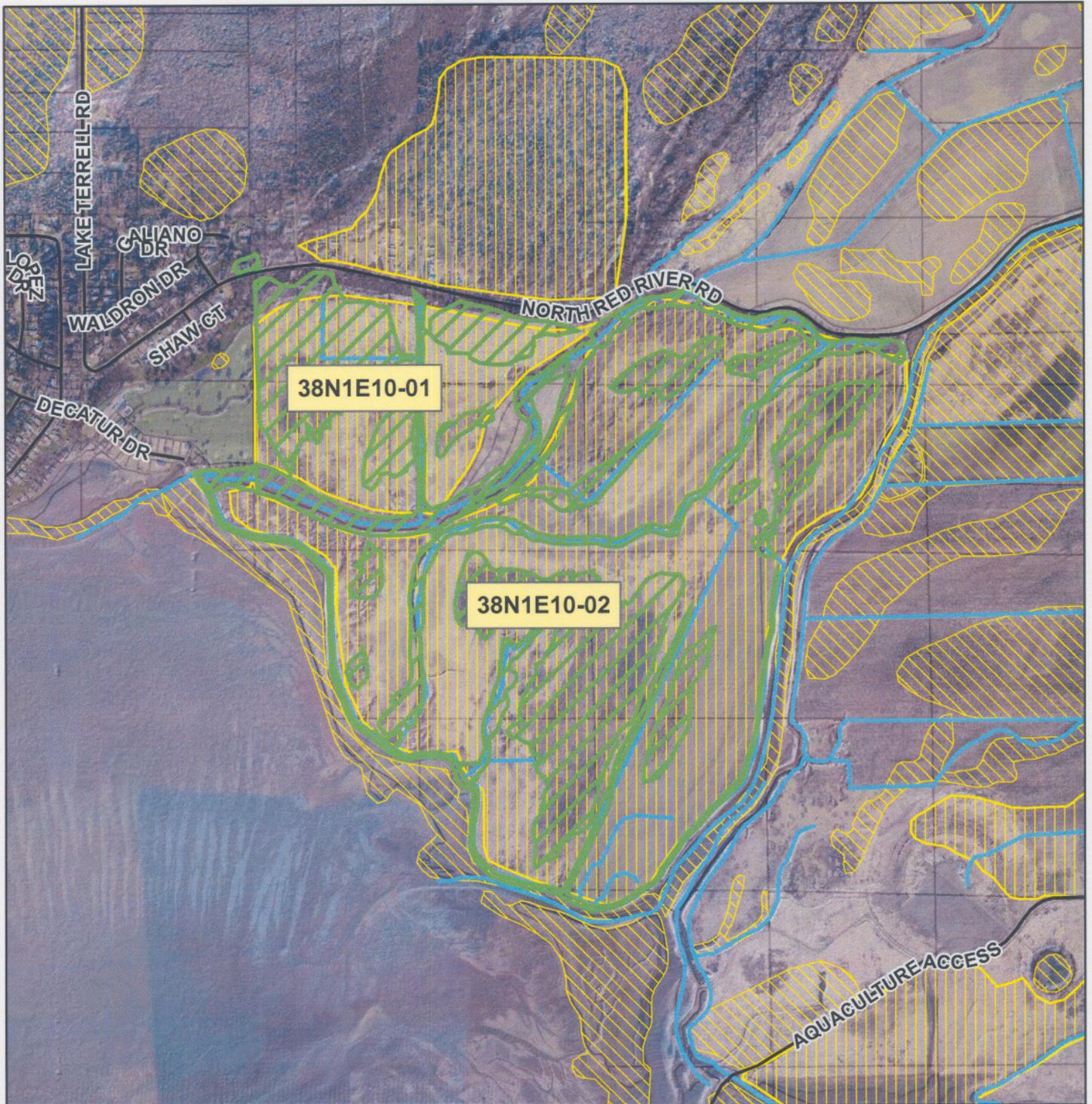
Parcels	Estimated Wetlands - 1999
Updated Wetland Boundary	Wetland
Approximate Channel Location	Wetland Complex

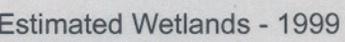
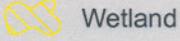
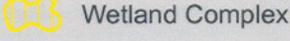


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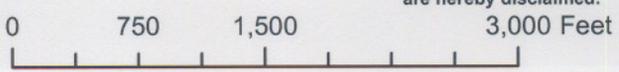
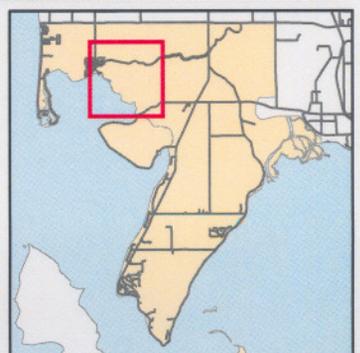
38N1E10-01 and 38N1E10-02

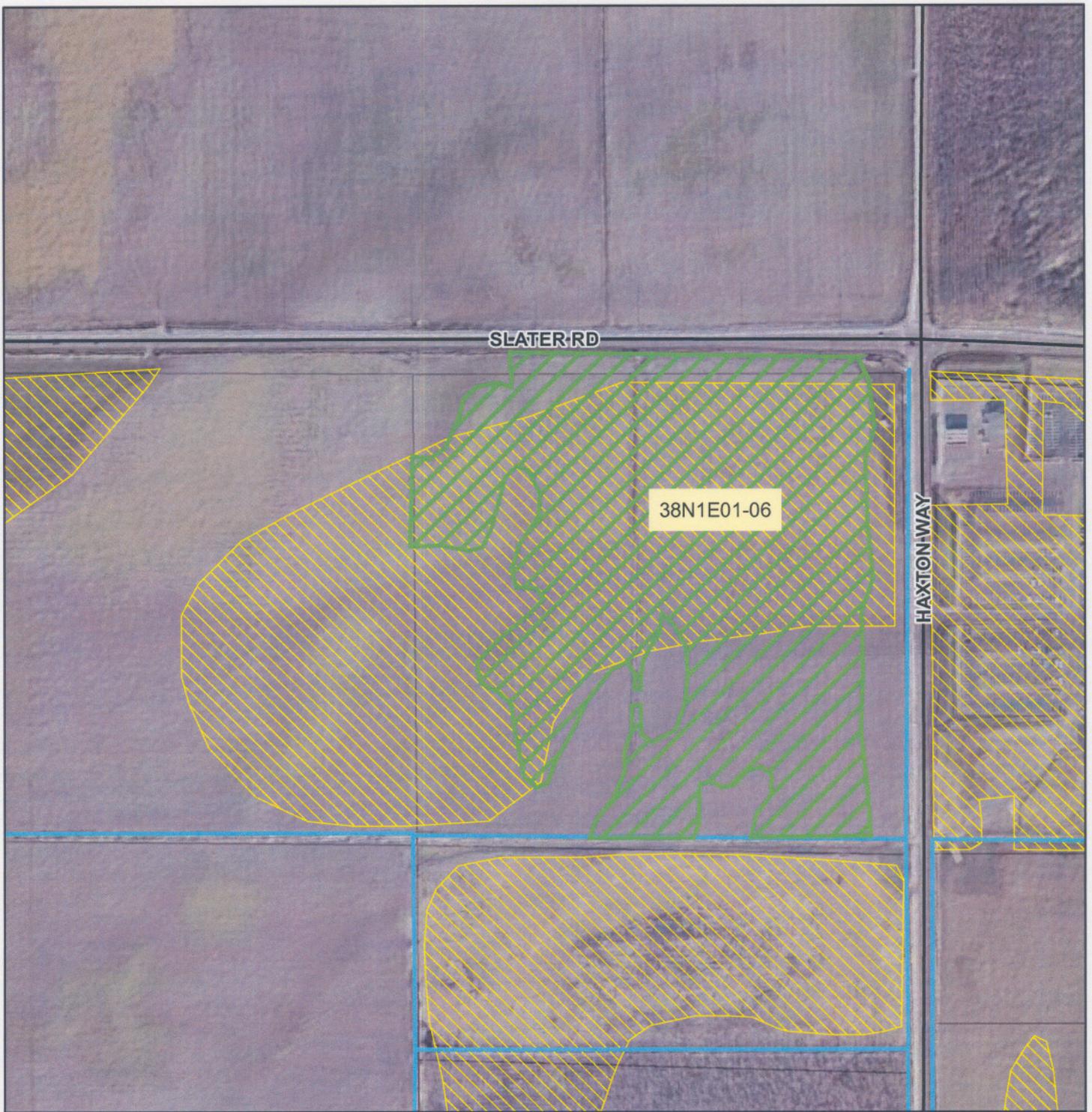


 Parcels	 Estimated Wetlands - 1999
 Updated Wetland Boundary	 Wetland
 Approximate Channel Location	 Wetland Complex



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- | | |
|--|---|
|  Parcels | Estimated Wetlands - 1999 |
|  Updated Wetland Boundary |  Wetland |
|  Approximate Channel Location |  Wetland Complex |

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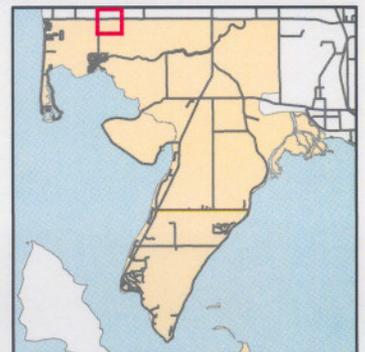


38N1E03-06 and 38N1E03-07

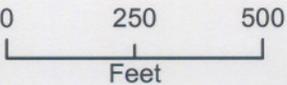
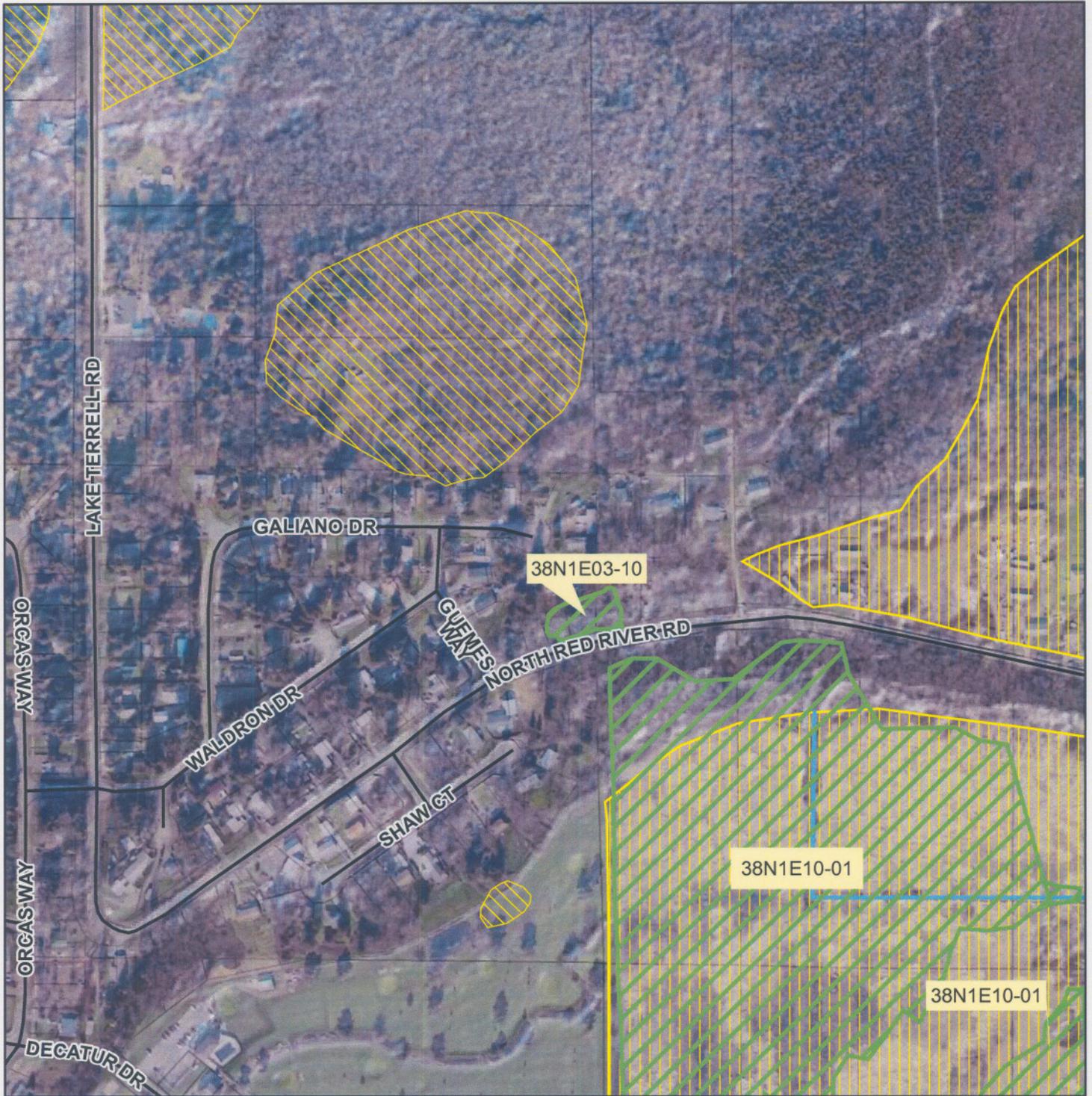


- | | |
|--|---|
|  Parcels | Estimated Wetlands - 1999 |
|  Updated Wetland Boundary |  Wetland |
|  Approximate Channel Location |  Wetland Complex |

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38N1E03-10



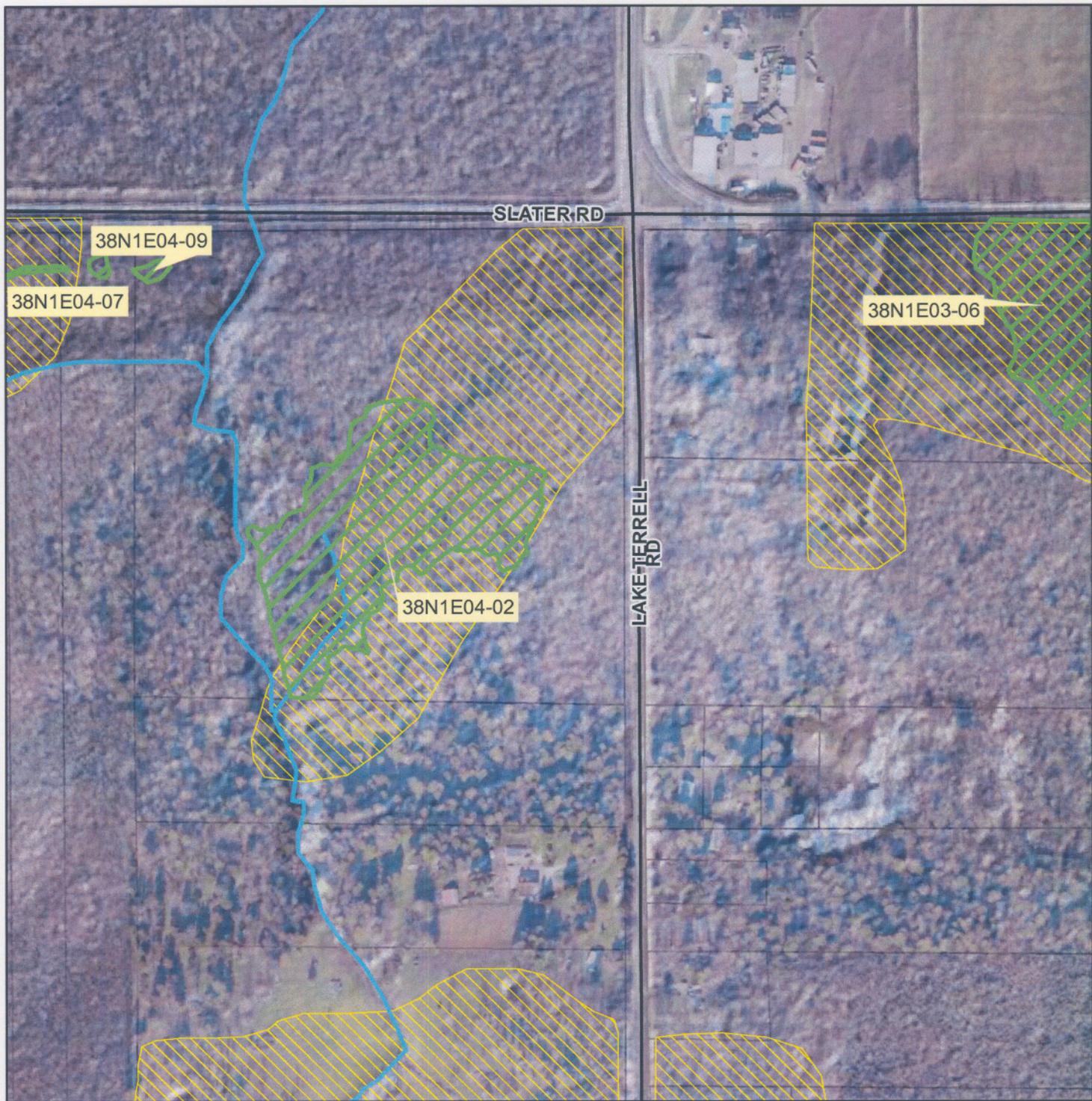
 Parcels	 Updated Wetland Boundary	 Wetland
 Approximate Channel Location	 Wetland Complex	

Estimated Wetlands - 1999

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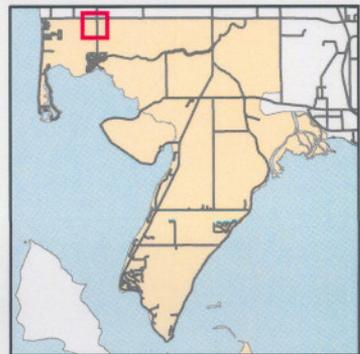
38N1E04-02



Parcels	Updated Wetland Boundary	Wetland
Approximate Channel Location	Wetland Complex	

Estimated Wetlands - 1999

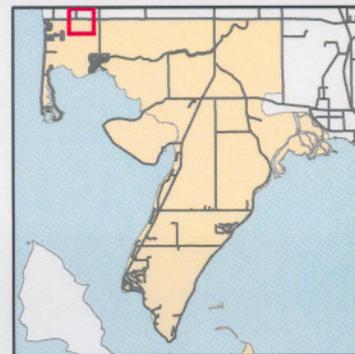
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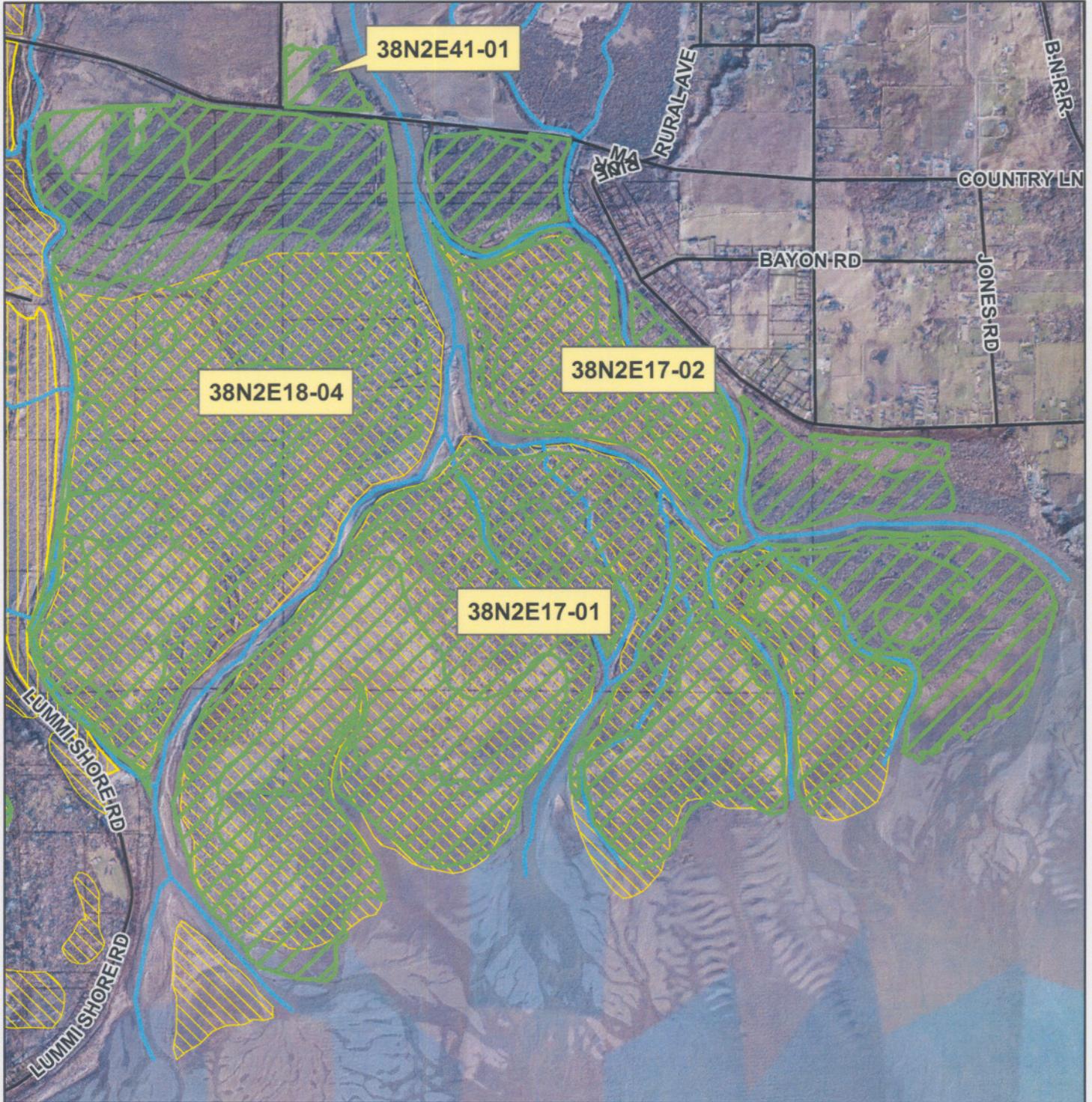


Parcels	Estimated Wetlands - 1999
Updated Wetland Boundary	Wetland
Approximate Channel Location	Wetland Complex

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38N2E41-01, 38N2E18-04, 38N2E17-01, and 38N2E17-02



- | | | |
|------------------------------|--------------------------|---------|
| Parcels | Updated Wetland Boundary | Wetland |
| Approximate Channel Location | Wetland Complex | |

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**APPENDIX B – SAMPLE FIELD NOTES AND FUNCTION ASSESSMENT
WORKSHEETS**

Approx 1000 ft west of Shellfish Co.,
 watershed 18.31 Acres
 7.40 hectares

Sisters Timber
 Sale

Wetland Name: 138N2E19-05

AU ID#: _____

Location: _____

T/S/R: _____

Data Collector: Lee Frost

Date: 3/21/05

Use this data sheet for:

DEPRESSIONAL CLOSED wetlands

in the Lowlands of Western Washington

- Use in conjunction with the written guidance provided in Parts 1 and 2
- Record only numbers, yes/no answers are recorded as a [1] or [0]

Estimate,

Score/ or Rating

LANDSCAPE DATA

0	1/0	D0	Do dikes surround the AU, and does it drain through a control structure that can be manipulated?
10.33	ha	D1	Area of AU 25.53 Acres w/ GPS
127	ha	D2	Area of contributing basin (upgradient watershed)
		D3	Land use (as % of total area) within 1 km of AU (include contiguous AUs of different class)
60	%	D3.1	Undeveloped forest (if previously clear-cut, cut at least 5 years ago)
0	%	D3.2	Agriculture (tilled fields and pastures; includes golf courses)
10	%	D3.3	Clear-cut logging (<5 years since clearing)
0	%	D3.4	Urban/commercial (any developed areas not identified as residential)
0	%	D3.5	High density residential (>1 residence/acre)
5	%	D3.6	Low density residential (<= 1 residence/acre)
25	%	D3.7	Undeveloped areas, shrubland, other wetlands, and open water

29 % rather
 than 0/1

WATER REGIME

		D4	
		D4.1	
		D4.2	
		D4.3	
		D5	
		D6	
		D7	
		D8	<u>Inundation</u>
80	%	D8.1	Percent of AU that is ponded or inundated for >1 month
20	%	D8.2	Percent of AU with permanent standing or moving water
0	%	D8.3	Percent of AU with permanent open water (without aquatic bed vegetation)
0	%	D8.4	Percent of AU with unvegetated bars or mudflats
0	0/1	D8.5	Unvegetated bars or mudflats at least 100 square meters in size
		D9	<u>Inundation regimes</u>
40	0/1	D9.1	Permanently flooded (include vegetated areas)
60	0/1	D9.2	Seasonally flooded (>1 month)
50	0/1	D9.3	Occasionally flooded (<= 1 month)
70	0/1	D9.4	Saturated but seldom inundated
0	0/1	D9.5	Permanently flowing stream
0	0/1	D9.6	Intermittently flowing stream
	m	D10	

By definition:
 D8.1 >= D8.2 >= D8.3

Chose all that apply that meet size
 criteria: area >0.1 ha (1/4 acre) or
 > 10% of AU if AU smaller than 1 ha
 (2.5 acres)

DEPRESSIONAL CLOSED

Wetland Name: _____ AU ID#: _____

D11
 0/1 D11.1
 0/1 D11.2
 0/1 D11.3

D12 Categories of water depths in AU, areas permanently or seasonally inundated/flooded
 1 0/1 D12.1 1-20 cm (<8 in)
 1 0/1 D12.2 20-100 cm (8-40 in)
 1 0/1 D12.3 >100 cm (>40 in)

Record a 1 for each category present if >0.1 ha (1/4 acre) or 10% of area

D13
 D13.1
 D13.2
 D13.3
 D13.4

VEGETATION
D14 Cowardin Classes (as % area of AU)
 20 % D14.1 Forest - evergreen
 30 % D14.2 Forest -deciduous
 0 % D14.3 Scrub-shrub - evergreen
 40 % D14.4 Scrub-shrub - deciduous
 10 % D14.5 Emergent
 0 % D14.6 Aquatic bed

• Include forest only if trees are rooted in AU.
 • If forest is a mix of deciduous and evergreen estimate the relative % cover of each and divide percentage between the two categories.
 • If vegetation classes are patchy, add the patches together for each class to get a total.
 • To count, a class must cover at least 0.1 ha or be more than 10% of the total area of the AU

1 0/1 **D15** Does D8.3 + D8.4 + sum (D14.1 to D14.6) = 100? If not, give reason.
 15 % **D16** % area of herbaceous understory in forest and shrub areas (not % area in entire AU)
 30 % **D17** % area of AU with >75% closure of canopy (SS, FO classes > 1 m high)

D18
D19 Plant Richness
 38 # D19.1 Record number of native plant species found in AU
 3 # D19.2 Record number of non- native plant species found in AU
 7 # **D20** The # of plant assemblages in the AU with area >0.1 ha (1/4 acre) or >10% if AU <1 ha (if more than 12 record a 12)

4 [1-6] **D21** Strata: The maximum # of strata present in any plant assemblage
 0 0/1 **D21.1** Is vine stratum dominated by non-native blackberries?

A stratum must have 20% cover in assemblage

1 0/1 **D22** Mature trees in AU

spruce cedar

Average DBH of 3 out of 5 largest trees of a species has to exceed size threshold

alder cottonwood sedge areas

red osier salmonberry

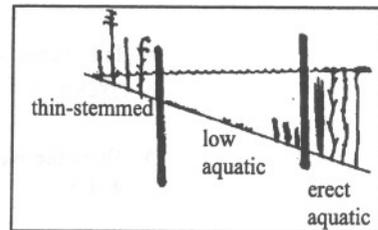
- Tsuga heterophylla* (western hemlock) >45 cm (18") ✓
- Thuja plicata* (western red cedar) >45 cm (18") ✓
- Pseudotsuga menziesii* (Douglas fir) >45 cm (18") ✓
- Picea sitchensis* (Sitka spruce) >45 cm (18") ✓
- Populus balsamifera* (black cottonwood) >45 cm (18") ✓
- Acer macrophyllum* (big-leaf maple) >45 cm (18") ✓
- Alnus rubra* (red alder) >30 cm (12") ✓
- Fraxinus latifolia* (Oregon ash) >30 cm (12")
- Pinus contorta* (lodgepole pine) >30 cm (12")
- Salix lucida* (Pacific willow) >30 cm (12")

Wetland Name:	AU ID#:
----------------------	----------------

- D23 Sphagnum bogs**
- 0 0/1 D23.1 % area of Sphagnum bog >75%
 - 0 0/1 D23.2 % area of Sphagnum bog = 50-75%
 - 0 0/1 D23.3 % area of Sphagnum bog = 25-49%
 - 0 0/1 D23.4 % area of Sphagnum bog = 1-24%
 - 1 0/1 D23.5 % area of Sphagnum bog = 0%
- D24 Dominance by non-native plant species**
- 0 0/1 D24.1 % area of non-native species >75%
 - 0 0/1 D24.2 % area of non-native species = 50-75%
 - 0 0/1 D24.3 % area of non-native species = 25-49%
 - 1 0/1 D24.4 % area of non-native species = 1-24%
 - 0 0/1 D24.5 % area of non-natives = 0%

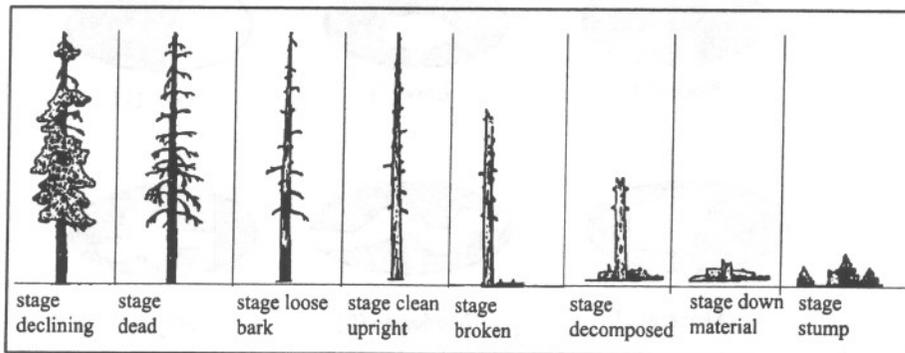
HABITAT CHARACTERISTICS

- 2 [0-3] **D25** Number of structure categories in aquatic bed vegetation
Applies only to aquatic bed species
DO NOT count persistent emergents



- D26 pH**
- 7 [4-9] D26.1 pH of interstitial water (*measure immediately after digging hole in non-inundated areas*)
 - 7 [4-9] D26.2 pH of open or standing water (*record the lowest pH, if you cannot measure record a [7]*)
- 0 0/1 **D27** Estuary: AU is within 8 km (5 mi) of a brackish or salt water estuary
- 0 0/1 **D28** Large lake: AU is within 1.6km (1 mi) of a lake >8 ha (20 acres)
- 1 0/1 **D29** Open field: AU is within 5 km (3 mi) of an open field (agriculture or pasture) >16 ha (40 acres)
- 1 0/1 **D30** Preferred woody vegetation: AU has >1 ha (2.5 acres) of preferred woody vegetation for beaver in and within 100 m of AU
- 8 [0-8] **D31** Snags (record # of stages)
Circle the categories present; minimum DBH of snag = 10 cm (4")

The AU is full of all sizes of snags



- 1 0/1 **D31.1** At least one of the snags above has a DBH greater than 30 cm (12").

DEPRESSIONAL CLOSED

Wetland Name:	AU ID#:
----------------------	----------------

- | | | | |
|----------|-----|------------|---|
| <u>1</u> | 0/1 | D32 | <u>Overhanging vegetation</u> , extending out for 1m, for at least 10 m (33 ft) over stream or open water. |
| <u>0</u> | 0/1 | D33 | <u>Upland islands</u> of at least 10 square meters (100 square ft.) within AU boundary
<i>Islands need to be surrounded by at least 30 m (100 ft) of open water deeper than 1 m (3 ft)</i> |

D34

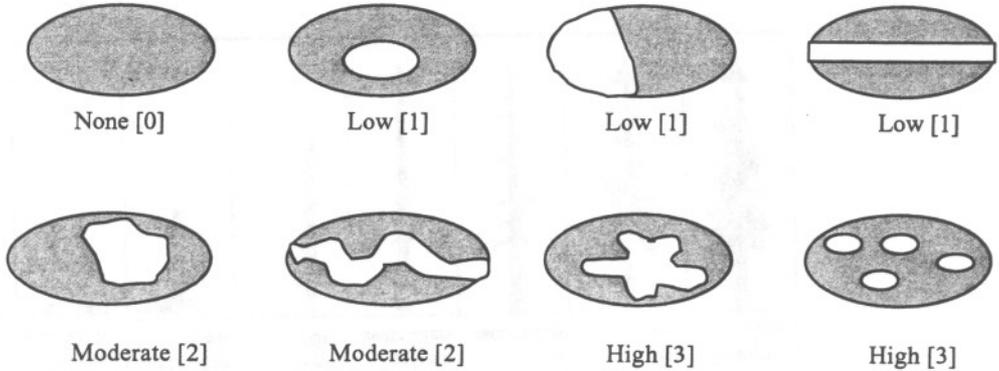
4 [0-4] **D35** Key for rating egg-laying structures for amphibians

1. Does the AU have thin-stemmed vegetation or thin branches (<8 mm) in at least 1/4 acre (or 10% of AU) of permanent or seasonally inundated areas? *Thin-stemmed vegetation can include herbaceous species such as water parsley.*
 NO - Score = 0 YES go to 2
2. Does the AU have at least 0.2 ha (1/2 acre) of thin-stemmed emergent vegetation or woody branches, 1-4 mm in diameter?
 NO go to 5 YES go to 3
3. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water]?
 NO go to 4 YES - Score = 4
4. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
 NO - Score = 2 YES - Score = 3 STOP
5. Does the AU have >0.1 ha (1/4 acre) of thin-stemmed emergent vegetation or woody branches, 1-4 mm?
 NO - Score = 1 YES go to 6
6. Does the area with thin stems contain open water interspersed in a patchwork of a ratio that is approximately 1:1 [no more than a 40- 60% of the total area is open water]?
 NO go to 7 YES - Score = 3
7. Is the area of open water between 25% and 75% of the total area in the zone of thin stemmed vegetation?
 NO - Score = 1 YES - Score = 2

1 0/1 **D36** Tannins in surface waters >10% of water surface

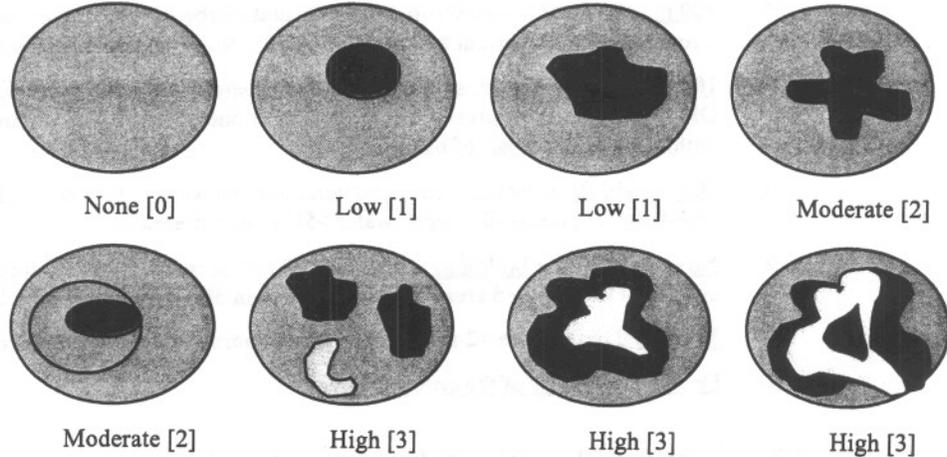
0 0/1 **D37** Steep banks for denning (>30 degree slope, fine material, >10 m long, >0.6 m high) (*may be a dike*)

2 [0-3] **D38** Interspersion between erect vegetation and permanent open water (POW + AB) areas of AU



Wetland Name:	AU ID#:
<u>3</u> [0-3] D39 <u>Interspersion between Cowardin vegetation classes</u>	

*AUs with only 2 classes can only score a moderate [2] or lower
 *AUs with 4 vegetation classes score a high [3]
 *AUs with 3 classes can score a moderate (2) or a high (3)



D40
3 [0-3] **D41** Edge of AU: The characteristics of the edge between AU and uplands or adjacent wetlands.
 Choose the description that best fits the characteristics of the AU edge:

- 0 There are **no differences in level** of vegetation height as reflected by vegetation classes on each side of the AU for more than 50% of the circumference: record a [0] **regardless of the sinuosity**.
 Examples: emergent (or herbaceous) to emergent (or herbaceous), shrub to shrub, forest to forest.
- 1 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight** for more than 50% of the circumference: record a [1]. Example: emergent (or herbaceous) to shrub, shrub to forest
- 2 There is a **difference of one level** in vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous** for more than 50% of the circumference: record a [2]. Examples: emergent (or herbaceous) to shrub, shrub to forest.
- 2 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is straight**: record a [2]. Examples: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.
- 3 There is a **difference of more than one level** of vegetation height as reflected by vegetation classes on each side of the AU and the **edge is sinuous**: record a [3]. Example: emergent (or herbaceous) to forest, bryophytes to scrub/shrub or forest.
- 2 If **no single category** above extends for more than 50% of the circumference, and the **edge is straight**: record a [2]
- 3 If **no single category** above extends for more than 50% of the circumference, and the **edge is sinuous**: record a [3]

DEPRESSIONAL CLOSED

Wetland Name:	AU ID#:
----------------------	----------------

5 [0-5] D42 **Buffer of AU:** Choose the description that best represents condition of AU buffer

* *Open water or adjacent wetlands are considered part of the buffer*
 * *Infrequently used gravel or paved roads or vegetated dikes in a relatively undisturbed buffer can be ignored as a "disturbance"*

- 5 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >95% of circumference. Clear-cut >5 years old is OK. No developed areas within undisturbed part of buffer.
- 4 100 m (330 ft) of forest, scrub, relatively undisturbed grassland or open water >50% circumference OR 50 m (170 ft) of forest scrub, grassland or open water >95% circumference. No developed areas within undisturbed part of buffer.
- 3 100 m (330 ft) of forest, scrub, grassland or open water >25% circumference, OR 50 m (170 ft) of forest, scrub, grassland or open water >50% circumference.
- 2 No paved areas or buildings within 25m (80 ft) of wetland >95% circumference. Pasture or lawns are OK. OR no paved areas or buildings within 50m of wetland >50% circumference
- 0 Vegetated buffers are <2 m wide (6.6 ft) for more than 95% of the circumference
- 1 Does not meet any of the criteria above

3 [0-3] D43 **Corridors of AU:** Rate corridors using following key (*record rating of 0, 1, 2, or 3*)

1. Is the AU part of a riparian corridor (*see text for definitions*)
 NO go to 5 YES go to 2
2. Is the wetland part of riparian corridor >50 m wide connecting 2 or more wetlands within 1 km with at least 30% shrub or forest cover in the corridor?
 NO go to 3 YES = [3]
3. Is the AU part of a riparian corridor 25-50 m wide connecting to other wetlands with at least 30% shrub or forest cover in the corridor?
 NO go to 4 YES = [2]
4. Is the AU part of a riparian corridor >5 m wide with relatively undisturbed veg. (grasslands, abandoned pasture are OK) that extends for more than 1 km?
 NO go to 5 YES = [1]
5. Is there a corridor >50 m wide with good (>30%) cover of forest or shrub (>2 m high) to natural upland area or open water that is >100 ha in size?
 NO go to 6 YES = [3]
6. Is there a 10-50 m wide forest or shrub corridor to a relatively undisturbed upland or open water that is >10 ha?
 NO go to 7 YES = [2]
7. Is there a corridor of relatively undisturbed vegetation (grassland, abandoned pasture) >50 m wide to an undisturbed upland or open water that is >10 ha?
 NO go to 8 YES = [2]
8. Is there any vegetated corridor 5-50 m wide between the AU and any relatively undisturbed area or open water that is >2.5 ha?
 NO = [0] YES = [1]

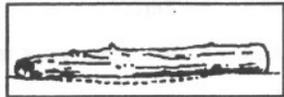
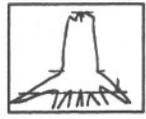
DEPRESSIONAL CLOSED

Wetland Name: _____ **AU ID#:** _____

10 [0-12] **D44** # of categories of large woody debris in AU outside of perm. water

Freshly cut stumps are not included

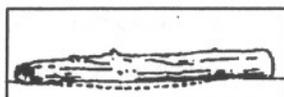
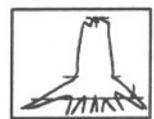


	Log Class 1	Log Class 2	Log Class 3	Stump
Diameter 10-20cm (4-8")	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
21-50cm (8-20")	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
>50 cm (>20")	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

1 [0-12] **D45** # of categories of large woody debris in permanent water of AU (may include aquatic bed areas)



	Log Class 1	Log Class 2	Log Class 3	Stump
Diameter 10-20cm (4-8")	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
21-50cm (8-20")	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
>50 cm (>20")	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

SOILS and SUBSTRATES

- D46** Composition of AU surface
- 1 0/1 **D46.1** Deciduous, broad-leaved, leaf litter
 - 1 0/1 **D46.2** Other plant litter
 - 1 0/1 **D46.3** Decomposed organic
 - 0 0/1 **D46.4** Exposed cobbles
 - 0 0/1 **D46.5** Exposed gravel
 - 0 0/1 **D46.6** Exposed sand
 - 1 0/1 **D46.7** Exposed silt
 - 0 0/1 **D46.8** Exposed clay

Record a 1 for each category present if its area is > 10 square meters. Note: bare earth from animal tunnels does NOT count.

- D47** Soils present in top (15 cm) of A horizon (record [1] if 1-49% area of AU, [2] if 50-95%, [3] if >95%)
- 0 [0-3] **D47.1** Peat
 - 2 [0-3] **D47.2** Organic Muck
 - 1 [0-3] **D47.3** Mineral with clay fraction <30%
 - 0 [0-3] **D47.4** Clay (clay fraction >30%)

Record the least permeable layer if there are several down to 60 cm.

DEPRESSIONAL CLOSED

Wetland Name:		AU ID#:
	D48	Infiltration rate of top 60 cm of soil in seasonally inundated areas
<u>0</u>	0/1 D48.1	Fast >50% gravel and cobble and the rest a sand, loamy sand, or sandy loam
<u>0</u>	0/1 D48.2	Moderate >50% sand and rest cobble, gravel, loamy sand, or sandy loam
<u>1</u>	0/1 D48.3	Slow - muck, peat, or loams (except sandy loam), silts, and clays
	D49	
	D49.1	
	D49.2	
	D49.3	

Judgements of Opportunity (Ratings of High, Medium, Low)

Rating	Functions
<u>L</u>	Removing Sediments
<u>L</u>	Removing Nutrients
<u>L</u>	Removing Toxic Metals and Organics
<u>L</u>	Reducing Peak Flows
<u>L</u>	Reducing Downstream Erosion
<u>H</u>	Recharging Groundwater
<u>H</u>	General Habitat
<u>L</u>	Anadromous Fish Habitat

Western Washington Wetland Classification Key

Wetland Name: 38N2E19-05
AU ID #: Sisters Timber Sale Date: 3-18-05

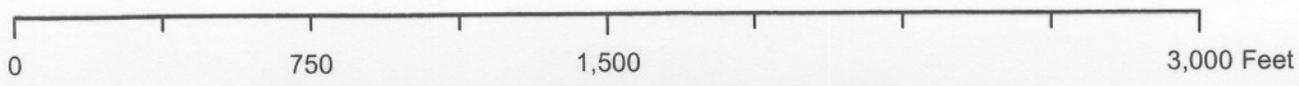
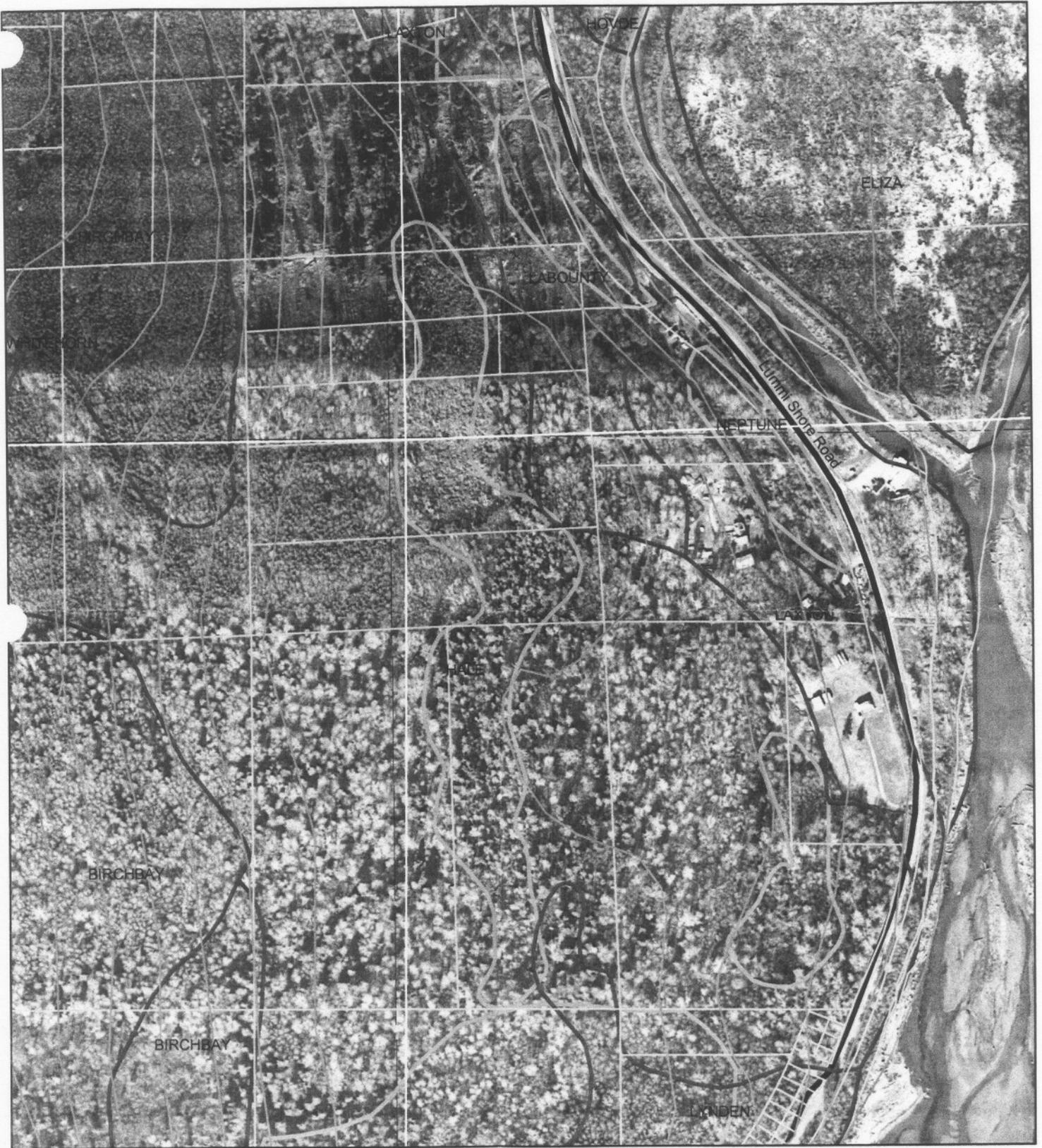
- 1) Water levels in AU usually controlled by tides
 No - go to 2 Yes - **Tidal Fringe**
- 2) Topography is flat and precipitation is only source (>90%) of water to the AU
 No - go to 3 Yes - **Flat**
- 3) AU is contiguous with >8 ha open water, and water is deeper than 2 m over 30% of open water area
 No - go to 4 Yes - **Lacustrine Fringe**
- 4) Open water is <8 ha and >2 m deep, but AU is a fringe narrower than 1/2 the radius of open water
 No - go to 5 Yes - **Lacustrine Fringe**
- 5) Water flow in AU is unidirectional on a slope, water is not impounded in the AU
 No - go to 6 Yes - **Slope**
- 6) AU is located in a topographic valley with stream or river in the middle
 No - go to 9 Yes - go to 7
- 7) Have data showing area flooded more than once every 2 yrs.; or indicators of flooding are present:
 - Scour marks common
 - Recent sediment deposition
 - Vegetation that is damaged or bent in one direction
 - Soils have alternating deposits
 - Vegetation along bank edge has flood marksNo for all indicators - go to 9 Yes for any indicator - go to 8
- 8) Flood waters retained
No - **Riverine Flow-through**
Yes - **Riverine Impounding**
 - Depression in floodplain
 - Constricted outlet
 - Permanent water
- 9) Has surface water outflow - **Depressional Outflow**
Has no surface outflow - **Depressional Closed**

Rationale for Choices:

Depressional Closed**Summary of Function Assessments**

Function	Index
Potential for Removing Sediment	10
Potential for Removing Nutrients	10
Potential for Removing Heavy Metals and Toxic Organics	7
Potential for Reducing Peak Flows	10
Potential for Reducing Decreasing Downstream Erosion	10
Potential for Groundwater Recharge	6
General Habitat Suitability	10
Habitat Suitability for Invertebrates	7
Habitat Suitability for Amphibians	9
Habitat Suitability for Anadromous Fish	N/A
Habitat Suitability for Resident Fish	N/A
Habitat Suitability for Wetland Associated Birds	8
Habitat Suitability for Wetland Associated Mammals	8
Native Plant Richness	8
Primary Production and Export	N/A

plot ortho52_040222.pmi



DRAFT WETLAND RATING FORM – WESTERN WASHINGTON

Name of wetland (if known): 38N2E19-05 (4 Sisters)

Location: SEC: ___ TOWNSHIP: ___ RANGE: ___ (attach map with outline of wetland to rating form)

Person(s) Rating Wetland: Lee First Affiliation: LNR Date of site visit: 3-21-05 +
other visits

DRAFT SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I ___ II ___ III ___ IV ___

Category I = Score >70
 Category II = Score 51-69
 Category III = Score 30-50
 Category IV = Score < 30

Score for Water Quality Functions	16
Score for Hydrologic Functions	12
Score for Habitat Functions	28
TOTAL score for functions	56

Category based on SPECIAL CHARACTERISTICS of wetland

I ___ II ___ Does not Apply ___

Final Category (choose the "highest" category from above)

II

Check the appropriate type and class of wetland being rated.

Wetland Type	Wetland Class	
Estuarine	Depressional	✓
Natural Heritage Wetland	Riverine	
Bog	Lake Fringe	
Mature Forest	Slope	
Old Growth Forest	Flats	
Coastal Lagoon	Freshwater Tidal	
Interdunal		
None of the above		

Does the wetland being rated meet any of the criteria below?

If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That Need Special Protection, and That Are Not Included in the Rating	YES	NO
<p>A1. <i>Has the wetland been documented as a habitat for any Federally listed Threatened or Endangered plant or animal species (T/E species)?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.</p>		X
<p>A2. <i>Has the wetland been documented as habitat for any State listed Threatened or Endangered plant or animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database.</p>		X
<p>A3. Does the wetland contain individuals of Priority species listed by the WDFW for the state?</p>		X
<p>A4. Does the wetland have a local significance in addition to its functions. For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</p>		X

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands for Western Washington

Wetland Name: 38N2E19-05 ^(4 sketches) Date: 4-6-05

1. Are the water levels in the wetland usually controlled by tides (i.e. except during floods)?

NO - go to 2 YES - the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? YES - **Freshwater Tidal Fringe** NO - **Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is rated as an **Estuarine** wetland. Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).*

2. Is the topography within the wetland flat and precipitation is only source (>90%) of water to it.

NO - go to 3 YES - The wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the wetland **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) where at least 20 acres (8 ha) are permanently inundated (ponded or flooded);

At least 30% of the open water area is deeper than 6.6 ft (2 m)?

NO - go to 4 YES - The wetland class is **Lake Fringe (Lacustrine Fringe)**

4. Does the wetland **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*),

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**?

NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks(depressions are usually <3ft diameter and less than 1 foot deep).*

NO - go to 5 YES - The wetland class is **Slope**

5. Is the wetland in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river? The flooding should occur at least once every two years, on the average, to answer "yes." *The wetland can contain depressions that are filled with water when the river is not flooding.*

NO - go to 6 YES - The wetland class is **Riverine**

6. Is the wetland in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year. *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7 YES – The wetland class is **Depressional**

7. Is the wetland located in a very flat area with no obvious depression and no stream or river running through it and providing water. The wetland seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

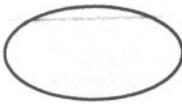
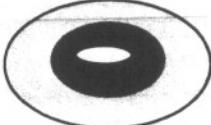
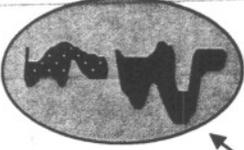
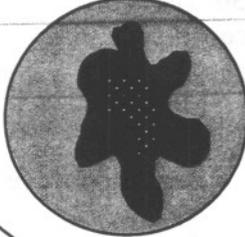
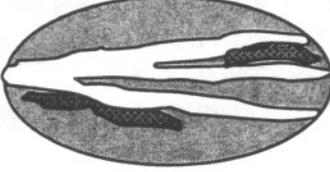
NO – go to 8 YES – The wetland class is **Depressional**

8. Your wetland seems to be difficult to classify. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. Sometimes we find characteristics of several different hydrogeomorphic classes within one wetland boundary. Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland being rated. If the area of the second class is less than 10% classify the wetland using the first class.

<i>HGM Classes Within a Delineated Wetland Boundary</i>	<i>Class to Use in Rating</i>
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake Fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

<i>These questions apply to wetlands of all HGM classes.</i>		Points
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat		
H 1. Does the wetland have the <u>potential</u> to provide habitat for many species?		
H 1.1 <u>Vegetation structure</u> (see p. 68) Check the types of vegetation classes present (as defined by Cowardin) if the class covers more than 10% of the area of the wetland or ¼ acre. <input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants <input checked="" type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input checked="" type="checkbox"/> Forested (areas where trees have >30% cover) <input checked="" type="checkbox"/> Forested areas have 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) Add the number of vegetation types that qualify. If you have:		2
4 types or more points = 4 3 types points = 2 2 types points = 1 1 type points = 0		
H 1.2. <u>Hydroperiods</u> (see p. 69) Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ acre to count. (see text for descriptions of hydroperiods)		3
<input checked="" type="checkbox"/> Permanently flooded or inundated 4 or more types present points = 3 <input checked="" type="checkbox"/> Seasonally flooded or inundated 3 types present points = 2 <input checked="" type="checkbox"/> Occasionally flooded or inundated 2 types present point = 1 <input checked="" type="checkbox"/> Saturated only <input type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland <input type="checkbox"/> Seasonally flowing stream in, or adjacent to, the wetland <input type="checkbox"/> Lake-fringe wetland = 2 points <input type="checkbox"/> Freshwater tidal wetland = 2 points		
H 1.3. <u>Richness of Plant Species</u> (see p. 71) Count the number of plant species in the wetland that cover at least 10 ft ² . (different patches of the same species can be combined to meet the size threshold) You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle If you counted: > 19 species points = 2 5 - 19 species points = 1 < 5 species points = 0 List species below if you want to:		2

<p>H 1.4. Interspersion of habitats (see p. 72) Decided from the diagrams below whether interspersion between types of vegetation (described in H 1.1), or vegetation types and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>None = 0 points</p> </div> <div style="text-align: center;">  <p>Low = 1 point</p> </div> <div style="text-align: center;">  <p>Moderate = 2 points</p> </div> <div style="text-align: center;">  </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  <p>High = 3 points</p> </div> <div style="text-align: center;">  <p>[riparian braided channels]</p> </div> </div> <p>NOTE: If you have four or more vegetation types or three vegetation types and open water the rating is always "high".</p>	3
<p>H 1.5. Special Habitat Features: (see p. 73) Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Large, downed, woody debris within the wetland (>4in. diameter and 6 ft long). <input checked="" type="checkbox"/> Standing snags (diameter at the bottom > 4 inches) in the wetland <input type="checkbox"/> Undercut banks are present for at least 6.6 ft (2m) and/or overhanging vegetation extends at least 3.3 ft (1m) over a stream for at least 33 ft (10m) <input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (>30degree slope) OR signs of recent beaver activity are present <input checked="" type="checkbox"/> At least ¼ acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated. (structures for egg-laying by amphibians) <input checked="" type="checkbox"/> Invasive plants cover less than 25% of the wetland area in each stratum of plants 	4
<p>H 1. TOTAL Score - potential for providing habitat <i>Add the scores in the column above</i></p>	14

Comments

H 2. Does the wetland have the opportunity to provide habitat for many species?	
<p>H 2.1 Buffers (see p. 75) <i>Choose the description that best represents condition of buffer of wetland. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."</i></p> <ul style="list-style-type: none"> — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No developed areas within undisturbed part of buffer. (relatively undisturbed also means no-grazing) Points = 5 — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. Points = 4 — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4 — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . Points = 3 — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference. Points = 3 <p style="text-align: center;">If buffer does not meet any of the three criteria above</p> <ul style="list-style-type: none"> — No paved areas (except paved trails) or buildings within 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — No paved areas or buildings within 50m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2 — Heavy grazing in buffer. Points = 1 — Vegetated buffers are <2m wide (6.6ft) for more than 95% of the circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland Points = 0. — Buffer does not meet any of the criteria above. Points = 1 	5
<p>H 2.2 Corridors and Connections (see p. 76)</p> <p>H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft wide, has at least 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? (<i>dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor</i>).</p> <p style="text-align: center;">YES = 4 points (go to H 2.3) NO = go to H 2.2.2</p> <p>H 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50ft wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? OR a Lake-fringe wetland, if it does not have an undisturbed corridor as in the question above?</p> <p style="text-align: center;">YES = 2 points (go to H 2.3) NO = H 2.2.3</p> <p>H 2.2.3 Is the wetland:</p> <ul style="list-style-type: none"> within 5 mi (8km) of a brackish or salt water estuary OR within 3 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? <p style="text-align: center;">YES = 1 point NO = 0 points</p>	2

H 2.3 Near or adjacent to other priority habitats listed by WDFW (see p. 77)

Which of the following priority habitats are within 330ft (100m) of the wetland?
(see text for a more detailed description of these priority habitats)

Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.

Aspen Stands: Pure or mixed stands of aspen greater than 0.8 ha (2 acres).

Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5000 ft.

Old-growth forests: (Old-growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age.

Mature forests: Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less than 100%; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest.

Prairies: Relatively undisturbed areas (as indicated by dominance of native plants) where grasses and/or forbs form the natural climax plant community.

Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.

Caves: A naturally occurring cavity, recess, void, or system of interconnected passages

Oregon white Oak: Woodlands Stands of pure oak or oak/conifer associations where canopy coverage of the oak component of the stand is 25%.

Urban Natural Open Space: A priority species resides within or is adjacent to the open space and uses it for breeding and/or regular feeding; and/or the open space functions as a corridor connecting other *priority habitats*, especially those that would otherwise be isolated; and/or the open space is an isolated remnant of natural habitat larger than 4 ha (10 acres) and is surrounded by urban development.

Estuary/Estuary-like: Deepwater tidal habitats and adjacent tidal wetlands, usually semi-enclosed by land but with open, partly obstructed or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. Along some low-energy coastlines there is appreciable dilution of sea water. Estuarine habitat extends upstream and landward to where ocean-derived salts measure less than 0.5% during the period of average annual low flow. Includes both estuaries and lagoons.

Marine/Estuarine Shorelines: Shorelines include the intertidal and subtidal zones of beaches, and may also include the backshore and adjacent components of the terrestrial landscape (e.g., cliffs, snags, mature trees, dunes, meadows) that are important to shoreline associated fish and wildlife and that contribute to shoreline function (e.g., sand/rock/log recruitment, nutrient contribution, erosion control).

If wetland has **3 or more** priority habitats = **4 points**

If wetland has **2** priority habitats = **3 points**

If wetland has **1** priority habitat = **1 point**

No habitats = 0 points

4

<p>H 2.4 <u>Wetland Landscape</u> (choose the one description of the landscape around the wetland that best fits) (see p. 79)</p> <p>There are at least 3 other wetlands within ½ mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development. points = 5</p> <p>The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within ½ mile points = 5</p> <p>There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3</p> <p>The wetland is Lake-fringe on a lake with disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3</p> <p>There is at least 1 wetland within ½ mile. points = 2</p> <p>There are no wetlands within ½ mile. points = 0</p>	3.
<p>H 2. TOTAL Score - opportunity for providing habitat Add the scores in the column above</p>	14
<p>Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1</p>	28

<p>SC 4.0 Forested Wetlands (see p. 85)</p> <p>Does the wetland have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? <i>If you answer yes you will still need to rate the wetland based on its functions.</i></p> <ul style="list-style-type: none"> — Old-growth forests: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. <p>NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter.</p> <ul style="list-style-type: none"> — Mature forests: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth. <p>YES = Category I NO ___</p>	<p>Cat. I</p>
<p>SC 5.0 Wetlands in Coastal Lagoons (see p. 86)</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <ul style="list-style-type: none"> — The wetland lies in a depression adjacent to Puget Sound that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The wetland contains surface water that is saline or brackish (> 0.5 ppt) during most of the year (<i>needs to be measured near the bottom</i>) — The wetland retains some of its surface water at low tide — The wetland is larger than 1/10 acre (4350 square feet) <p>YES = Category I NO ___ not a wetland in a coastal lagoon</p> <p><i>If you answer yes you will still need to rate the wetland based on its functions.</i></p>	<p>Cat. I</p>

<p>SC 6.0 Interdunal Wetlands (see p. 88)</p> <p>Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)?</p> <p>YES - go to SC 6.1 NO __ not an interdunal wetland for rating</p> <p><i>If you answer yes you will still need to rate the wetland based on its functions.</i></p> <p>In practical terms that means the following geographic areas:</p> <ul style="list-style-type: none"> • Long Beach Peninsula- lands west of SR 103 • Grayland-Westport- lands west of SR 105 • Ocean Shores-Copalis- lands west of SR 115 and SR 109 	
<p>SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger?</p> <p>YES = Category II NO – go to SC 6.2</p> <p>SC 6.2 Is the wetland between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre?</p> <p>YES = Category III</p>	<p>Cat. II</p> <p>Cat. III</p>
<p>Category of wetland based on Special Characteristics</p> <p><i>Choose the "highest" rating if wetland falls into several categories, and record on p. 1.</i></p> <p>If you answered NO for all types enter "Not Applicable" on p. 1</p>	