Vegetation Assessment and Wetland Reconnaissance Technical Memo for the Fir Island Restoration Feasibility Study Skagit County, Washington

November 19, 2010

Submitted To:
Mr. Brian Williams
Washington Department of Fish and Wildlife
Natural Resources Building
1111 Washington Street SE
Olympia, Washington 98501

By:
Shannon & Wilson, Inc.
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21-1-12318-001

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GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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November 19, 2010

Mr. Brian Williams
Washington Department of Fish and Wildlife
Natural Resources Building
1111 Washington Street SE
Olympia, WA 98501

RE: TECHNICAL MEMORANDUM 1.6 – WETLAND RECONNAISSANCE AND VEGETATION ASSESSMENT, FIR ISLAND FARM RESTORATION FEASIBILITY STUDY, SKAGIT COUNTY, WASHINGTON

Dear Mr. Williams:

Shannon & Wilson completed a wetland reconnaissance and baseline vegetation assessment for the Fir Island Farm Restoration site project. The intent of this baseline data collection was to characterize existing vegetation and habitat communities on or immediately adjacent to the site to better understand impacts and species reestablishment associated with various restoration alternatives.

This technical memorandum summarizes the results of the wetland reconnaissance and vegetation assessment baseline data collection fieldwork, which occurred on August 25, 26, and 31, 2010.

PROJECT BACKGROUND

The wetland reconnaissance and baseline vegetation assessment described herein are part of an overall baseline study at the Fir Island Farm site to evaluate the dike setback restoration of juvenile Puget Sound Chinook habitat. Currently, the Fir Island Farm site is managed by the Washington State Department of Fish and Wildlife (WDFW) for snow goose forage habitat through the cultivation of winter cover crops on agricultural land.

As part of the dike setback project evaluation, impacts to existing wetlands and post-construction vegetation response condition will be evaluated. Therefore, a wetland reconnaissance was completed to approximate the extent of existing wetlands located on and adjacent to the project site, and a vegetation assessment of existing bay front areas to assess the likelihood of establishment of similar species for the restored condition.

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The vegetation assessment was conducted to document species distribution relative to their elevation and level and duration of tidal inundation. As part of our baseline study, this on-site vegetation assessment will be compared to data compiled and presented by Greg Hood of the Skagit River System Cooperative (SRSC, 2009). The *Skagit Delta Vegetation Monitoring Data* compiles vegetation data from multiple sites located within three separate zones within the Skagit Delta: (1) South Fork, (2) Swinomish [Swin] Channel, and 3) Bayfringe areas. Salinity at these sites ranged from 0 to 6 parts per thousand (ppt) at the South Fork site, 19 to 22 ppt at the Swin Channel site, and 17 ppt at the Bayfringe site. The results of the SRSC's data are compiled to show the distribution relative to elevation (tidal inundation and salinity) for 24 different species, as well as the mud-line and the upland edge of marsh species. Providing the on-site vegetation data corresponds well to the SRSC's *Skagit Delta Vegetation Monitoring Data*, as adjusted for different elevation datums, both sets of data may be used as a predictive tool and model to estimate vegetation colonization under post-construction conditions for each dike setback alternative. Understanding vegetation composition is an important element of the overall fish habitat restoration method. This as well as tidal marsh channel morphology and tidal hydrologic and water quality characteristics will allow the restoration design team to evaluate the project alternatives and predict fish use and smolt production.

METHODS

Wetland Reconnaissance

A reconnaissance of the site was completed to identify potential wetlands and approximate their extent and classification. Wetlands were identified using the triple-parameter approach, which considers vegetation types, soil conditions, and hydrologic conditions, as described within the Corps (Corps 1987, Corps 2010) and Ecology (Ecology, 1997) wetland delineation manuals.

Five data plots (2 upland and 3 wetland) were recorded within identified potential wetland and upland plant community types to characterize general conditions at the site (Figure 1). Information on vegetation, soils, and hydrology was collected at each data plot. These data plots were located in areas that exhibited conditions similar to wetlands (i.e., drainage patterns and hydrophytic vegetation). Information gathered at these locations is provided in Appendix A.

Using the information compiled from the on-site wetland reconnaissance, the extent of wetlands on and immediately adjacent to the site were approximated using aerial photography and LiDAR

imagery. Potential wetlands were characterized using the Cowardin classification system. The limits of estuarine and palustrine wetlands were approximated based on salinity measurements performed on August 17, 2010.

Vegetation Assessment

During our site reconnaissance, a Shannon & Wilson biologist completed three 100-foot vegetation transects comprised of six, ½-meter sample plots spaced at 20-foot intervals (Figure 2). Vegetation Transects 1 and 2 were located at representative locations within the estuarine intertidal zone south and southwest of the site to characterize the vegetation composition of the high and low marsh habitats along the existing dikes. The third vegetation transect (Transect 3) extended perpendicular to the centerline of Claud O' Davis Slough to characterize the vegetation composition typical of the inland, less saline, drainage channels. Plant species were identified and their relative cover was quantified at each sample plot location. In total, 18 vegetation sampling plots were completed along the three transects. Data compiled at each sample plot for Transects 1 through 3 are provided in Appendix B.

Vegetation data compiled from Transects 1 and 2 were compared to the SRSC's *Skagit Delta Vegetation Monitoring Data* (Hood, 2009) (see Appendix C), as a means of verifying the application of the vegetation data model to the on-site conditions and use in future predictive assessments. Transect 3 characterized on-site freshwater conditions and, therefore, did not reflect similar estuarine habitat conditions assessed within the *Skagit Delta Vegetation Monitoring Data*. As a result, data from Transect 3 was not compared for use in the vegetation models.

RESULTS

The farm areas of the site are currently managed by WDFW for agriculture purposes whereby typical crops such as potatoes, cucumbers, hay and wheat during summer growing months, and a winter wheat crop is grown as food for providing snow goose forage habitat during their migration. Through this management, the forage crop is grown on the site during the fall and winter seasons when snow geese migrate south from Alaska and Canada. During the spring and summer seasons, the other commodity crops are cultivated on site.

Using the Cowardin classification system, there are three general types of wetlands on and immediately adjacent to the site: estuarine, palustrine, and farmed potential wetlands. The reconnaissance characterization of these wetlands are described herein.

Estuarine Wetlands

Estuarine wetlands are predominantly located south and southwest, bay-ward of the dike and within the Brown's Slough complex (Figure 1). The estuarine wetland system is comprised of estuarine intertidal emergent (E2EM), estuarine intertidal unconsolidated shore (E2US), and estuarine subtidal unconsolidated shore (E1US) Cowardin classifications.

Vegetation identified within these estuarine wetland communities is dominated by Lyngbye's sedge (*Carex lyngbyei*, OBL), creeping bentgrass (*Agrostis stolonifera*, FACW), narrow leaf cattail (*Typha angustifolia*, OBL), Pacific silverweed (*Argentina egedii*, NI), saltmarsh bulrush (*Schoenoplectus maritimus*, OBL), and baltic rush (*Juncus balticus*, FACW+).

Additionally, estuarine wetlands extend upstream and interior to the dikes a short distance along brackish areas of the channel. Based on salinity measures performed on August 17, 2010, estuarine conditions also exist upstream of the tide gats along the drainage channels and upstream into No Name Slough. No Name Slough has an estuarine intertidal unconsolidated shore (E2US) wetland system that drains the surrounding cultivated fields and uplands. This interior drainage does not appear to support a vegetated community except for a minor community along its banks comprised of herbaceous species, including reed canarygrass (*Phalaris arundinacea*, FACW).

Surficial soils catalogued on the site include tidal hydraquents, Skagit silt loam and Sumas silt loam (NRCS, 2009) (Appendix D). Soils observed within the estuarine wetlands includes a depleted dark gray silt clay loam matrix (5Y 4/1) within the upper 9 inches exhibiting dark brown (7.5YR 3/4) concentrations and oxidized root pores. Below this, soils were a very dark greenish gray (10Y 3/1) silt clay loam lacking redoximorphic features. Based on these characteristics, these wetlands appear to satisfy the depleted matrix (F3) hydric soil indicator (NRCS, 2010).

Hydrology present in these estuarine wetlands varies based on the elevation of the wetland and its resulting level of tidal inundation. Subtidal wetlands were inundated and the intertidal wetlands were saturated to the surface during our field visit.

Palustrine Wetlands

Dry Slough and Claud O' Davis Slough have developed wetland systems comprised of palustrine scrub-shrub (PSS), palustrine emergent (PEM), and palustrine unconsolidated bottom (PUB) Cowardin classifications (Figure 1).

Vegetation within these palustrine wetland communities is largely dominated by common cattail (Typha latifolia, OBL), saltweed (*Atriplex patula*, FACW), nootka rose (*Rosa nutkana*, FAC), and reed canarygrass (*Phalaris arundinacea*, FACW). Other species identified within Claud O' Davis slough includes willow species (*Salix spp.*), hardstem bulrush (*Schoenoplectus acutus, OBL*), American vetch (*Vicia americana, FAC*), and Himalayan blackberry (*Rubus armeniacus*, FACU) amongst others.

Soils observed in these wetland systems were observed at two data plot locations located near the approximate wetland/upland interface and within the centerline of Claud O' Davis Slough. In the middle of Claud O' Davis Slough, soils were characterized by black (10YR 2/1) highly organic soils lacking redoximorphic features. Soils were likely muck, although tests for percent organic material were not performed. Near the wetland edge, soils exhibited a depleted dark gray (10YR 4/1) silt loam matrix with dark brown (7.5YR 3/4) concentrations and oxidized root pores within the upper 10 inches. Below this upper layer, a middle layer of depleted dark gray (10YR 4/1) sand with dark brown (7.5YR 3/4) concentrations and oxidized root pores extended down to a depth of 15 inches. Below 15 inches, soils were comprised of very dark gray (7.5YR 3/1) sand with dark brown (7.5YR 3/4) concentrations and oxidized root pores. Based on the soil characteristics observed, soils within the center of Claud O' Davis Slough likely satisfied the presence of a histisol (A1) hydric soil indicator while those soils near the slough's edge satisfied the depleted matrix (F3) hydric soil indicator.

Hydrology observed included inundation of brackish surface water and saturated soils to the surface with ponding present in the middle of Claude O' Davis Slough.

Uplands / Farmed Potential Wetlands

Wetlands may be present in parts of the cultivated farm fields, although this determination could not be verified during our wetland reconnaissance. At the time of our site visit, the farm fields had been recently plowed and vegetation had been disturbed throughout most of the site.

During our wetland reconnaissance, an undisturbed location within the cultivated farm fields was characterized in Data Plot 2 (Figure 1). At this location, soils exhibited a thin, depleted surface layer comprised of dark grayish brown (10YR 4/2) silty clay loam matrix lacking redoximorphic features in the upper 4 inches. Below this upper layer, soils exhibited the same conditions throughout the matrix although dark yellowish brown (10YR 4/6) concentrations were present to a depth of 16 inches. Below this middle layer, soils exhibited a greenish gray (10/Y 5/1) silt loam matrix with dark yellowish brown (10YR 4/6) concentrations with oxidized root pores. Additionally, dominant vegetation included Oregon crab apple (Malus fusca, FACW) and reed canarygrass (Phalaris arundinacea, FACW). Therefore, this undisturbed pocket within the cultivated fields satisfied both the hydric soils and hydrophytic vegetation criteria.

Data Plot 5 was located within the cultivated fields, where soils exhibited a layer comprised of a depleted dark grayish brown (2.5Y 4/2) silt loam matrix with dark yellowish brown (10YR 4/6) concentrations within the upper 12 inches. Below this layer, soils exhibited a depleted dark gray (2.5Y 4/1) silt loam matrix with dark yellowish brown (10YR 4/6) concentrations. Therefore, this portion of the cultivated field satisfies the hydric soils criteria.

We recommend that future wetland delineation of the farmed potential wetland and upland boundary occurs during the early portion of the growing season to determine whether wetland hydrology is present for a minimum of 14 days. For the purposes of this wetland reconnaissance, the location and extent of farmed potential wetlands were estimated based upon aerial photograph interpolation (Figure 1). Areas that appeared to have ponding or surface saturation were identified as farmed potential wetlands. These areas are subject to change depending upon hydrologic conditions present in the early growing season.

Vegetation Assessment

Of the 24 species identified within the *Skagit Delta Vegetation Monitoring Data*, five species and mud-line were present in Transects 1 and 2 and used for on-site comparison (Figure 2)

(Appendix C). These similar species include Lyngbye's sedge (*Carex lyngbyei*, OBL), narrow leaf cattail (*Typha angustifolia*, OBL), saltmarsh bulrush (*Schoenoplectus maritimus* [formerly *Scirpus maritimus*], OBL), creeping bentgrass (*Agrostis stolonifera* [formerly *Agrostis alba*], FACW), and Pacific silverweed (*Argentina egedii* [formerly *Potentilla pacifica*], NI). These on-site populations for each of these five species largely fell within the typical elevations identified on the graph as compiled by the SRSC (Appendix C).

Given the close correlation observed between the on-site vegetation and the SRSC's data, we believe the *Skagit Delta Vegetation Monitoring Data* will provide a reliable tool for predicting vegetation composition for the restored Fir Island Farm site during the alternatives analysis. Therefore, as part of our evaluation of the setback dike project, we propose to use the *Skagit Delta Vegetation Monitoring Data* along with dike setback alternatives marsh restoration elevations, modeled tidal inundation, and salinity conditions to predict vegetation reestablishment.

CLOSURE

The findings and conclusions documented in this technical memorandum have been prepared for specific application to this project, and have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with the terms and conditions set forth in our agreement. The conclusions and recommendations presented in this technical memorandum are professional opinions based on interpretation of information currently available to us, and are made within the operational scope, budget, and schedule constraints of this project. No warranty, express or implied, is made.

Wetland boundaries identified by Shannon & Wilson are approximate and considered to be preliminary until a formal wetland delineation is completed. Validation of the wetland boundary by the regulating agency(s) provides a certification, usually written, that the wetland boundaries verified are the boundaries that will be regulated by the agency(s) until specified data or until the regulations are modified. Only the regulating agency(s) can provide this certification.

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We recommend performing full wetland delineations of the project during the engineering design and permitting phase of the project, once the preferred alternative alignments and adequate details of project components are known. The phasing of formal wetland delineation is important due to the size of the project and that full site delineation prior to determination of the project alignments is cost prohibitive.

Shannon & Wilson, Inc. has prepared the enclosed Appendix D, "Important Information About Your Wetland Delineation/Mitigation and/or Stream Classification Report" to assist you and others in understanding the use and limitations of our technical memorandum.

If you have any questions regarding the findings within this technical memorandum, please contact me at (206) 695-6699.

Sincerely,

SHANNON & WILSON, INC.

Per Johnson, P.W.S.
Biologist

PCJ:KLW/pcj

Enc: Figure 1 – Fir Island Farm Baseline Wetland Reconnaissance
Figure 2 – Fir Island Farm Vegetation Sampling Locations
Appendix A – Wetland Reconnaissance Data Sheets
Appendix B – Vegetation Transect Results
Appendix C – Skagit Delta Vegetation Monitoring Data plus Fir Island Farm Vegetation Assessment Data
Appendix D – NRCS Soil Survey Map and USFWS National Wetland Inventory Map
Appendix E – Important Information About Your Wetland Delineation/Mitigation and/or Stream Classification Report

REFERENCES

Hood, Greg W., 2009, Estuarine Habitat Restoration with Global Climate Change and Rising Sea-levels, Presentation to Northwest Straits Marine Conservation 2009 Climate Change Conference.

U.S. Army Corps of Engineers Engineer Research and Development Center, 2010, Regional supplement to the Corps of Engineers wetland delineation manual: western mountains, valleys, and coast region (version 2.0): Vicksburg, Miss., U.S. Army Corps of Engineers Engineer Research and Development Center, Final report ERDC/EL TR-10-3, 152 p.

U.S. Army Corps of Engineers (Corps), 1987, Corps of Engineers wetlands delineation manual: Vicksburg, Miss., U.S. Army Engineer Waterways Experiment Station, Technical Report Y-87-1.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS), 2009, Soil Survey, Skagit County Area, Washington (WA657), (Version 5)

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2010. Field Indicators of Hydric Soils in the United States, Version 7.0. L.M. Vasilas, G.W. Hurt, and C.V Noble (eds.) USDA, NRCS in cooperation with the National Technical Committee for Hydric Soils.

Washington State Department of Ecology (Ecology), 1997, Washington State wetlands identification and delineation manual: Olympia, Wash., Washington State Department of Ecology, Publication #96-94.

Legend

Data Plot

Farmed Potential Wetland

Cowardin Classifications

Palustrine Unconsolidated Bottom (PUB)

Palustrine Emergent (PEM)

Palustrine Scrub-Shrub (PSS)

Estuarine Subtidal Unconsolidated Shore (E1US)

Estuarine Intertidal Unconsolidated Shore (E2US)

Estuarine Intertidal Emergent (E2EM)

NOTE

Wetland boundaries are approximated through information gathered from an on-site field reconnaissance, aerial photograph interpolation, and light detection and ranging (LiDAR) elevation data. A formal wetland delineation is recommended to support permit documents.

N W E S

0 250 500 1,000 Feet

Fir Island Farm Restoration
Skagit County, Washington

FIR ISLAND FARM BASELINE WETLAND RECONNAISSANCE

December 2010 21-1-12318-001

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FIG. 1

Filename: T:\Project\21-2\16470_Fir_Island\AV_mxd\Wetland_Delineation.mxd Date: 12/01/10 BEO

Elevation Key (NAVD 88)

- less than 3 ft
- 3 - 4 ft
- 4 - 5 ft
- 5 - 6 ft
- 6 - 7 ft
- 7 - 8 ft
- 8 - 9 ft
- 9 - 10 ft
- 10 - 11 ft
- 11 - 12 ft
- 12 - 13 ft
- 13 - 14 ft
- 14+ ft

Vegetation Sampling Plot Elevations

T1P1	8.40	T2P1	4.57	T3P1	2.40
T1P2	8.36	T2P2	5.47	T3P2	4.81
T1P3	2.84	T2P3	6.91	T3P3	3.98
T1P4	6.42	T2P4	7.00	T3P4	6.71
T1P5	7.86	T2P5	7.09	T3P5	5.69
T1P6	8.55	T2P6	8.65	T3P6	6.10

Note: Elevations are given in North American Vertical Datum of 1988 (NAVD88)

N W E S

0 50 100 150 300 Feet

Fir Island Farm Restoration
Skagit County, Washington

FIR ISLAND FARM VEGETATION SAMPLING LOCATIONS

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FIG. 2

Filename: T:\Project\21-2\16470_Fir_Island\AV_mxd\VegetationSampling.mxd Date: 12/01/10 beo

APPENDIX A

WETLAND RECONNAISSANCE DATA SHEETS

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: FIR ISLAND FARM RESTORATION SITE City/County: SKAGIT COUNTY Sampling Date: 8-25-10

Applicant/Owner: WDFW State: WA Sampling Point: Data Plot 2

Investigator(s): PER JOHNSON Section, Township, Range: SEC. 22, TWN. 33N, RNG. 3E, W.M.

Landform (hillslope, terrace, etc.): ____ Local relief (concave, convex, none): ____ Slope (%): ____

Subregion (LRR): LRR 'A' Lat: 48.331293° Long: -122.411180° Datum: ____

Soil Map Unit Name: Skagit silt loam (123) NWI classification: NONE

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? NO Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? NO (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: Data plot, located in undisturbed upland location SW of Claud O'Dan's Slough and adjacent to an abandoned trailer.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	N/A = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Malus fusca	30%	Y	FACW
2.			
3.			
4.			
5.			
	30% = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Phalaris arundinacea	65%	Y	FACW
2. Agrostis stolonifera	15%	N	FACW
3. Lolium perenne	10%	N	FACU
4. Taraxacum officinale	10%	N	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90% = Total Cover		

Woody Vine Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Rubus armeniacus	15%	N	FACW
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 10%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: Data Plot 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4"	10YR4/2	100%	N/A	—			silty clay loam	
4-16"	10YR4/2	85%	10YR4/6	15%	C	M	silty clay loam	
16+"	10YR5/1	65%	10YR4/6	35%	C	M/PL	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 16" bgs

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: FIR ISLAND FARM RESTORATION SITE City/County: SKAGIT COUNTY Sampling Date: 8-25-10

Applicant/Owner: WDFW State: WA Sampling Point: Data Plot 1

Investigator(s): PER JOHNSON Section, Township, Range: SEC. 22, TWN. 32N, RNG. 3E, W.M.

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): LRR A Lat: 48.333185° Long: -122.414814° Datum: _____

Soil Map Unit Name: Hydraquents, tidal (72) NWI classification: E2EMN

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? NO Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? NO (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Located in Estuarine high-marsh. Also co-located at Vegetation Transect 1, Plot 1.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	N/A = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. N/A			
2.			
3.			
4.			
5.			
	N/A = Total Cover		
Herb Stratum (Plot size: 5')			
1. Agrostis stolonifera	65%	Y	FACW
2. Argentina egedii	20%	Y	OBL
3. Carex lyngbyei	15%	N	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: 5')			
1. N/A			
2.			
	N/A = Total Cover		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: Data Plot 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-9"	5Y 4/1	65%	7.5YR 3/4	35%	C	M/PL	silt clay loam	
9+"	10Y 3/1	100%					silt clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: N/A

Depth (inches): N/A

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ✓ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): low tide

Water Table Present? Yes ✓ No ___ Depth (inches): 14" bgs

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

tide data available.

Remarks:

located in tidally influenced zone.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: FIR ISLAND FARM RESTORATION SITE City/County: SKAGIT COUNTY Sampling Date: 8/25/10

Applicant/Owner: WDFW State: WA Sampling Point: DATA Plot 3

Investigator(s): PER JOHNSON Section, Township, Range: SEC. 22, TWN. 33N, RNG. 3E, W.M.

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): LRR 'A' Lat: 48.331587° Long: -122.410347° Datum: _____

Soil Map Unit Name: Skagit silt loam (523) NWI classification: NONE

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? NO Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? NO (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:
Located near the wetland / upland edge of Grand O' Dam's Slough.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	N/A = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. Malus fusca	15%	Y	FACW
2.			
3.			
4.			
5.			
	15% = Total Cover		
Herb Stratum (Plot size: 5')			
1. Phalaris arundinacea	80%	Y	FACW
2. Atriplex patula	15%	N	FACW
3. Vicia americana	5%	N	FAC
4. Cirsium spp.	T	N	
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100% = Total Cover		
Woody Vine Stratum (Plot size: 5')			
1. N/A			
2.			
	N/A = Total Cover		

% Bare Ground in Herb Stratum 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: Data Plot 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10"	10YR4/1	80%	7.5YR3/4	20%	C	M/PL	Silt loam	
10-15"	10YR4/1	60%	7.5YR3/4	40%	C	M/PL	Sand	
15+	10YR3/1	60%	7.5YR3/4	40%	C	M/PL	Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: N/A

Depth (inches): N/A

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: FIR ISLAND FARM RESTORATION SITE City/County: SKAGIT COUNTY Sampling Date: 8/31/10

Applicant/Owner: WDFW State: WA Sampling Point: DATA PLOT 4

Investigator(s): PER JOHNSON Section, Township, Range: SEC. 22, TWN. 33N RNG. 3E, W.M.

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): LRR 'A' Lat: 48.332307° Long: -122.407135° Datum: _____

Soil Map Unit Name: Skagit silt loam (123) NWI classification: NONE

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? NO Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? NO (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: Located in centerline of Claud O'Davis Slough. Co-located at Transect 3, plot 1.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	N/A = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. N/A			
2.			
3.			
4.			
5.			
	N/A = Total Cover		
Herb Stratum (Plot size: 5')			
1. Typha latifolia	30%	Y	OBL
2. Atriplex patula	30%	Y	FACW
3. Phalaris arundinacea	T	N	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60% = Total Cover		
Woody Vine Stratum (Plot size: 5')			
1. N/A			
2.			
	N/A = Total Cover		

% Bare Ground in Herb Stratum 40%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: Data Plot 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12+	10YR 2/1	100%	N/A	—			highly organic (muck)	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ✓ Histosol (A1) (muck)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Sulfide (A4)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- __ 2 cm Muck (A10)
- __ Red Parent Material (TF2)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks:
Muck assumed to meet 12-18+% organic weight although testing was not performed.
Stinky egg smell present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1) (Near Data plot)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Surface Soil Cracks (B6)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- __ Salt Crust (B11)
- __ Aquatic Invertebrates (B13)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres along Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron Reduction in Tilled Soils (C6)
- __ Stunted or Stressed Plants (D1) (**LRR A**)
- __ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ✓ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ✓ Drainage Patterns (B10)
- __ Dry-Season Water Table (C2)
- __ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ FAC-Neutral Test (D5)
- __ Raised Ant Mounds (D6) (**LRR A**)
- __ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): Near Data Plot

Water Table Present? Yes ✓ No ____ Depth (inches): Surface after 5-min.

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): surface

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: FIR ISLAND FARM RESTORATION SITE City/County: SKAGIT COUNTY Sampling Date: 8.31.10

Applicant/Owner: WDFW State: WA Sampling Point: DATA Plot 5

Investigator(s): PER JOHNSON Section, Township, Range: SEC. 22, TWN. 33N, RNG. 3E, W.M.

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): LRR 'A' Lat: 48.332651° Long: -122.407052° Datum: _____

Soil Map Unit Name: Skagit silt loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation ✓, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? NO (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks: located in cultivated field west of C and O'Dan's slough. Co-located at Transect 3, Plot 6.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
	N/A = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
3.			
4.			
5.			
	N/A = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. winter wheat crop	45%	Y	NI
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	45% = Total Cover		

Woody Vine Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. N/A			
2.			
	N/A = Total Cover		

% Bare Ground in Herb Stratum 35%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: Data Plot 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12"	2.5Y 4/1	95%	10YR 4/6	5%	C	M	silt loam	
12+"	2.5Y 4/1	65%	10YR 4/6	35%	C	M/PL	silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: N/A

Depth (inches): N/A

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX B

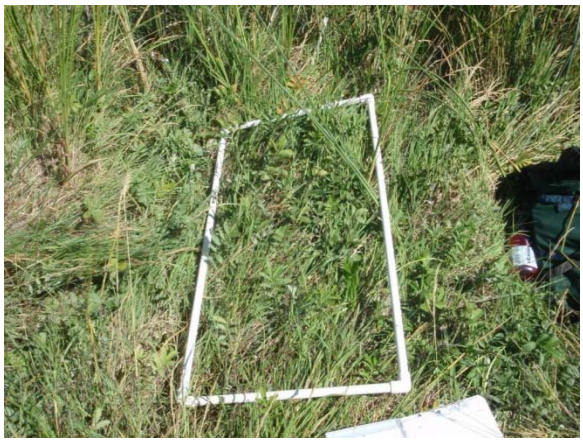
VEGETATION TRANSECT RESULTS

FIR ISLAND FARM VEGETATION ASSESSMENT DATA

Transect 1 – Plot 1 (NAVD88 Elevation 8.40)

Scientific Name	Common Name	Percent Cover
Agrostis stolonifera	Creeping bentgrass	65%
Argentina egedii	Pacific silverweed	20%
Carex lyngbyei	Lyngbye's sedge	15%

Transect 1 – Plot 2 (NAVD88 Elevation 8.36)



Scientific Name	Common Name	Percent Cover
Argentina egedii	Pacific silverweed	35%
Agrostis stolonifera	Creeping bentgrass	30%
Juncus balticus	Baltic rush	20%
Schoenoplectus maritimus	Saltmarsh bulrush	15%

Transect 1 – Plot 3 (NAVD88 Elevation 2.84)

Scientific Name	Common Name	Percent Cover
Ruppia maritima	Widgeon grass	20%

Transect 1 – Plot 4 (NAVD88 Elevation 6.42)

Scientific Name	Common Name	Percent Cover
Agrostis stolonifera	Creeping bentgrass	45%
Schoenoplectus maritimus	Saltmarsh bulrush	35%
Carex lyngbyei	Lyngbye's sedge	20%

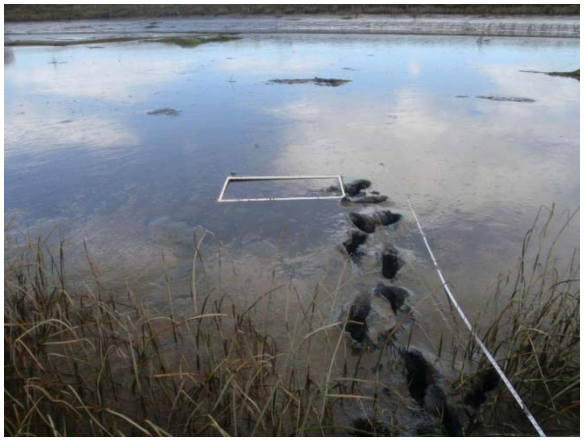
Transect 1 – Plot 5 (NAVD88 Elevation 7.86)

Scientific Name	Common Name	Percent Cover
Carex lyngbyei	Lyngbye's sedge	60%
Agrostis stolonifera	Creeping bentgrass	40%

Transect 1 – Plot 6 (NAVD88 Elevation 8.55)

Scientific Name	Common Name	Percent Cover
Carex lyngbyei	Lyngbye's sedge	65%
Symphyotrichum subspicatum	Douglas aster	25%

Transect 2 – Plot 1 (NAVD88 Elevation 4.57)



Scientific Name	Common Name	Percent Cover
None	None	N/A

Transect 2 – Plot 2 (NAVD88 Elevation 5.47)

Scientific Name	Common Name	Percent Cover
Carex lyngbyei	Lyngbye's sedge	80%

Transect 2 – Plot 3 (NAVD88 Elevation 6.91)

Scientific Name	Common Name	Percent Cover
Carex lyngbyei	Lyngbye's sedge	70%
Agrostis stolonifera	Creeping bentgrass	28%
Cotula coronopifolia	Common brassbuttons	2%

Transect 2 – Plot 4 (NAVD88 Elevation 7.00)

No photograph due to camera malfunction.

Scientific Name	Common Name	Percent Cover
Carex lyngbyei	Lyngbye's sedge	50%
Typha angustifolia	Narrow leaf cattail	40%

Transect 2 – Plot 5 (NAVD88 Elevation 7.09)

No photograph due to camera malfunction.

Scientific Name	Common Name	Percent Cover
Typha angustifolia	Narrow leaf cattail	45%
Carex lyngbyei	Lyngbye's sedge	40%
Schoenoplectus maritimus	Saltmarsh bulrush	15%

Transect 2 – Plot 6 (NAVD88 Elevation 8.65)

No photograph due to camera malfunction.

Scientific Name	Common Name	Percent Cover
Carex lyngbyei	Lyngbye's sedge	45%
Argentina egedii	Pacific silverweed	35%
Symphyotrichum subspicatum	Douglas aster	5%
Cirsium arvense	Canada thistle	5%

Transect 3 – Plot 1 (NAVD88 Elevation 2.40)

Scientific Name	Common Name	Percent Cover
Typha latifolia	Common cattail	30%
Atriplex patula	Saltweed	30%

Transect 3 – Plot 2 (NAVD88 Elevation 4.81)

Scientific Name	Common Name	Percent Cover
Rosa nutkana	Nootka rose	100%
Rubus armeniacus	Himalayan blackberry	5%
Epilobium watsonii	Watson's willowherb	3%

Transect 3 – Plot 3 (NAVD88 Elevation 3.98)

Scientific Name	Common Name	Percent Cover
Phalaris arundinacea	Reed canarygrass	100%

Transect 3 – Plot 4 (NAVD88 Elevation 6.71)

Scientific Name	Common Name	Percent Cover
Phalaris arundinacea	Reed canarygrass	100%

Transect 3 – Plot 5 (NAVD88 Elevation 5.69)

Scientific Name	Common Name	Percent Cover
Unknown	Winter wheat (crop)	30%

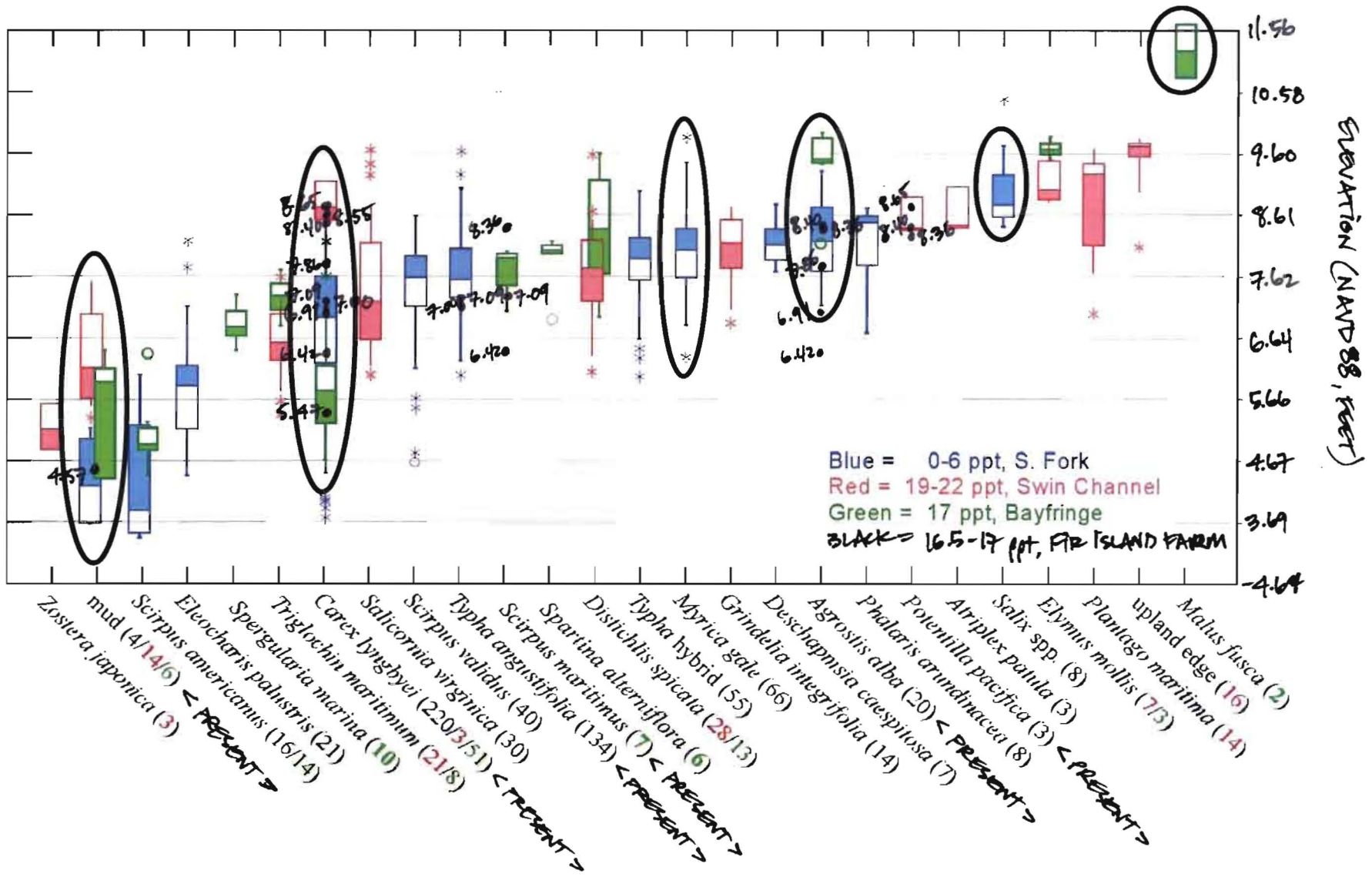
Transect 3 – Plot 6 (NAVD88 Elevation 6.10)

Scientific Name	Common Name	Percent Cover
Unknown	Winter wheat (crop)	40%

APPENDIX C

SKAGIT DELTA VEGETATION MONITORING DATA
PLUS FIR ISLAND FARM VEGETATION ASSESSMENT DATA

SKAGIT DELTA VEGETATION MONITORING DATA



SOURCE: HOOD, GREG. SKAGIT RIVER SYSTEM COOPERATIVE. ESTUARINE HABITAT RESTORATION WITH GLOBAL CLIMATE CHANGE AND RISING SEA-LEVELS PRESENTATION, SLIDE 13 OF 20. LA CONNER, WASHINGTON

NOTES: CONVERTED FROM ELEVATION DATUM NGVD 29 TO DATUM NAVD 88 AND FROM METERS TO FEET.

APPENDIX D

NRCS SOILS CLASSIFICATION & NWI MAPPING INFORMATION

Soil Map—Skagit County Area, Washington
(Fir Island Soils Map)

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Gully

Short Steep Slope

Other

Political Features

Cities

PLSS Township and Range

PLSS Section

Water Features

Oceans

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

MAP INFORMATION

Map Scale: 1:10,800 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 10N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Skagit County Area, Washington
Survey Area Data: Version 6, Sep 22, 2009

Date(s) aerial images were photographed: 7/21/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Skagit County Area, Washington (WA657)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
72	Hydraquents, tidal	158.3	26.2%
123	Skagit silt loam	405.5	67.0%
136	Sumas silt loam	21.6	3.6%
142	Tacoma silt loam, drained	9.3	1.5%
166	Water	4.6	0.8%
Subtotals for Soil Survey Area		**599.3**	**99.1%**
Totals for Area of Interest		**604.9**	**100.0%**

U.S. Fish and Wildlife Service

National Wetlands Inventory

Fir Island Farm

Sep 27, 2010

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deetwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Status

- Digital
- Scan
- Non-Digital
- No Data

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

User Remarks:

NWI

APPENDIX E

IMPORTANT INFORMATION ABOUT YOUR WETLAND DELINEATION/MITIGATION AND/OR STREAM CLASSIFICATION REPORT

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Attachment to and part of Report 21-1-12318-001

Date: November 19, 2010
To: Mr. Brian Williams
Washington Department of Fish and Wildlife

IMPORTANT INFORMATION ABOUT YOUR WETLAND DELINEATION/MITIGATION AND/OR STREAM CLASSIFICATION REPORT

A WETLAND/STREAM REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

Wetland delineation/mitigation and stream classification reports are based on a unique set of project-specific factors. These typically include the general nature of the project and property involved, its size, and its configuration; historical use and practice; the location of the project on the site and its orientation; and the level of additional risk the client assumed by virtue of limitations imposed upon the exploratory program. The jurisdiction of any particular wetland/stream is determined by the regulatory authority(s) issuing the permit(s). As a result, one or more agencies will have jurisdiction over a particular wetland or stream with sometimes confusing regulations. It is necessary to involve a consultant who understands which agency(s) has jurisdiction over a particular wetland/stream and what the agency(s) permitting requirements are for that wetland/stream. To help reduce or avoid potential costly problems, have the consultant determine how any factors or regulations (which can change subsequent to the report) may affect the recommendations.

Unless your consultant indicates otherwise, your report should not be used:

- If the size or configuration of the proposed project is altered.
- If the location or orientation of the proposed project is modified.
- If there is a change of ownership.
- For application to an adjacent site.
- For construction at an adjacent site or on site.
- Following floods, earthquakes, or other acts of nature.

Wetland/stream consultants cannot accept responsibility for problems that may develop if they are not consulted after factors considered in their reports have changed. Therefore, it is incumbent upon you to notify your consultant of any factors that may have changed prior to submission of our final report.

Wetland boundaries identified and stream classifications made by Shannon & Wilson are considered preliminary until validated by the U.S. Army Corps of Engineers (Corps) and/or the local jurisdictional agency. Validation by the regulating agency(s) provides a certification, usually written, that the wetland boundaries verified are the boundaries that will be regulated by the agency(s) until a specified date, or until the regulations are modified, and that the stream has been properly classified. Only the regulating agency(s) can provide this certification.

MOST WETLAND/STREAM "FINDINGS" ARE PROFESSIONAL ESTIMATES.

Site exploration identifies wetland/stream conditions at only those points where samples are taken and when they are taken, but the physical means of obtaining data preclude the determination of precise conditions. Consequently, the information obtained is intended to be sufficiently accurate for design, but is subject to interpretation. Additionally, data derived through sampling and subsequent laboratory testing are extrapolated by the consultant who then renders an opinion about overall conditions, the likely reaction to proposed construction activity, and/or appropriate design. Even under optimal circumstances, actual conditions may differ from those thought to exist because no consultant, no matter how qualified, and no exploration program, no matter how comprehensive, can reveal what is hidden by earth, rock, and time. Nothing can be done to prevent the unanticipated, but steps can be taken to help reduce their impacts. For this reason, most experienced owners retain their consultants through the construction or wetland mitigation/stream classification stage to identify variances, to conduct additional evaluations that may be needed, and to recommend solutions to problems encountered on site.

WETLAND/STREAM CONDITIONS CAN CHANGE.

Since natural systems are dynamic systems affected by both natural processes and human activities, changes in wetland boundaries and stream conditions may be expected. Therefore, delineated wetland boundaries and stream classifications cannot remain valid for an indefinite period of time. The Corps typically recognizes the validity of wetland delineations for a period of five years after completion. Some city and county agencies recognize the validity of wetland delineations for a period of two years. If a period of years have passed since the wetland/stream report was completed, the owner is advised to have the consultant reexamine the wetland/stream to determine if the classification is still accurate.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or water fluctuations may also affect conditions and, thus, the continuing adequacy of the wetland/stream report. The consultant should be kept apprised of any such events and should be consulted to determine if additional evaluation is necessary.

THE WETLAND/STREAM REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when plans are developed based on misinterpretation of a wetland/stream report. To help avoid these problems, the consultant should be retained to work with other appropriate professionals to explain relevant wetland, stream, geological, and other findings, and to review the adequacy of plans and specifications relative to these issues.

DATA FORMS SHOULD NOT BE SEPARATED FROM THE REPORT.

Final data forms are developed by the consultant based on interpretation of field sheets (assembled by site personnel) and laboratory evaluation of field samples. Only final data forms customarily are included in a report. These data forms should not, under any circumstances, be drawn for inclusion in other drawings because drafters may commit errors or omissions in the transfer process. Although photographic reproduction eliminates this problem, it does nothing to reduce the possibility of misinterpreting the forms. When this occurs, delays, disputes, and unanticipated costs are frequently the result.

To reduce the likelihood of data form misinterpretation, contractors, engineers, and planners should be given ready access to the complete report. Those who do not provide such access may proceed under the mistaken impression that simply disclaiming responsibility for the accuracy of information always insulates them from attendant liability. Providing the best available information to contractors, engineers, and planners helps prevent costly problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because a wetland delineation/stream classification is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in written transmittals. These are not exculpatory clauses designed to foist the consultant's liabilities onto someone else; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

THERE MAY BE OTHER STEPS YOU CAN TAKE TO REDUCE RISK.

Your consultant will be pleased to discuss other techniques or designs that can be employed to mitigate the risk of delays and to provide a variety of alternatives that may be beneficial to your project.

Contact your consultant for further information.