UDOT

Utah Department of Transportation

Wetland Functional Assessment Method

Prepared for Utah Department of Transportation

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Prepared by
Principle Investigator
Craig Johnson

Research Assistants
Ryan Pitts
Lori Porreca

Computer Graphics
David Frey

Department of Landscape Architecture
and Environmental Planning
Utah State University
4005 Old Main Hill
Logan, UT 84322-4005

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Lars Anderson	UDOT, Landscape Architect, UT.
Robert Anderson	UDOT, Engineer, UT.
Jared Barton	UDOT, Landscape Architect, UT.
Dennis Blankhorn	Wetland Specialist, COE, UT.
Amy Defreese	Wetland Specialist, COE, UT.
John Higgins	UDOT, Engineer, UT.
Terry Johnson	UDOT, Landscape Architect, UT.
Nancy Kang	Wetland Specialist, COE, UT.
Nancy Keate	UDWR, Wetland Biologist, UT.
Blaine Leonard	UDOT, Research Coordinator, UT.
Robert Moses	UDOT, Landscape Architect, UT.
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Paul West	UDOT, Biologist, UT.

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INTRODUCTION

In 2003, the Utah Department of Transportation (UDOT) and an advisory team that included representatives from UDOT, Utah Division of Wildlife Resources (UDWR), United States Fish and Wildlife Service (USFWS), and the Army Corps of Engineers (COE), developed a wetland evaluation method to be applied to highway projects in Utah. The method is based extensively on the Montana Department of Transportation's (MDT), *Montana Wetland Assessment Method* (1999). The MDT method has been extensively field tested and reviewed favorably by wetland professionals. Changes have been made in the MDT method to accommodate Utah wetland types, wildlife and other Utah-specific issues. In addition water quality, connectivity and stream type classifications have been added as factors or functions to be included in the assessment.

Future plans include field-testing the UDOT method for one season, incorporating several wetlands of each wetland type. Comparisons will be made between evaluation results prepared by several different evaluators to identify whether there are inconsistencies between evaluators. Where appropriate, changes will be made to the 2005 edition of the UDOT method. These instructions and field evaluation forms constitute the 2005 version of the UDOT Wetland Functional Assessment Method.

This assessment method was designed to address highways and other lineal projects. **The method is intended to evaluate wetland functions and values. It is not intended for use to delineate jurisdictional wetland boundaries. Wetland delineation should occur prior to functional assessment using the 1987 COE wetland delineation manual or other COE approved methods.**

The objective of the UDOT method is to provide a science-based, rapid, economical and repeatable wetland evaluation method applicable to Utah that:

- meets the needs of local regulatory agencies for quantifying jurisdictional wetland functions and values inherent in the majority of proposed wetland disturbance-related projects in the state, particularly highway projects.
- minimizes subjectivity and variability between evaluators.
- provides a means of assigning wetlands overall ratings to facilitate avoidance priorities (avoiding where feasible wetlands of highest functional value).
- uses some of the principles of the hydro geomorphic (HGM) assessment method in the evaluation form as an interim method if and until HGM is implemented in Utah and as an alternative once HGM is implemented. At the time of writing this handbook, no HGM guidebook for assessing the function of Utah's wetlands has been completed but there is an assessment protocol.

NOTE:

Section 404 of the Clean Water Act defines a playa as a Water of the U.S., not a wetland. Specifically, playas are regulated by the Corps under the provisions of the Code of Federal Regulations 33 CFR 328.3 (a) implementing Section 404 of the Clean Water Act (CWA). Federal Register 33 CFR 328.3 [a] states "The term 'waters of the United States' means (1) all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (2) all interstate waters including interstate wetlands; (3) all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce…; (4) all impoundment of waters otherwise defined as waters of the United States under the definition; (5) tributaries of waters identified in [items] (1)-(4) [of this definition]; (6) the territorial seas; (7) wetlands adjacent to waters (other than waters that are themselves wetlands) identified in [items] (1)-(6) [of this definition]". Because playas are not wetlands, the Corps does not use the 1987 Wetland Delineation Manual to delineate playas.

For the purposes of the UDOT Wetland Functional Assessment Method, playas are included as wetlands. However, for the purposes of the wetland delineations, playas are not to be delineated according to the 1987 Wetland Delineation Manual because they are not wetlands, but waters of the U.S.

METHODS

The methods presented in this assessment handbook are largely based on the MDT method prepared by J. Berglund, Western Eco Tech (1998). Potential revisions to the MDT method to address Utah-specific conditions were initially discussed at workshops conducted by UDOT and facilitated by Larry Urban, MDT. Meeting Participants included UDOT biologists, engineers, landscape architects and research personnel, UDWR wetland ecologists, and COE wetland specialists. A draft form was presented in 2004 to the Utah Interagency Group with representatives from UDOT, UDWR, COE, USFWS, the Environmental Protection Agency (EPA), private consultants and the Natural Resources Conservation Service (NRCS). The Utah Natural Heritage Program (UNHP) and the Utah Geological Survey were also consulted. The MDT method, upon which this UDOT method is based, was revised in the fall of 2004 based on comments received, meeting results and a literature review.

Primary literature sources referenced in preparation of the 1996 and 1999 drafts of the MDT wetlands assessment method include:

- Regional Guidebook for Assessing the Functions of Intermountain Prairie Pothole Wetlands in the Northern Rocky Mountains (Hauer et al. 1999)
- A Comprehensive Review of Wetland Assessment Procedures (Bartoldus 1999)
- Oregon Freshwater Wetland Assessment Methodology (Roth et al. 1993)
- Minnesota Routine Assessment Method for Evaluating Wetland Functions (Minnesota Interagency Wetland Group 1996)
- Draft Hydro geomorphic Assessment of Riverine Wetlands (Hauer and Cook 1996)
- An Approach for Assessing Wetland Function Using Hydro geomorphic Classification, Reference Wetlands, and Functional Indices (Smith et al. 1995)
- Wetland Evaluation Technique (Adamus et al. 1991)
- The Highway Methodology Workbook (COE 1995)
- Washington State Wetlands Rating System for Eastern Washington (Washington State Department of Ecology [WDE] 1991)
- Washington State Wetlands Rating System – Western Washington (WDE 1993)

FUNCTIONS AND VALUES

Wetland functions are inherent self-sustaining properties of a wetland ecosystem; they exist in the absence of associated valleys and relate to ecological properties. Flood attenuation for riverine wetlands, is an example of a wetland function. The value of a given wetland function, or combination of functions is based on society's assessment of the worth, importance or quality attributed to those functions. The COE Regulatory Division must consider impacts to wetland functions, in this case highway-related impacts, when evaluating section 404b of the Clean Water Act permit applications. The following functions and values are evaluated in the UDOT method.

- Functions
  - Biological
    - Habitat
      - Level of disturbance
      - Plant community composition
      - Federally listed or proposed Threatened or Endangered Plants or Animals or Plants or Animals rated S1 by the UNHP
      - Plants or animals rated S2, or S3 by the UNHP
      - General wildlife species
      - General fish/aquatic Species
      - Amphibians
  - Hydrological
    - Flood attenuation
    - Short and long-term water storage
    - Sediment/nutrient/toxicant retention and removal
    - Sediment/shoreline stabilization
- Values
  - Visual quality
  - Recreation/education

All functional assessment fields are included on the evaluation form for each wetland classification type. However, for some wetland types, variables within an assessment field have been added, deleted or modified. These changes reflect the inherent hydrological, biological and physical characteristics of that particular wetland type. For example, sediment/shoreline stabilization, as a variable was deleted for depressional wetlands. Depressional wetlands are typically seasonal, semi-permanent or ephemeral and are seldom subject to wave action.

USERS GUIDE

The evaluation form is similar to a dichotomous key.

STEP A

The evaluator is first asked several questions that are related to project site geography; placing the site in an ecoregion, watershed and county. Next, the evaluator determines the size and configuration of the assessment area (AA) and the expanded assessment area (EAA), using the criteria detailed in question 10 on the evaluation form and as delineated in Appendix B, Sample Assessment Areas.

STEP B

The evaluator is asked to determine whether or not the AA is documented primary habitat for species listed as threatened or endangered (T&E), as identified under the Endangered Species Act (ESA) and State listed S1 species. During the application process, if a T&E species or its habitat is identified within the project area, then the Corps may initiate Section 7 consultation with United States Fish and Wildlife Services (FWS). At that time, the FWS will either conduct a biological evaluation or a biological opinion, depending on
whether a "take" may occur. The majority of the time, the consultation will prevent a "take", as long as the applicant follows certain conditions set by the FWS. Therefore, the Corps and the applicant will continue processing the application according to Corps regulations and the FWS conditions. Likewise the presence of a State listed S1 species requires consultation with UDWR and may require an addition biological evaluation on the AA.

STEP C

The evaluator is then asked to determine which one of the five Utah Wetland Classification types it belongs to or whether it meets the definition of a roadside ditch wetland. The evaluator can refer to Appendices D and E, which include wetland profiles, photographs of each wetland classification type and a list of wetland plant species typically associated with each wetland type. A definition of a non-jurisdictional roadside ditch wetland is included in the Glossary of Terms.

STEP D

If the wetland is not primary habitat for T&E species, the evaluator proceeds with the functional assessment. Return to the wetland classification type assigned to the AA in Step C. If the AA has been delineated as a non-jurisdictional roadside ditch wetland, it is automatically classified as a Category IV wetland. If the wetland meets the definition of a non-jurisdictional roadside ditch, the wetland is classified Category 4, no further evaluation is necessary. However, all necessary papers must be submitted to COE for approval and issuance of a permit prior to impacting the wetland.

STEP E

If the wetland is a jurisdictional wetland it is one of five naturally occurring types present in Utah landscapes.

Wetland Type Section Color

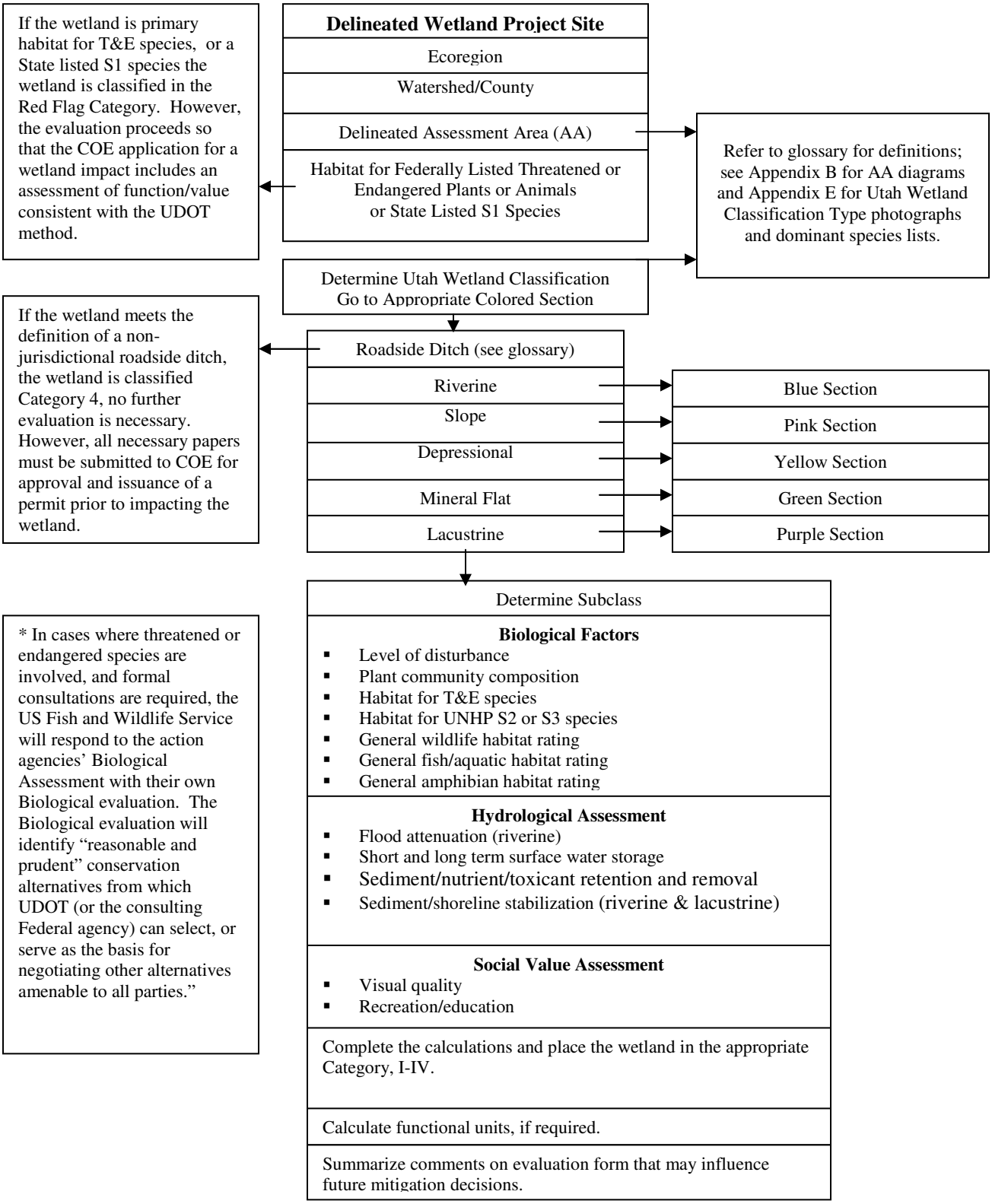
- ❑ Riverine — Blue
- ❑ Slope — Pink
- ❑ Depressional — Yellow
- ❑ Mineral Flat — Green
- ❑ Lacustrine — Purple

Proceed to the colored section for the wetland classification type assigned to the AA.

STEP F

Identify the wetland subclass (if applicable) and complete the colored forms following the instructions.

WETLAND ASSESSMENT METHOD PROCESS DIAGRAM



INSTRUCTIONS AND DISCUSSION

This section of the report provides discussion and instructions for completing each of the fields on the form.

The COE Regulatory Division must consider impacts to wetland functions and values when evaluating Section 404 permit applications. Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society, and relate to ecological significance without regard to subjective human values (COE 1995). Groundwater discharge is an example of a wetland function. Values are benefits that derive from either one or more functions and the physical characteristics associated with a wetland (COE 1995). The value of a given wetland function, or combination of functions, is based on human judgment of the worth, merit, importance or quality attributed to those functions.

The following functions and values are evaluated by this method:

Functions
- Level of disturbance
- Plant community composition
- Habitat for federally listed or proposed threatened or endangered plants or animals or habitat or plants or animals rated S1 by the UNHP
- Habitat for plants or animals rated S2 or S3 by the UNHP
- General wildlife habitat
- General fish/aquatic habitat
- General amphibian habitat
- Flood attenuation (riverine)
- Short and long-term surface water storage
- Sediment/ nutrient/ toxicant retention and removal
- Sediment/ shoreline stabilization (riverine and lacustrine)

Values
- Visual quality
- Recreation/ education potential

The form assesses and assigns each of the eleven functions ratings of "low", "moderate" or "high") and scores each on a scale of .1 (lowest) to 1 (highest) "functional points." The scoring scale for each function is similar to that of HGM, although not all of the variables considered by HGM with respect to a given function were included in this method. The two value assessments (visual quality and recreation/educational potential) are not included in the scoring.

Functional points are summed on the data form and expressed as a percentage of the possible total; functions that do not apply to a given wetland are overlaid with a grey tone on the evaluation form and are assigned a rank of "NA" and are **not included** in point totals. This percentage is then used in conjunction with other criteria to provide an overall wetland ranking into one of five categories. The Red Flag Category is for AAs with documented presence of TorE plants or animals or state listed S1 species or its habitat. Category I is the highest overall ranking a wetland can receive, followed by Category II, Category III and Category IV. Functional points can be multiplied by the total existing or expected (post-project) acreage in the assessment area (AA) to determine the total "functional units" existing, expected to be lost, or expected to be gained at a given site. Wetland categories and functional units are further discussed in the latter portion of this section.

When completing questions 15a through 15k (the functions assessment portion of the form), if it is the evaluator's best professional opinion that a rating for a particular function is inadequately represented on the form due to specific site conditions, it is appropriate to override the calculated value and note the justification in the comment space provided. It is important to note, however, that this should be treated as the exception rather than the rule.

Generally, it is appropriate to assess wetlands, or assessment areas (AA), individually on separate data forms. However, it is also appropriate to address several AAs on one data form if the AAs are similar with respect to size, compositions, exposure to disturbance, and other features. AAs that differ enough from one another such that they would result in different ratings for various functions and values should be assessed on separate data forms.

Several attributes throughout the form are rated by working through matrices. Variables used within these matrices are addressed in a dichotomous, "top to bottom" fashion, resulting in an assignment of functional points and a rating for each evaluated function.

THE ASSESSMENT FORM

1. Project Name
Enter the appropriate project name.

2. Project Number
Enter the appropriate project number, if applicable.

3. USCOE Permit Number and Project Pin Number: Enter the appropriate control numbers, if applicable.

4. Evaluation Date
Enter the date(s) that the field evaluation was conducted.

5. Evaluating Agency
Fill in the appropriate agency (for UDOT projects, this will generally be "UDOT")

6. Evaluator(s)
Enter the names and/or affiliation of the personnel conducting the evaluation.

7. Purpose of Evaluation
Check the appropriate project category.

8. Wetland/ Site Number(s)
Enter the wetland identification number(s) e.g., Fish Creek), if applicable.

9. Wetland Location(s)
Enter the appropriate ecoregion, watershed, county, legal description, stationing or mileposts and the eight-digit watershed descriptor (U.S. Department of the Interior, U.S. Geological Survey 2002, http://ut.water.usgs.gov/gis/hub.html), global positioning satellite (GPS) reference number (if available, not required), and other desired location information for the evaluated wetlands.

10. Wetland Size
Enter the estimated or measured (not required) size of the entire wetland that includes the assessment area (AA). If the AA is delineated such that the entire wetland is included, the responses to 8 and 9 will be the same. If evaluating more than one AA on a single data form, enter the average wetland size or the range of wetland sizes.

11. Assessment Area (AA)
Indicate the estimated or measured (not required) acreage within the boundaries of the AA using the guidance below. If splitting a wetland into more than one AA, indicate the AA boundaries on the wetland delineation map. Wetlands bisected by roads are considered as a single AA. If evaluating more than one AA another data form will be needed. Several example Assessment Areas relative to highway projects are provided in Appendix B.

The AA includes only the portion of delineated jurisdictional wetland that is within a proposed project zone, right-of-way, construction easement, permit area, known detour area, etc.

11a Expanded Assessment Area (EAA)
This area is determined by extending all boundaries of the AA (the portion of the delineated jurisdictional wetland that is within a proposed project zone, right-of-way, construction easement, permit area, known detour area, etc. to a distance of 600 feet. Wetlands with open water that have not been delineated as jurisdictional wetland, apply A or B to determine the EAA.

A contiguous up and downstream from the project to physical points of significant hydrologic change (natural [geomorphic] or man made constrictions or expansions, points where the gradient changes rapidly, points of significant inflow) [e.g., tributaries] or places where other factors limit hydrologic interaction *or*

B contiguous up and downstream from the project to a maximum distance of 600 feet if no points of significant hydrologic change (including termination of the wetland) occur within this radius.

This "expanded" area is used to evaluate contextual factors such as level of disturbance that may affect wetland function. For riverine wetlands the EAA is extended 600 feet perpendicular to the stream channel and is extended upstream and downstream as determined by A or B.

12. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals and State Listed S1 Species
A "red flag" attribute, this field assesses habitat for species receiving protection under provisions of the Endangered Species Act; that is, listed or proposed threatened or endangered species. Potential effects to threatened and endangered species are examined by the COE during 404 permit application reviews. According to the COE general conditions for Nationwide 404 permits, "no activity is authorized which is likely to jeopardize the continued existence of a threatened or endangered species or a species

proposed for such designation, as identified under the Endangered Species Act or which is likely to destroy or adversely modify the critical habitat of such species". The most current list of threatened and endangered species for Utah and state listed S1 species can be found at: http://dwrcdc.nr.utah.gov/ucdc/ Presence must be observed and recorded by a qualified observer. State listed S1 (although S1 species do not receive protection by statute they should be given special consideration) species should also be considered in Step 12. It is recommended that the evaluator contact the U. S. Fish and Wildlife Service with regard to presence or absence of threatened or endangered species and UDWR for presence or absence of state listed S1 species.

Primary Habitat: Habitat essential to the short or long-term viability of individuals or populations. The presence of traditional breeding, spawning, nesting, denning or critical migratory habitat, large seasonal congregations (including communal roosts, staging habitat, traditional foraging congregations, etc.), or USFWS or UDWR - designated critical habitat or core areas in the AA indicates primary habitat, as does any occurrence of a T&E plant or S1 species. If T&E or S1 species habitat is documented at the AA, indicate the source of the documentation.

As previously noted, if the project site is documented habitat for TorE species or state listed S1 species it is assigned to the Red Flag Category. In cases where threatened or endangered species are involved and formal consultations are required, the FWS will respond to the action agencies Biological Assessment with their own Biological Evaluation. The Biological Evaluation will identify "reasonable and prudent" conservation alternatives from which UDOT or the consulting agency can select, or serve as a basis for negotiating an alternative amenable to all parties. If the AA is not documented primary habitat for threatened or endangered species or state listed S1 species and the AA is not automatically classified in the Red Flag Category, it may nevertheless be an important habitat component for them. Thus in question 15c, the evaluator will be asked to determine whether the AA is primary suspected habitat, secondary documented or suspected habitat, or incidental habitat for threatened or endangered species or S1 species.

13. Selecting a Wetland Classification

Wetland classes found in Utah are riverine, slope, depressional, mineral flats, and lacustrine. A classification hierarchy showing systems, subsystems, classes and subclasses for Utah Wetland Classification (UWC) is provided in Keate (2004) Appendices D and E.

For number 13, enter the UWC that applies to the AA using the UWC (Keate 2004) classification system.
Note: topographic maps and aerial photographs should be studied prior to field evaluation to assist in determining wetland classification.

- **Riverine wetlands:** Occur in floodplains and riparian corridors in association with stream channels. Water source is river or stream flow or overbank flow at peak hydrological periods. (Overbank flow should occur once every two years or 50% of the time. If flooding does not occur at this minimal rate, it is probably not a riverine based wetland). Dominant hydrodynamics are unidirectional and horizontal. A subsurface hydraulic connection between the wetland and stream does not necessarily indicate a riverine system.
- **Slope wetlands:** Occur at points of surface changes, breaks in slope or stratigraphic changes. Surface water runoff and groundwater outflow (i.e. – spring or seep) are the primary water sources. Water flow is unidirectional (down slope/gradient). Water may discharge to a stream, lake or depression. Wetland complexes can be comprised of a slope wetland with several depressions or low-points interspersed throughout. Relying on topographic maps, aerial photographs, and field evaluation will help determine which classification is dominant and or most appropriate.
- **Depressional wetlands:** Occur in topographic depressions with closed contours. Water sources are precipitation, runoff and groundwater. Water flow vectors are toward the center of the depression. Dominant hydrodynamics are vertical. May or may not have inlets or outlets. Depressions that are full, may release water down slope/gradient and tend to be a part of a larger slope complex. Relying on topographic maps, aerial photographs, and field evaluation will help determine which classification is dominant and or most appropriate.
- **Mineral Flat wetlands:** Occur on large relict lakebeds. Dominant water source is precipitation. Dominant hydrodynamics are

vertical. Typically are large features in the landscape, associated with old Lake Bonneville bottom deposits with close proximity to GSL or other large permanent, semi-permanent or ephemeral water bodies. (e.g. – Sevier Lake) Only found in basin and range ecoregions. Example: Great Salt Lake mud flats and salt flats. Subclasses are not known.

- **Lacustrine Fringe wetlands:** Occur adjacent to large lakes and reservoirs. Dominant water source is lake water level. Hydrodynamics are bi-directional. Subject to waves and seiches.
- **Roadside Ditch Wetland:** Any non-jurisdictional wetland <30 feet in width that exists in its entirety within the highway ROW, is an excavated upland and is not connected to any other jurisdictional wetland. Its primary source of hydrology is runoff from the road surface, irrigation overflow, irrigation ditch leakage or non-point surface runoff from an adjacent urbanized area. In addition, to qualify as a roadside ditch wetland the wetland of concern must **not** convey water to any adjacent natural stream, spring or natural or created wetland outside the ROW and must not contain any threatened or endangered species.

14. Subclassification
Identify the subclass, soil type, pH range and water salinity if applicable to the particular wetland class. For detailed subclass information for see Appendices D and E.

15a Level of Disturbance
Disturbance: This field assesses the level of disturbance within the wetland (AA) and the level of disturbance within the expanded assessment area (EAA). The EAA is a 600 foot buffer around the perimeter of the AA. Disturbance at the AA is defined based on land use both at the AA and in the surrounding area (EAA). Land use in surrounding areas can provide a measure of disturbance within AAs and negatively influence their habitat quality even though the AAs themselves may be relatively undisturbed.

Circle the description of the level of disturbance that most closely reflects conditions observed within the AA and the EAA.

Comments: Provide a brief (1 to 2 sentence) descriptive summary of the AA and surrounding area. The description may include dominant species, adjacent land use, proximity to other wetlands, etc.

15b Plant Community Composition
Using the table provided in Appendix G to determine plant community composition for the AA. Plant community composition is defined as layers of vegetation (riverine and lacustrine only), percent ground coverage dominated by native wetland vegetation within the entire AA, and the percent of native wetland to non-native or non-wetland plant species. Observation is used determine layers of vegetation (riverine and lacustrine only) as well as to estimate percent ground cover dominated by native wetland species in the AA. Estimates of each of these factors are compared with reference standard sites with subclasses as described by Keate (2004) for slope, depressional, and mineral flat wetland classes. (see Appendices D, E and F for lists of dominant native vegetation, photographs, plans and cross sections). Reference standard sites for riverine and lacustrine were developed from research by Pagette et al. (1989). For riverine and lacustrine wetlands, first determine site elevation then reference Appendix F.

The native wetland to non-native or non-wetland plant percent is obtained by using transect sampling procedures detailed in Appendix G. The evaluator divides the total number of native wetland plant species by the total number of plants observed.

It is important to note that in some circumstances it may not be possible to conduct a transect protocol as described in Appendix G. For example, heavily wooded areas along a riverine corridor, small size of the AA or fragmented pieces of jurisdictional wetland scattered over the project site. In these circumstances the evaluator(s) should visually assess the vegetation and use their best professional judgment.

15c Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals
This field assesses primary suspected, secondary documented or suspected or incidental documented or suspected use of the AA by federally listed or proposed threatened or endangered species, or documents the AA as unsuitable habitat for threatened or endangered species.

i. Circle S to indicate whether habitat for listed or proposed TorE species is suspected within the AA at the ascertained level using the definitions provided below. It may be appropriate to indicate more than one use level for multiple species. For example, an AA may contain secondary habitat for bald eagles and incidental habitat for peregrine falcons. List the

species that correspond to each habitat level determined to apply to the AA.

Secondary Habitat:
Habitat that is occasionally or semi-regularly used by a given species, but that is not necessarily essential to the short or long-term viability or individuals or populations. Examples would include non-specific migration areas and occasional forage or perch sites. Primary habitat, as defined above, may occur in the general vicinity (e.g., within the project area, EAA, section, drainage, watershed, etc.), but not in the AA.

Incidental Habitat:
Habitat that receives chance, inconsequential use by a given species or habitat conditions or the known distribution of the species would indicate this level of use. This term implies that, while it may be conceivable that a given species may occur at an AA at a given point in time, the chance is remote and the use is not likely to be repeated.

ii. Rating: Use the highest level habitat (e.g., the level that corresponds to the highest functional point value) determined under **i** to determine the functional point value for the AA. If the AA is not documented Primary Habitat for threatened or endangered species and the AA is not automatically classified as a Category I, it may nevertheless be an important habitat component for them. Thus in question 15c, the evaluator will be asked to determine whether the AA is secondary or incidental habitat for threatened and endangered species.

15d Habitat for Plants or Animals Rated S1, S2, or S3 by the Utah Natural Heritage Program
This field assesses use of or existence in the AA by species rated S2 (imperiled), or S3 (vulnerable) by the UNHP (not including "watch list" species). S1 (critically imperiled) species would have been placed in the Red Flag Category in Step 12. Species within these UNHP categories are inclusive of U.S. Forest Service-listed sensitive species and FWS candidate species that are not subject to the provisions of the Endangered Species Act. To avoid duplication, do not include species listed above under 12 and 15c. Evaluators are encouraged to contact the Utah State University Herbarium (435) 797-1584 if they have T or E plant identification questions. Contact UDWR (801) 538-4700 for plant and wildlife questions and documentation.

i. Circle D or S to indicate whether habitat for these species is documented or suspected within the AA at the ascertained level using the definitions provided above under 12 and 15c or in the glossary. As discussed in 12, it may be appropriate to indicate more than one habitat level for multiple species. List the species that correspond to each habitat level applying to the AA.

ii. Rating: Use the highest level habitat (e.g., the level that corresponds to the highest functional point value) determined under **i** to determine the functional point value for the AA. If sensitive species habitat is documented at the AA, indicate the source of the documentation.

15e General Wildlife Habitat
This field assesses general wildlife habitat potential within the AA based upon documentation of wildlife use and habitat features. The combination of these two variables is considered to more accurately assess this function than if habitat features alone were used. A site may contain what are perceived to be outstanding habitat features for wildlife, but for reasons difficult to detect (such as presence of toxins, etc.) may only receive minimal to moderate use. Opportunities for enhancement may exist if such a situation were correctable. Conversely, a site may contain few desirable habitat features, but may receive significant use due to a general lack of habitat in the area or other factors and may be under-rated for this function if documented wildlife use was not considered.

Degree of disturbance at a wetland and in the adjacent landscape can greatly influence its use by wildlife. Examples of disturbance include direct conversion, conversion of upland supporting habitats, and encroachment and fragmentation by human activity sources, such as buildings, trails, roads, canals and ditches.

Plant community composition relates to the number of niches in a wetland class as well as its vertical and horizontal structural characteristics as described in the reference standard site. More niches are potentially available as more layers of habitat occur within the range of expected layers for native vegetation and structural characteristics in a given wetland class, so more wildlife species potentially are supported by more structurally complex habitats.

ii. Wildlife Habitat Features: Working from top to bottom within the double vertical lines, circle the appropriate AA attributes in the matrix provided on the data form to arrive at a high (H), moderate (M), or low (L) rating. The first variable considered is the

level of disturbance. The second variable is plant community composition.

Modified Habitat Quality Rating: Consult with the UDWR regional wildlife biologist to determine the level of wildlife use in the AA.

Circle "high" "moderate" or "low" level of use based on the data collected and following consultation with the UDWR regional biologist. For further guidance, refer to the definitions of high, moderate or low to no use provided below. Evidence of use is considered to be indicative of level of use.

High use:
AA is regularly used in high numbers relative to local or transient populations.

Moderate use:
AA is regularly used in small to moderate numbers relative to local populations, or infrequently or sporadically used in any numbers relative to local or transient populations.

Low to No use:
AA regularly, infrequently or sporadically used by extremely small numbers relative to local populations, or receives chance, inconsequential use in any numbers relative to local or transient populations.

iii. Rating: Determine and circle the general wildlife habitat rating and functional points for the AA by applying the results of **i** and **ii** to the matrix provided in the data form.

15f General Fish/ Aquatic Habitat
This field assesses general fish and aquatic habitat at the AA based upon the presence of certain groups of fish and habitat features. In Utah this only applies to riverine and lacustrine wetlands. Assess this function only if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish (e.g., fish use is precluded by perched culvert or other barrier, etc.). If the AA is not or was not historically used by fish due to lack of habitat (including duration of surface water), excessive gradient, etc. (e.g., the AA does not have the opportunity to provide habitat for fish), circle **NA** where indicated on the data form and proceed to the next function. The maximum duration of surface water (any water above the ground surface that is available to wildlife; not necessarily open water) covering at least 10% of the AA. The 10 percent criterion should be considered a rule of thumb and is intended to be applied primarily at smaller (e.g., less than 1 or 2 acres), rather than larger sites. For example, 9 acres of surface water should not be dismissed at a 100-acre AA simply because this 10 percent guidance is not met. The intent of this criterion is to allow consideration of significant surface water amounts within an AA relative to fish habitat, while disallowing insignificant surface water amounts. The final call will depend on the specific situation at hand, and is therefore left to the evaluator. Abbreviations for surface water durations are as follows: P/P = permanent/ perennial; S/I = seasonal/ intermittent; T/E = temporary/ ephemeral; and A = absent where:

Permanent/ perennial:
Surface water is present throughout the year except during years of extreme drought.

Seasonal/ intermittent:
Surface water is present for extended periods, especially early in the growing season, or may persist throughout the growing season, but may be absent at the end of the growing season; or surface water does not flow continuously, as when water losses from evaporation or seepage exceed the available stream flow.

Temporary/ ephemeral:
Surface water is present for brief periods during the growing season, but the water table is well below the surface for most of the year; or surface water flows briefly in response to precipitation in the immediate vicinity and the channel is above the water table.

Variables assessed to determine a rating for habitat quality include duration of surface water, structural cover, shading, and habitat availability. Presence of surface water is an obvious critical component of fish habitat. Seasonally flooded areas can be important nursery and foraging areas for fish (and can result in "high" habitat quality ratings using this assessment); however, longer duration of surface water generally results in higher ratings because surface waters of such duration are available to fish for greater periods and varieties of life stages. Flow or water level stability is an important habitat component for a variety of fish species.

Abundant structural cover and well-vegetated stream banks and shorelines are also important habitat components for several fish species. Structural cover such as submerged logs and vegetation, other woody debris, floating-leaved vegetation, and large rocks provides resting areas, refuge from predators, hiding areas from predators, and functions as a substrate for

insect larva; an important food source for many fish species. High water temperatures that result from removal of streamside vegetation can render habitat as unsuitable for fish that are sensitive to higher temperatures, such as Bonneville cutthroat trout. Vegetation along streams, ponds, and lakes also provides insect habitat, an important food source for many fish species.

Although the physical habitat attributes of a site may be attractive to fish, use of the area may be significantly reduced or precluded due to the presence of inadequately sized culverts, dikes, continual sources of degradation, or other causes. Consequently, potential "habitat modifiers" are also considered in the assessment.

The presence of certain groups of fish in the AA is considered along with habitat features to derive an overall fish/ aquatic habitat rating. UDWR seeks to preserve and enhance all desirable aquatic species and their supporting ecosystems. To accomplish this UDWR continues to develop and implement policies and programs that foster sound management of wild fish populations and their habitats, at the same time that it monitors and regulates angler harvests, maintains recreational activities for anglers, and provides improved access to fisheries.

Given these management priorities (managing for wild fish populations **and** recreational opportunities), the following groups of fish are considered in the assessment in order of descending "rank:" native game sport fish; introduced game fish; non-game fish; and no fish.

As listed in the 2004 Utah Fishing Proclamation, Utah native sport fish include: Mountain, Bonneville and Bear Lake Whitefish, Bonneville Cisco and four subspecies of Cutthroat Trout, Bear Lake, Bonneville, Colorado and Yellowstone. Non-native coldwater sport species include: Rainbow Trout, Lake Trout, Brook Trout, Arctic Grayling, Kokanee Salmon and Brown Trout. Cool and warm water sport fish include: Walleye, Yellow Perch, Striped Bass, White Bass, Smallmouth Bass, Largemouth Bass, Bullhead, Channel, Catfish, Black Crappie, Green Sunfish and Bluegill. Hybrid sport fish include: Tiger Muskelunge, Tiger Trout and Splake. Non-game fish include: Carp, Utah Sucker and Utah Chub. The June Sucker is an endangered species. Threatened species and state species of concern can be found at http://dwrcdc.nr.utah.gov/ucdc/.

i. Habitat Quality: Working from top to bottom within the double vertical lines, circle the appropriate AA attributes in the matrix provided on the data form to arrive at a high (H), moderate (M), or low (L) rating. The first variable considered is the maximum duration of surface water in the AA. Use the definitions provided above. The second variable is structural cover. Estimate the percentage of the waterbody within the AA that contains cover objects such as submerged logs, large rocks and boulders, overhanging banks, and submerged and floating-leaved vegetation. The final variable is shading, as determined by estimating the percent of stream bank or shoreline within the AA that contains wetland or riparian scrub-shrub or forested communities. This will determine the rating for habitat quality.

ii. Modified Habitat Quality: Circle the appropriate response to the following question: Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity **or** is the waterbody included on the UDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support? If the answer is yes, then reduce the habitat quality rating determined in **i** above by .1. If the answer is no, then do not modify the habitat quality rating determined in **i**.

iii. Rating: Determine and circle the general fish/ aquatic rating and functional points for the AA by applying the results of **i** and **ii** to the matrix provided in the data form. The term "native" implies a species indigenous to Utah; not necessarily to a given drainage or water body. The evaluator is referred to *Fishes of Utah* (Sigler and Miller 1963) for the status (native vs. introduced) of fish species known or suspected to occur in the AA.

15g Amphibian Habitat

This field assesses general amphibian habitat potential at the AA. The assessment is based upon the presence of water quality and habitat characteristics that could support amphibians or document amphibian use of the AA. The level of amphibian use of the AA or the potential of the AA to support amphibians is determined through consultation with a UDWR regional biologist. If amphibians are present in the AA or habitat and water quality characteristics are such that they could support amphibians add .2 under the functional points rating column in the Functional Assessment Rating section.

15h Flood Attenuation
This field assesses the capability of jurisdictional wetlands in the AA to slow in-channel or overbank flow during high water/flood events. This parameter applies only if the AA is classified as a riverine wetland or contains a discernible floodplain (e.g., is subject to flooding and possesses the opportunity to attenuate flood waters), based on floodwater proximity, evidence of flood deposits, FEMA maps, etc., and can apply to any AA that includes a flowing water/channel component (e.g., rivers, streams, flowing ditches). If a jurisdictional wetland within the AA does not occur within a channel or discernible floodplain, circle **NA** where indicated on the form and proceed to the next function.

The variable used to assess this function is surface roughness in the AA. Surface roughness features for riverine wetlands include emergent wetland, deep rooted woody and or tall sturdy herbaceous vegetation (e.g. stream bank wheatgrass) and may also include course woody debris, litter, boulders, rock outcroppings and micro topography. Riverine wetlands with a high percentage of aerial coverage of these features are better able to retard flood waters than are wetlands with moderate or low surface roughness. (See glossary for roughness definitions)

i. Rating: Working from top to bottom, use the matrix on the data form to arrive at [circle] the functional points and rating [H=high, M=moderate, or L=low] for this function.

Estimate surface roughness in the AA using the definitions in the glossary. Do not include non-wetland open water channel in this estimate. Circle the appropriate rating and functional points.

ii. Indicate whether there are residences, businesses, or other features (parks, sports fields, historic sites, roads, etc.) that could be damaged by floodwater located within 0.5 miles downstream of the AA. Describe these features in the comments section.

15i Short and Long Term Surface Water Storage
This field assesses the potential of the AA to capture and hold surface water originating from precipitation, upland surface (sheetflow) or subsurface (groundwater) flow. If jurisdictional wetlands in the AA are not subject to inundation or ponding, circle **NA** where indicated on the data form and proceed with the evaluation.

Variables used to assess this function are: frequency of inundation or ponding and whether or not the wetlands natural ability to store water has been disturbed negatively. Wetlands that pond frequently provide water storage functions more often than do wetlands that pond less frequently. Duration of water retention is implied in the wetland class or subclass definition. Also wetlands whose natural hydrology has not been modified by dikes or drains retain their inherent ability to store surface water.

i. Rating: Working form top to bottom, use the matrix on the data form to arrive at [circle] the functional points and rating [H=high, M=moderate, or L=low] for this function. First estimate (based on photographs, NRCS data, interviews, knowledge of the area, etc.) whether the jurisdictional wetlands that flood or pond do so at a frequency greater than or less than five out of every 10 years and circle the appropriate functional points and rating. Then determine whether the wetland's natural ability to store water has been disturbed negatively.

15j Sediment/ Nutrient/ Toxicant Retention and Removal
This field assesses the ability of the AA to retain sediments and retain and remove excess nutrients and toxicants. This field only applies to wetlands which could receive sediments and excess nutrients or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, circle **NA** where indicated on the data form and proceed with the evaluation. Nitrogen and phosphorus are the two nutrients most often associated with water pollution; both occur in high concentrations in fertilizers and discharges from sewage treatment plants and livestock operations, and excessive amounts of either can result in algal blooms and subsequent oxygen deficiencies in receiving waters. Toxicants include pesticides, herbicides, petroleum products, metals and other potentially harmful constituents.

The assessment is based on the site's proximity to sediment/nutrient/toxicant sources; plant community composition; evidence of flooding or ponding; and presence or absence of an outlet. Wetlands which could receive and successfully process sediment, nutrients, and toxicants provide these functions at a higher capacity than do wetlands that receive excessive amounts of these constituents such that other functions are impaired. Generally, a wetland's ability to uptake nutrients and toxicants and filter sediment increases with the density of its vegetation within its expected range of percent cover. Flooded or ponded wetlands are indicative of sites that retain water; these areas allow sediments to settle out and

increase nutrient/toxicant contact time with vegetation, facilitating uptake. Sites whose natural ability to store water have not been altered in a negative way, retain their ability to perform settling and uptake functions.

i. Rating: Working from top to bottom, use the matrix on the data form to arrive at [circle] the functional points and rating [H=high, M=moderate, or L=low] for this function. First, determine if the AA receives or surrounding lands have the potential to deliver low to moderate levels of sediments, nutrients, or toxicants such that other functions in the AA are not substantially impaired (e.g., the wetland is processing these inputs but is not significantly affected by them). Observation of some sedimentation, relatively minor potential sources of nutrients or toxicants, or signs of minor to moderate eutrophication would be indicative of this input level.

If the AA is in close proximity to or receives input from or is listed on the UDEQ list of Utah's 2004 303(d) List of Impaired Waters (UDEQ 2004) with listed "probable causes" related to sediment, nutrients or toxicants (e.g., not based exclusively on flow alteration, other habitat alterations, etc.), then the second column of the matrix should be used. Such related probable causes include "metals," "nutrients." "organic enrichment/DO", "suspended solids", "unionized ammonia." "priority organics," "siltation," "other inorganic," "salinity/TDS/chlorides," etc. The impaired waterbody list is lengthy and dynamic and is not included as an appendix to this document; however, the list is available at: http://waterquality.utah.gov.
If the AA is not included on the UDEQ TMDL list, but high levels of these inputs are observed or expected and are impairing other functions at the AA, as evidenced by observations of land use, major sedimentation, major contaminant sources, major eutrophication, etc., then the second column of the matrix should be used. The next variable addresses the percent of high to moderate surface roughness. The final variable determines if the wetland's ability to store water has been altered in a negative manner.

15k Sediment/Shoreline Stabilization
This field, (applicable to riverine and lacustrine wetlands), assesses the ability of the AA to dissipate flow or wave energy, reducing erosion. Complete this field only if the jurisdictional wetland within the AA occurs on the shoreline of a standing water body that is subject to wave action or on the banks of a river stream or, other natural or manmade channel. Variables to consider when determining if a waterbody is subject to wave action include estimated wind velocity, water depth and fetch (distance across the water). Although not required for application of this assessment method, Linsley and Franzini (1979) cite the following equation for determining wave height: rise of wave (ft) = [(wind velocity [mph])2 x fetch (miles)] / (1,400 x water depth [ft]). If this field does not apply, circle **NA** where indicated on the data form and proceed to the next function.

The variable used to assess this function is surface roughness in the AA. Surface roughness for lacustrine wetlands include emergent wetland, deep rooted woody, and or tall hardy herbaceous vegetation (e.g. stream bank wheatgrass) and may also include coarse woody debris, litter, boulders, rock outcroppings and micro topography. Lacustrine wetlands with a high percentage of aerial coverage of these features are better able to dissipate wave energy than are wetlands with moderate or low surface roughness. (See glossary for roughness definitions). Estimate surface roughness in the AA using the definitions in the glossary. Next, determine the duration of surface water in the rooted zone. Lakes, reservoirs, and rivers or streams where water in the root zone is permanent have more vigorous plant communities which provide better shoreline stabilization than reservoirs or streams where summer draw-downs stress vegetation increasing plant mortality and unvegetated slopes are exposed to wave and flow induced erosion.
i. Rating: Working from top to bottom, use the matrix and the data form to arrive at [circle] the functional points and rating [H=high, M=moderate, or L=low] for this function. First, estimate surface roughness with respect to herbaceous species. Annual plants are considered individually. Sedges and rushes, for example, are considered to provide deep, binding root-masses, while Kentucky bluegrass is not. Next, determine whether the duration of surface water adjacent to rooted vegetation in the AA using the definitions provided above is permanent or seasonal and circle the appropriate functional points and rating.

Groundwater Discharge/Recharge
Groundwater discharge and recharge only occur in some subclasses of Utah wetlands. Playas provide neither discharge nor recharge. Slope wetlands are usually groundwater discharge. Neither discharge nor recharge are common in Utah and hence have been deleted from functional assessment.

16 Visual Quality*

Wetlands are a visual resource. This field assesses the importance of the AA to the overall visual quality of the adjacent landscape. The assessment distinguishes between "wildland" and "urban/exurban" wetlands. Any type of wetland that has experienced low to moderate levels of disturbance and is devoid of human structures such as roads, debris, rubble, etc., have higher visual quality than wetlands with these intrusions.

Two additional factors are used for assessment of "urban/exurban" wetlands; potential number of viewers and viewing distance. Wetlands seen by many viewers are assumed to have higher aesthetic value for a larger segment of society than wetlands viewed by few. In addition, research suggests that wetlands that are observed as foreground or middle ground in the viewshed are of higher aesthetic value than background wetlands (see glossary). Further, public ownership of wetlands, either rural or urban provides a higher probability of resource management that will preserve, enhance or restore the visual resource.

The rating is based on the evaluator's assessment of the wetland's aesthetic attributes, visual accessibility and ownership. Ratings for visual quality are not used in calculating overall wetland functional ratings. Rather they are an estimate of a wetlands value to society.

17 Recreation/Education Quality*

This field assesses the potential of the AA to provide recreation/education opportunities. A wetland, which is presently used for recreation and/or education or is in public ownership has a greater probability of continuing to provide recreation/education opportunities. In addition, close proximity to educational facilities and wetland site accessibility by various modes of transportation increases the recreation and/or education value of a wetland.

The rating is based on the evaluator's assessment of the wetland's potential for recreation and/or education. Ratings for recreation and/or education potential are not used in calculating overall wetland functional ratings. Rather they provide an estimate of a wetland's value to society.

*NOTE: In some cases wetlands may contain plant or wildlife species or perform functions that would be diminished by human activity. In these cases recreational and educational activities would be prohibited.

Function & Value Summary and Overall Rating

Transfer the ratings and functional points assigned for each of the 12 functions in items 15c through 15k to the appropriate fields on the summary form. Record values of 1 under the Possible Functional Points column for functions that apply to the AA but for which no default values appear on the form. For functions that do not apply to a given AA (e.g., flood attenuation), enter "NA" under each of the column headings.

If desired, calculate the functional units for each function by multiplying the actual functional points by the estimated acreage in the AA (from 11). This is optional and will not affect the site's overall rating. In some cases, such as when more than one site is assessed on a single form, it is best to leave this column blank and derive a separate table or other means to depict functional units. Record the totals from the Actual Functional Points, Possible Functional Points, and Functional Units columns (if completed) in the Totals row. Calculate the percentage of the possible functional points that the AA achieved using the following equation: % of possible = total actual functional points / total possible functional points x 100. Determine the appropriate overall rating (described below) based on the criteria indicated on the form.

Red Flag Category

This category is for AA's in which a threatened and or endangered species or its habitat has been documented. Processing the application follows a somewhat different procedure. The COE may decide to initiate Section 7 consultation with the USFWS. UDOT may consider design modifications to prevent a "take" or follow certain conditions set by USFWS. Therefore, completion of the evaluation of the AA is required and the COE will continue processing the application according to COE regulations and USFWS conditions. State listed S1 species should also be included in this category since their presence requires consultation with UDWR.

Category I

Category I wetlands are of exceptionally high quality or are important from a regulatory standpoint. Category I wetlands can: represent a high quality example of a rare wetland type; provide irreplaceable ecological functions (e.g., are not replaceable within a human lifetime, if at all); exhibit exceptionally high flood attenuation capability; are rated exceptionally high for Plant Community Composition or are assigned high ratings for most of the assessed

functions. To be rated as a Category I site, the AA must:

- Score .9 functional points for primary documented S2 species or .8 primary suspected for S2 species; **or**
- Score 1 functional point for Flood Attenuation (riverine wetlands only) (e.g., contains riverine wetlands with a ≥ 65% aerial coverage of high surface roughness); **or**
- Score 1 functional point for Plant Community Composition; **or**
- Total functional points > 80% (round to nearest tenth) of total possible functional points.

Category II

Category II wetlands are more prevalent than Category I wetlands, and are those that provide habitat for sensitive plants or animals, function at very high levels for wildlife/fish/amphibian habitat or are assigned high ratings for many of the assessed functions and values. To be rated as a Category II site, the AA must not qualify as a Category I site and:

- Score ≥ .9 functional point for General Wildlife Habitat (e.g., habitat quality is high and or there is documented evidence of high or moderate levels of wildlife use; **or**
- Score ≥ .9 functional point for General Fish/Aquatic Habitat (riverine or lacustrine only) (e.g., contains native game fish and habitat quality is high or contains introduced game fish and habitat quality is high) and or there is documented evidence of amphibians present; **or**
- Score .9 functional points for primary documented S3 wetland community that is common in the watershed but with low disturbance/fragmentation; **or**
- Score .8 functional points for Plant Community Composition; **or**
- Total actual functional points > 65% (round to nearest tenth) of total possible functional points.

Category III

Category III wetlands are more prevalent, they generally have moderate to low Plant Community Composition rating and have a higher level of disturbance than Category I and II wetlands. They can provide many functions and values, although they may not be assigned high ratings for as many parameters as are Category I and II wetlands. To be rated Category III site, the AA must not qualify as a Category I, II or IV site.

Category IV

Category IV wetlands are generally small, isolated, and are rated low for Plant Community Composition. These sites provide little in the way of wildlife habitat. To be rated as a Category IV site, the AA must not qualify as a Category I, II or III site and:

- Achieve a Low rating for Plant Community Composition; and
- Total actual functional points < 30% (round to nearest tenth) of total possible functional points

The overall rating can be used to establish wetland avoidance/protection strategies at the project level. For example, if wetland impacts are unavoidable for a given project, and alternatives are available such that a choice can be made between affecting a Category I or a Category III site, the applicant and reviewing agencies could direct impacts to the Category III site. Other applications of the overall rating concept may include the eventual development of mitigation ratio policy

Functional units are not used in determining the overall rating, but are provided for the evaluator's consideration in assessing project impacts, mitigation needs, or in assessing mitigation plans or the success of constructed projects. An example of how functional units could be used to develop mitigation that would replace overall (cumulative) functions and values for a given project is presented as follows. The total actual functional points for a given 8-acre AA is 6.3. Total functional units for the AA would be calculated by multiplying 6.3 points x 8 acres = 50.4 functional units. A proposed highway project would impact 2 acres of the AA. Assuming a relatively uniform distribution of functional capacity across the AA, the loss in functional units to the AA would be 2 acres x 6.3 points = 12.6 functional units. To compensate for lost wetland functions and values, mitigation would need to be designed that would replace the 12.6 functional units. If the predicted total actual functional points for a mitigation project was 5.1, and the goal was to replace12.6 functional units, the applicant would need at least 2.5 acres of mitigation to compensate for the loss (2.5 x 5.1 =12.6). If limited to a two-acre mitigation site, the applicant could, in theory, design the mitigation project such that the predicted functional points met or exceeded 6.3, resulting in the replacement of at least 12.6 functional units (2x6.3 = 12.6), or could obtain an additional site such that the sum of the functional units for the two sites met or exceeded the total 12.6 points replacement requirement.

Functional Units can also be examined on a function-by-function basis to compare existing pre-project conditions with predicted post-project conditions. This concept is employed by the HGM method (Smith et al. 1995), and is illustrated by the following table, which assumes a two-acre impact to a 10-acre AA for hypothetical project.

There are several possible ways to determine mitigation needs using this approach, including:

- designing mitigation for individual functions or cumulatively for all functions using the **greatest** predicted loss in functional units as the replacement target (in this case, designing mitigation such that each function provides a minimum 5.2 functional units or designing the mitigation such that, cumulatively, 5.2 + 5.2 = 10.4 functional units are replaced); or

- designing mitigation for individual functions or cumulatively for all functions using the **average** predicted loss in functional units as the replacement target (in this case, designing mitigation such that each function provides a minimum 5 functional units [(4.8 + 5.2) / 2=5] or designing the mitigation such that, cumulatively, 5+5 = 10 functional units are replaced); or

- designing mitigation for individual functions or cumulatively for all functions using **individual** predicted changes in functional units as the target (in this case, 4.8 for function A and 5.2 for function B, or cumulatively using 4.8 + 5.2 = 10 functional units).

There may be circumstances that simply preclude the replacement of a given function/value parameter at the same level at which it is rated for an affected wetland. For example, if a project impacts a wetland rated "high" for Plant Community Composition due to its undisturbed hydrology and plant community, it is very unlikely that these could be mitigated at the same level at a replacement wetland because of the difficulty associated with replacement. In virtually all cases, appropriate mitigation of lost wetland functions and values will be subject to coordination/negotiation with the regulatory agencies involved in the project. It is not the purpose of this evaluation form to dictate wetland mitigation policy. What is and is not considered appropriate mitigation will ultimately be determined by the regulatory agencies; primarily the COE and EPA. While this evaluation method does provide a means for quantifying predicted impacts to wetland functions and values, it is important to stress that coordination with the regulatory agencies as to the application of this evaluation method and discussed mitigation determination strategies to a given project is crucial and needs to be carried out on a project by project basis.

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GLOSSARY OF TERMS

Background:
The distant part of the landscape surroundings, especially those behind something and providing harmony or contrast, > ½ mile from the viewer.

Deep Binding Rootmass:
Plants with extensive and deep root systems such as trees and shrubs, as well as sedges and rushes.

Entrenchment Ratio:
The ratio of the width of the flood prone area to the bank full surface of the channel.

Foreground:
The detailed landscape found within zero to ¼ - ½ mile from the observer.

Gradient:
The percent slope of the stream channel.

Groundwater Discharge:
Indicators of discharge include observed springs or seeps, vegetation growing during dormant or drought seasons, wetlands at the toe of a natural slope, permanent flooding during drought periods and presence of an outlet but no inlet.

Groundwater Recharge:
Indicators of recharge are difficult to discern in the field and include observation of a permeable substrate without an underlying impeding layer, or presence of an inlet but no outlet.

High Disturbance:
Land is heavily cultivated or heavily grazed, hayed or logged; subject to relatively substantial fill placement, grading, clearing or hydrological alteration, high road or building density.

Human Artifacts:
Objects made by humans, structures, fences, power lines, trash, etc.

Low Disturbance:
Land is managed in predominantly natural state; is not grazed, logged, cultivated or otherwise altered; does not contain roads or occupied buildings.

Middle ground:
The space between the foreground and the background in a landscape. The area located from ¼ - ½ mile from the viewer.

Moderate Disturbance:
Land is not cultivated but moderately grazed, hayed or selectively logged; or has been subject to minor clearing, fill placement or hydrological alteration; contains few roads or buildings.

Native Wetland Plants:
Vegetation that is considered to be native and categorized as an obligate wetland (OBL), facultative wetland (FACW), or facultative+ (FAC+) in the intermountain region (Region 8). Facultative (FAC), facultative- (FAC-), facultative upland (FACU), and obligate upland (UPL) species are not considered to be wetland plants.

Organic or Mineral Soils:
Soils are classified as organic if they are 20% or more organic carbon by weight. A soil is classified as an organic soil (Histosol) if more than half of the upper 80 cm (32 in) of the soil is organic or if the organic

soil material of any thickness rests on rock or fragmental material having interstices filled with organic materials. In general, peat material needs to be 24 in. in depth to be considered an organic soil.

Permanent/Perennial:
Surface water is present throughout the year except during years of extreme drought.

Restricted Outlet:
A wetland with an outlet that is impeded by a dam, dike or water control structure.

Roadside Ditch Wetland:
For purposes of this UDOT functional assessment document a roadside ditch wetland is defined as follows: Any non-jurisdictional wetland <30 feet in width that exists in its entirety within the highway ROW, is an excavated upland and is not connected to any other jurisdictional wetland. Its primary source of hydrology is runoff from the road surface, irrigation overflow, irrigation ditch leakage or non-point surface runoff from an adjacent urbanized area. In addition, to qualify as a roadside ditch wetland the wetland of concern must **not** convey water to any adjacent natural stream, spring or natural or created wetland outside the ROW and must not contain any threatened or endangered species.

Salinity:
Containing sodium chloride or any of the salts of alkali metals or magnesium; measured as the amount of dissolved salts (ds) in solution measured as the electro conductivity of a water sample.

Seasonal/Intermittent:
Surface water is present for extended periods, especially early in the growing season, or may persist throughout the growing season, but may be absent at the end of the growing season; or surface water does not flow continuously, as when water losses from evaporation of seepage exceed the available stream flow.

Surface Roughness (High):
65% by aerial coverage of the AA contains surface roughness features. Surface roughness features include: emergent wetland, deep rooted woody and or herbaceous vegetation and for riverine and lacustrine wetlands may also include coarse woody debris, litter, boulders and micro-topography. (Adapted from Kleinschmidth Associates, 1999)

Surface Roughness (Moderate):
Between 35% and 65% by aerial coverage of the AA contains surface roughness features. (See above for surface roughness features) (Adapted from Kleinschmidth Associates, 1999)

Surface Roughness (Low):
<35% by aerial coverage of the AA contains surface roughness features. (See above for surface roughness features) (Adapted from Kleinschmidth Associates 1999)

Temporal/Ephemeral:
Surface water is present for brief period during the growing season, but the water table is well below the surface for most of the year; or surface water flows briefly in response to precipitation in the immediate vicinity and the channel is above the water table.

Threatened & Endangered Documented Habitat:
Federally listed or proposed threatened or endangered species have been documented at the AA by one or more credible sources, and the site is documented as critical habitat.

Threatened & Endangered Incidental Habitat:
Habitat that receives chance, inconsequential use by a given species or habitat conditions or the known distribution of the species would indicate this level of use. This term implies that, while it may be conceivable that a given species may occur at an AA at a given point in time, the chance is remote and the use is not likely to be repeated.

Threatened & Endangered Primary Habitat:
Habitat essential to the short or long-term viability of individuals or populations. The presence of traditional breeding, spawning, nesting, denning, or critical migratory habitat, large seasonal congregations (including communal roosts, staging habitat, traditional foraging congregations, etc.), or USFWS-designated critical habitat or core areas in the AA indicates primary habitat, as does any occurrence of a T&E plant.

Threatened & Endangered Secondary Habitat:
Habitat that is occasionally or semi-regularly used by a given species, but that is not necessarily essential to the short or long-term viability or individuals or populations. Examples would include non-specific migration areas and occasional forage or perch sites. Primary habitat, as defined above, may occur in the general vicinity (e.g., within the project area, section, drainage, watershed, etc.), but not in the AA.

Threatened & Endangered Suspected Habitat:
The physical and biological characteristics of the AA are similar to other wetlands in the ecoregion, where threatened or endangered species presence has been documented but presence has not been documented in the AA.

Unrestricted Outlet:
A wetland with an unimpeded outlet.

Urban/Exurban Wetland:
A wetland that exists within an urban or exurban context; hydrology is often altered by roads, buildings, parking, and other impervious surfaces; architectural elements are a predominant aspect of the visible landscape.

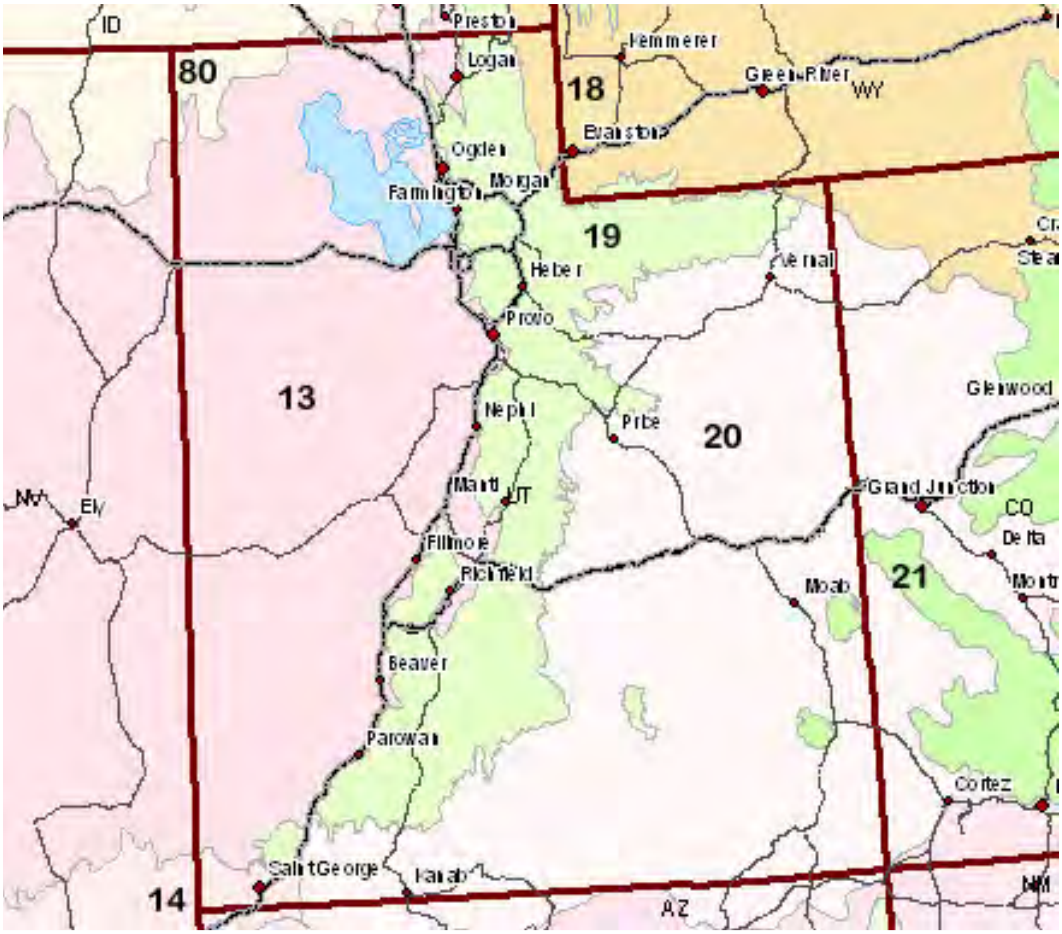
Viewshed:
The areas that include all that the observer can see from a particular location. Defining elements are frequently topography and vegetation. It is conceptually similar to a watershed.

Wetland Floodplain:
Wetlands within a floodplain.

Wildland Wetland:
A wetland that exists within a rural or wildland context; natural hydrological processes persist, rural or natural elements are a predominant aspect of the visible landscape

Width/Depth Ratio:
The ratio of bankfull channel width to bankfull mean depth.

APPENDIX A
Utah Ecoregions Map
Sources: **http://www.nativeseednetwork.org/ecomap?state=UT**
http://www.hort.purdue.edu/newcrop/cropmap/utah/maps/UTeco3.html
http://www.epa.gov/nheerl/arm/designing/design_eco_maps.htm



Ecoregion Descriptions
13. Central Basin and Range
The Central Basin and Range ecoregion is internally drained and is characterized by a mosaic of xeric basins, scattered low and high mountains, and salt flats. It has a hotter and drier climate, more shrubland, and more mountain ranges than the Snake River Plain and Northern Basin and Range ecoregions to the north. Basins are covered by Great Basin sagebrush or saltbush-greasewood vegetation that grow in Aridisols; cool season grasses are less common than in the Mollisols of the Snake River Plain and Northern Basin and Range. The region is not as hot as the Mojave and Sonoran Basin and Range ecoregions and it has a greater percent of land that is grazed.

14. Mojave Basin and Range
This ecoregion contains scattered mountains which are generally lower than those of the Central Basin and Range. Potential natural vegetation in this region is predominantly creosote bush, as compared to the mostly saltbush-greasewood and Great Basin sagebrush of the ecoregion to the north, and creosote bush-bur sage with large patches of palo verde-cactus shrub and saguaro cactus in the Sonoran Basin and Range to the south. Most of this region is federally owned and there is relatively little grazing activity because of the lack of water and forage for livestock. Heavy use of off-road vehicles and motorcycles in some areas has caused severe wind and water erosion problems.

18. Wyoming Basin
This ecoregion is a broad intermontane basin dominated by arid grasslands and shrublands and interrupted by high hills and low mountains. Nearly surrounded by forest covered mountains, the region is somewhat drier than the Northwestern Great Plains to the northeast and does not have the extensive cover of pinyon-juniper woodland found in the Colorado Plateaus to the south. Much of the region is used for livestock grazing, although many areas lack sufficient vegetation to support this activity. The region contains major producing natural gas and petroleum fields.

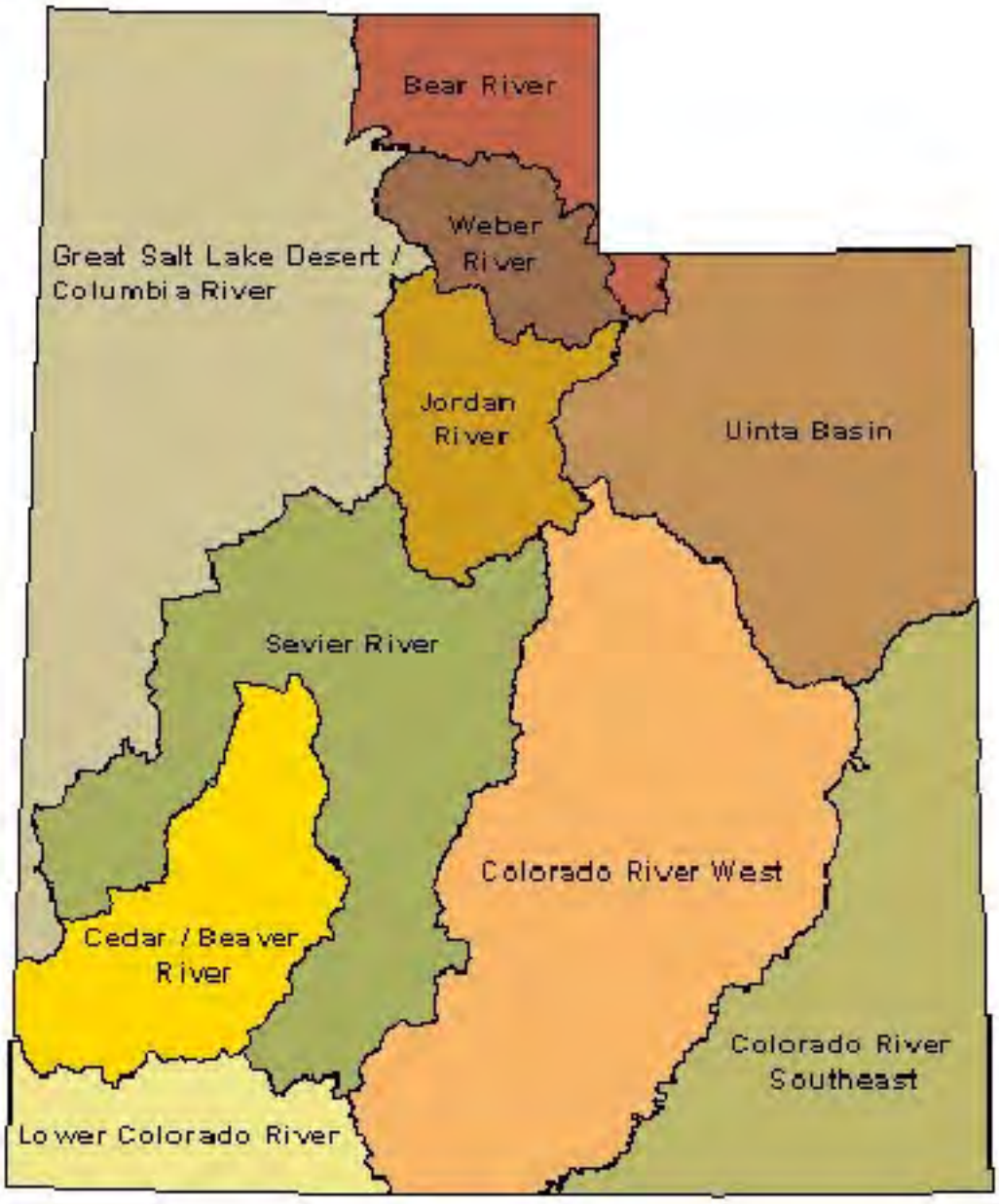
19. Wasatch and Uinta Mountains
This ecoregion is composed of a core area of high, precipitous mountains with narrow crests and valleys flanked in some areas by dissected plateaus and open high mountains. The elevational banding pattern of vegetation is similar to that of the Southern Rockies except that aspen, chaparral, and juniper-pinyon and oak are more common at middle elevations. This characteristic, along with a far lesser extent of lodgepole pine and greater use of the region for grazing livestock in the summer months, distinguish the Wasatch and Uinta Mountains ecoregion from the more northerly Middle Rockies.

20. Colorado Plateaus
Rugged tableland topography is typical of the Colorado Plateau ecoregion. Precipitous side-walls mark abrupt changes in local relief, often from 300 to 600 meters. The region is more elevated than the Wyoming Basin to the north and therefore contains a far greater extent of pinyon-juniper woodlands. However, the region also has large low lying areas containing saltbrush-greasewood (typical of hotter drier areas), which are generally not found in the higher Arizona/New Mexico Plateau to the south where grasslands are common.

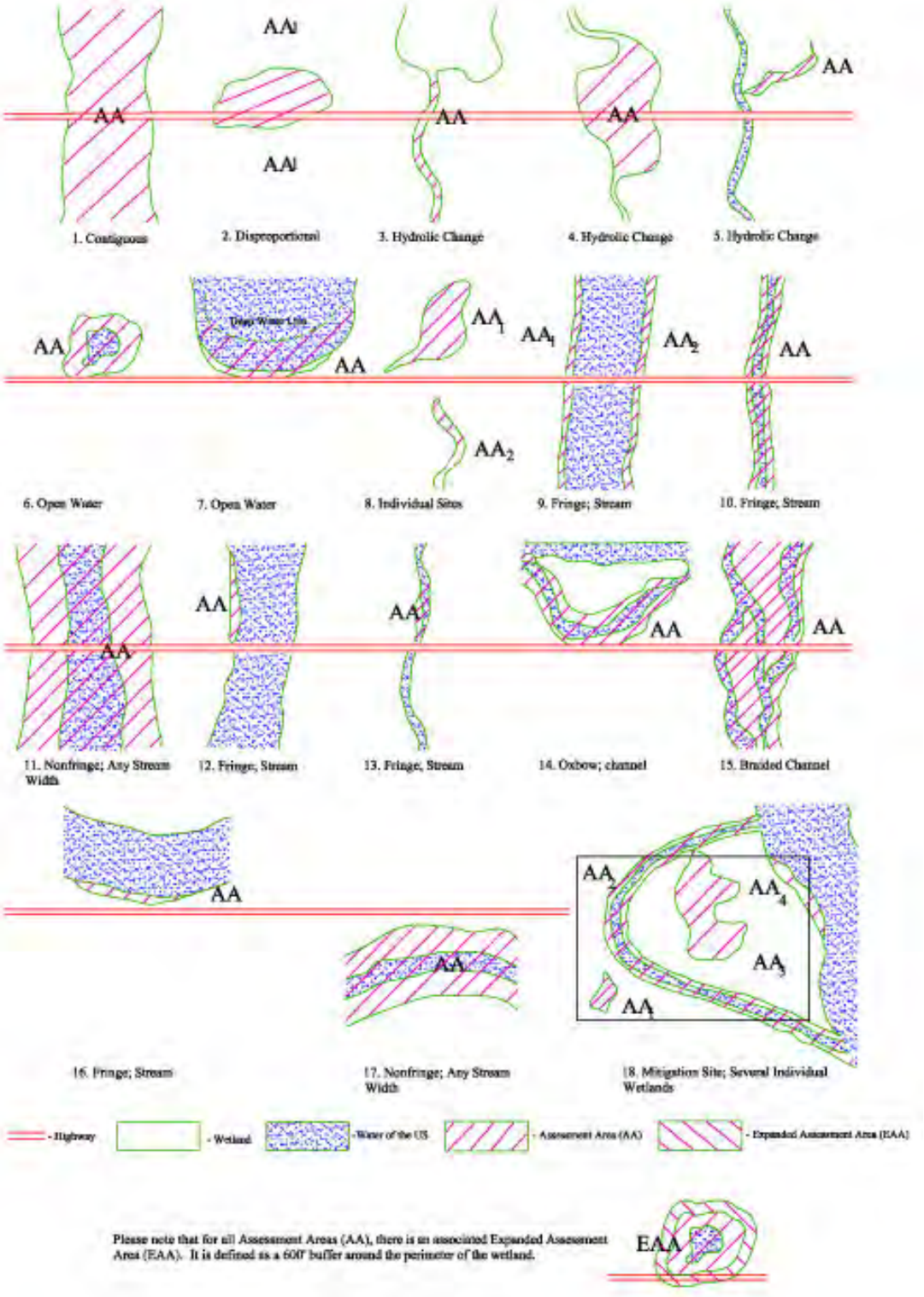
21. Southern Rockies
The Southern Rockies are composed of high elevation, steep rugged mountains. Although coniferous forests cover much of the region, as in most of the mountainous regions in the western United States, vegetation, as well as soil and land use, follows a pattern of elevational banding. The lowest elevations are generally grass or shrub covered and heavily grazed. Low to middle elevations are also grazed and covered by a variety of vegetation types including Douglas fir, ponderosa pine, aspen, and juniper oak woodlands. Middle to high elevations are largely covered by coniferous forests and have little grazing activity. The highest elevations have alpine characteristics.

80. Northern Basin and Range
This ecoregion contains arid tablelands, intermontane basins, dissected lava plains, and scattered mountains. Non-mountain areas have sagebrush steppe vegetation; cool season grasses and Mollisols are more common than in the hotter-drier basins of the Central Basin and Range where Aridisols are dominated by sagebrush, shadscale, and greasewood. Ranges are generally covered in Mountain sagebrush, mountain brush, and Idaho fescue at lower and mid-elevations; Douglas-fir, and aspen are common at higher elevations. Overall, the ecoregion is drier and less suitable for agriculture than the Columbia Plateau and higher and cooler than the Snake River Plain. Rangeland is common and dryland and irrigated agriculture occur in eastern basins.

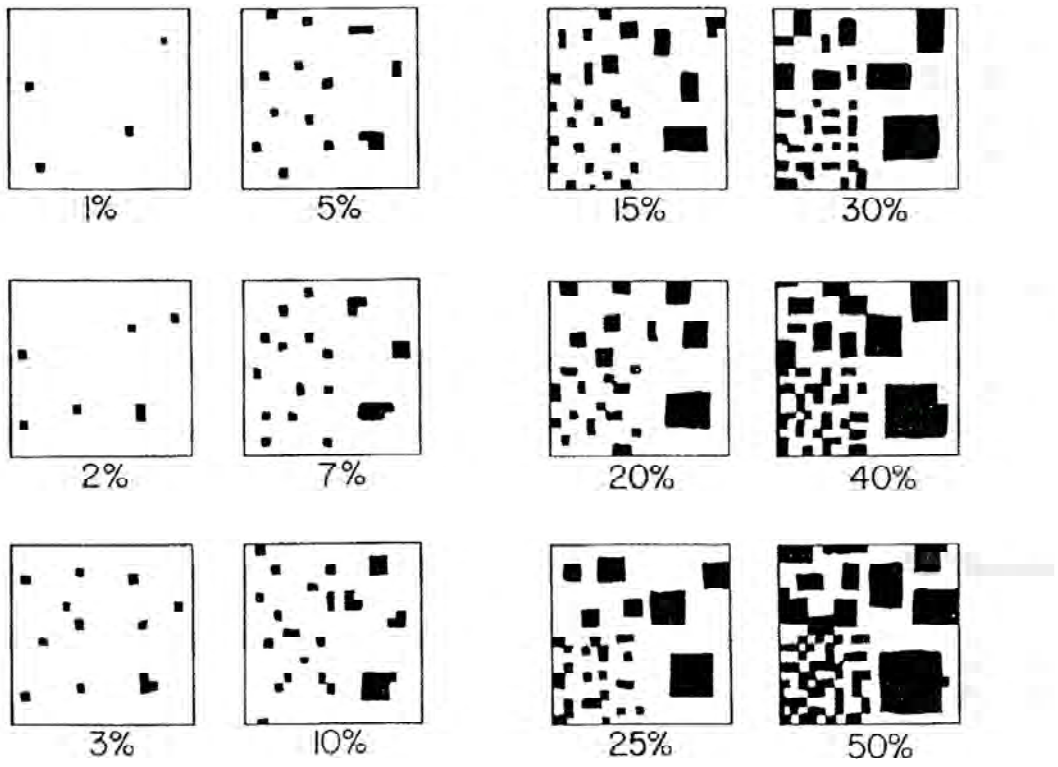
Utah Watershed Map
From http://waterquality.utah.gov/watersheds/state.htm



APPENDIX B
Sample Assessment Area (AA) Diagrams



APPENDIX C
Guidelines for Estimating %Coverage or %Canopy Closure



Note: To Estimate percentages >50% use white portions instead of black. (e.g., to get an idea of what 75% looks like, look at 25% and use the white instead of the black). Each fourth of any one square has the same amount of black. Source: Munsell Soil Charts (1994, revised edition).

APPENDIX D
Great Basin Depressional and Slope Wetlands Profiles by Subclass

Introduction

The wetland profiles described in this booklet are based on HGM subclasses. The state is divided into three major Ecoregions – Great Basin (13), Rocky Mountain (19), and Colorado Plateau (20).

[The term "Great Basin" refers to all four Ecoregions that this appendix applies to – Central Basin and Range (13), Mojave Basin and Range (14), Wyoming Basin (18), and Northern Basin and Range (80).]

EPA Level III Ecoregions

The subclasses in the Great Basin are driven by the salinity of the water and the water regime (determined through principal components factor analysis of reference standard sites in the entire class). The salinity is based on electrical conductivity and given in dS.

The classes of salinity are as follows:

1 Low salinity < 7.5 dS
2 Moderate salinity ≥7.5 and <22.5 dS
3 High salinity / hypersaline ≥ 22.5 dS

Water regime classes for depressions are as follows:

0 Ephemeral – surface water is present in some years for brief periods (<3 months)
1 Seasonal – surface water is present in most years for 3-6 months
2 Semi permanent – surface water is common to persistent in most years for 6-12 months
3 Permanent – surface water is continuously present in all years.

Water regime classes for slopes are as follows:

1 Seasonal slope - Average depth to water table > 20 inches
2 Persistent slope - Average depth to water table ≤ 20 inches

Hydrogeomorphic Depression and Slope Wetland Class Descriptions

Depressional wetlands are topographic depressions with closed contours. Water sources are precipitation, runoff and/or groundwater. Water flow vectors are toward the center of the depression. The dominant hydrodynamics are vertical. They may or may not have inlets and outlets.

Slope wetlands occur at points of surface changes, breaks in slope or stratigraphic changes. Groundwater and runoff are the primary water sources. Water flow is unidirectional (down slope/ gradient). Water may discharge to a stream, lake or depression.

[Mineral flat wetlands occur on large relict lakebeds. Dominant water source is precipitation and dominant hydrodynamics are vertical. (Great Salt Lake mudflats and salt flats)]

Great Basin Ecoregion

The ecoregion is made up of north-south trending, fault block mountain ranges whose bases are buried in their own alluvium. Valley bottoms often contain salt pans, salt flats or fresh to saline lakes and ponds. The slopes directly above the pans are complexes of alluvial fans. Valleys on the east sides of the mountains tend to fall less steeply and are generally longer than those on the west sides. There are few perennial streams (all drain internally) and there are many small springs. Large lakes and marshes occur in the valley bottoms and may be fresh or saline. The natural vegetation from low to higher elevations is saltbrush-greasewood, Great Basin sagebrush, pinyon-juniper woodland and western spruce-fir forest.

The average annual precipitation ranges from about 12 inches in the lower valleys to more than 30 inches at higher elevations. Average annual temperature is in the low 50's in the valleys and low 40's in the mountains. Summers are usually hot and dry. Most of the summer precipitation is the result of thunderstorms that build up over the mountains. Precipitation is light during the summer and early fall. It reaches a maximum in the spring when storms moving in from the Pacific are most intense. About one third of the precipitation falls as snow during the period between December and March.

Soils in the region range from mesic Aridisols at low elevations to frigid Mollisols at higher elevations. Entisols occur on fans, floodplains and in valley bottoms. Basin soils are often saline and alkaline.

Seasonal or Semi Permanent Depressions - hypersaline (EC > 22.5 dS)

(These sites may be moderately saline (7.5 – 22.5 dS) at other times of the year)

Vegetation index of biological integrity (VIBI) = (native/noninvasive score + index of similarity) / 2

Native/noninvasive score = ratio of native/noninvasive species* in the five dominant species / 5 or the total number of dominants if less than 5.

Index of similarity = ratio of number of species at site found in reference standard sites / number of species found at site

Descriptive Statistics hypersaline reference standard sites				
	Minimum	Maximum	Mean	Std. Deviation
Elevation ft	4,202	4,520	4,284.56	134.03
Native species	1.00	1.00	1.00	0.00
Indicator species*	0.80	0.96	0.88	0.05
Vegetation cover	0.21	0.35	0.27	0.06
TDS water ppm	13,800.00	341,980.00	73,000.00	106,970.60
TSS water mg/L	202.00	365.00	243.00	70.58
EC water dS	24.10	100.00	49.53	23.21
Water pH	7.00	8.30	7.61	0.37
Nitrate-N water mg/L	0.11	0.22	0.18	0.04
Phosphates water mg/L	0.03	0.12	0.07	0.04
NP ratio water	1.42	4.00	3.15	1.19
Silica water mg/L	6.32	21.02	14.94	6.51
Cadmium water mg/L	0.02	0.02	0.02	0.00
Lead water mg/L	0.03	0.06	0.04	0.02
Soil pH	7.68	7.82	7.73	0.05
Soil EC dS	14.10	440.00	131.79	127.59
Soil organic carbon %	2.92	8.63	5.87	2.34
Soil total nitrogen %	0.03	0.29	0.11	0.09
Soil CN ratio	11.55	287.67	114.46	107.50
Cadmium mg/kg	0.05	0.10	0.08	0.03
Lead mg/kg	0.16	1.81	0.84	0.81

Dominant species

1st dominant - *Distichlis stricta* (desert salt grass) is always the first dominant in reference sites with average cover of .26 and it makes up an average of 84% of the total vegetative cover

2nd dominant – *Salicornia utahensis* (Utah samphire) or more often, *Salicornia europaea* (annual samphire) are the second dominant in all reference sites with average cover of .03

3rd dominant - *Triglochin maritima* (maritime arrowgrass) or *Cordylanthus maritimus* (alkali birdsbeak) with average cover of .01 *Scirpus maritimus* (alkali bulrush) at .01 with some disturbance

4th dominant – *Suaeda depressa* (broom seepweed), *Triglochin palustris* (marsh arrowgrass) with average cover of .01

5th dominant – *Sporobolus airoides* (alkali saccaton) and *Triglochin maritima* (maritime arrowgrass) with average cover of .01

Vegetation species richness

Average species richness is 4 (range 1-5), often including -*Distichlis stricta* (desert salt grass), *Salicornia europaea* (annual samphire) and *Triglochin maritima* (maritime arrowgrass). Species richness tends to increase with disturbance, with average species richness increasing to between 6 and 7 species.

Typical invasive species
Hordeum jubatum (foxtail barley), *Phragmites australis* (common reed), *Kochia scoparia* (summer cypress)

Plant list for reference standard sites
Distichlis stricta (desert salt grass)
Salicornia europea / utahensis (annual and Utah samphire)
Triglochin maritima / palustris (maritime and marsh arrowgrass)
Cordylanthus maritimus (alkali birdsbeak)
Scirpus maritimus (alkali bulrush)
Suaeda depressa (broom seepweed)
Sporobolus airoides (alkali saccaton)

Sites surveyed are located in Box Elder, Salt Lake, Tooele and Utah Counties. All sites in Salt Lake and Tooele Counties are below 4217 feet.

Site location and vegetation scores

Sites	Easting	Northing	Reference	VIBI	Richness
goshenplaya1	12424531	4422782	1.00	1.00	5.00
goshenplaya3	12424531	4422782	1.00	1.00	5.00
saltwellsplaya1	12356517	4619352	1.00	1.00	5.00
saltwellsplaya2	12356517	4619352	1.00	1.00	5.00
saltwellsplaya3	12356517	4619352	1.00	1.00	5.00
goshensalt4	12422972	4428245	1.00	1.00	1.00
bluelakeplaya2	11751222	4487832	.93	.86	7.00
plover	12367854	4508863	.93	1.00	2.00
plover2	12367847	4508875	.93	1.00	3.00
limestone1	12364323	4509462	.93	1.00	3.00
limestone2	12364323	4509462	.93	.73	6.00
southpond1	12406732	4515154	.75	.76	7.00
northpond	12404703	4517581	.75	.51	7.00
saltwellspond1	12356483	4619286	.75	.83	6.00

Plover Playa, Tooele County

Salt Wells Playa, Box Elder County

Goshen Playa, Utah County

Seasonal Depressions - moderately saline (7.5 – 22.5 dS)

Vegetation index of biological integrity (VIBI) = (native/noninvasive score + index of similarity) / 2

Native/noninvasive score = ratio of native/noninvasive species in the five dominant species / 5 or the total number of dominants if less than 5

Index of similarity = ratio of number of species at site found in reference standard sites / number of species found at site

Descriptive Statistics seasonal moderately saline reference standard sites				
	Minimum	Maximum	Mean	Std. Deviation
Species richness	5.00	11.00	7.17	2.04
Elevation ft	4,217	4,520	7.17	116.95
Native species	1.00	1.00	1.00	0.00
Indicator species	0.80	0.96	0.91	0.07
Vegetation cover	0.33	0.44	0.36	0.04
TDS water ppm	5,400.00	7,926.00	6,849.33	852.17
TSS water mg/L	25.00	83.00	50.33	29.69
EC water dS	9.00	13.20	10.98	1.58
water pH	8.50	9.80	9.09	0.54
Nitrate-N water mg/L	0.05	0.16	0.09	0.06
Phosphate water mg/L	0.01	0.02	0.01	0.00
NP ratio water	5.00	16.00	7.80	4.76
Silica water mg/L	0.56	11.86	5.07	5.05
Cadmium water mg/L	0.02	0.02	0.02	
Lead water mg/L	0.03	0.06	0.06	
Soil pH	7.60	8.87	8.07	0.53
Soil EC dS	29.00	590.00	160.67	214.12
Soil organic carbon %	2.92	12.20	6.62	3.83
Soil total nitrogen %	0.01	0.19	0.10	0.07
Soil CN ratio	17.18	356.00	129.76	123.70
Cadmium mg/kg	0.05	0.10	0.06	0.03
Lead mg/kg	0.15	7.21	3.43	2.98

Dominant species

1st dominant - *Distichlis stricta* (desert salt grass) is always the first dominant in reference sites with average cover of .28.

2nd / 3rd dominant – Salicornia *utahensis* (Utah samphire)(average cover .01) in 67% of sites, *Scirpus maritimus* (alkali bulrush) (average cover .02) in 83% of sites or *Salicornia europaea* (annual samphire) (average cover .05) in 33 % of sites.

4th and 5th dominant – *Triglochin spp* (arrowgrass) (average cover .01) in 50% of sites, *Allenrolfea occidentalis* (iodine bush) (average cover .01) in 16 %, *Sarcobatus vermiculatus* (greasewood) (average cover .01) in 16% of sites.

Other species occurring

Puccinellia nuttalliana (Nuttall's alkaligrass), *Scirpus acutus* (hardstem bulrush) and *S. americanus* (Olney's threesquare)

Nonnative/ invasive species

Hordeum jubatum (foxtail barley), *Polypogon monspeliensis* (rabbitfoot grass)

Vegetation species richness
Species richness of plants in reference sites averages 7 species, ranging from 5-7. In disturbed sites, it falls to 3 and climbs as high as 11.

Plant list for references standard sites
Distichlis stricta (desert salt grass)
Salicornia europea / utahensis (annual and Utah samphire)
Scirpus maritimus (alkali bulrush)
Triglochin maritime / palustris (maritime and marsh arrowgrass)
Allenrolfea occidentalis (iodine bush)
Scirpus acutus (hardstem bulrush)
Sarcobatus vermiculatus *(greasewood)*
Puccinellia nuttalliana (Nuttall's alkaligrass)
Suaeda depressa (broom seepweed)

Site location and vegetation scores

Site	Easting	Northing	Reference	VIBI	Richness
bluelakeplay1	11751222	4487832	0.93	1.00	7.00
bluelakeplay3	11751222	4487832	0.93	1.00	7.00
bluelakeplay4	11751222	4487832	0.93	1.00	7.00
goshenplay2	12424531	4422782	1.00	1.00	5.00
duckplaya2	12391395	4604369	0.92	1.00	6.00
migrate1	12343716	4617473	0.91	0.90	10.00
migrate2	12343716	4617473	0.91	0.90	10.00
migrate3	12343716	4617473	0.91	0.90	10.00
airport22	12411865	4519420	0.83	0.76	8.00
airport23	12411865	4519420	0.83	0.76	5.00
airport30	12411810	4519614	0.83	0.88	4.00
airport32	12411810	4519614	0.83	0.95	5.00
airport33	12411810	4519614	0.83	0.88	4.00
airport34	12411810	4519614	0.83	0.88	4.00
airport20	12411865	4519420	0.83	0.68	8.00
amalgabarrn	12422773	4634164	0.75	0.72	3.00
airport21	12411865	4519420	0.83	0.51	7.00

Salt Lake Airport, Salt Lake County

Semi permanent and permanent depressions - Moderately saline (7.5 – 22.5 dS)

Vegetation index of biological integrity (VIBI) = (native/noninvasive score + index of similarity) / 2

Native/noninvasive score = ratio of native/noninvasive species in the five dominant species / 5 or the total number of dominants if less than 5.

Index of similarity = ratio of number of species at site found in reference standard sites / number of species found at site

Descriptive Statistics semi-permanent and permanent moderately saline reference standard sites	Minimum	Maximum	Mean	Std. Deviation
Species richness	1.00	7.00	4.45	2.54
Elevation ft	4,220	4,500	4,319.00	118.38
Native species	1.00	1.00	1.00	0.00
Indicator species	0.80	0.92	0.87	0.05
Vegetation cover	0.56	0.79	0.69	0.09
TDS water ppm	6,960.00	11,520.00	9,197.45	1,885.23
TSS water mg/L	18.00	22.30	20.15	3.04
Water EC dS	10.10	20.10	15.08	3.55
Water pH	7.50	8.90	8.04	0.56
Nitrate-N water mg/L	0.03	0.21	0.09	0.08
Phosphate water mg/L	0.01	0.05	0.02	0.02
NP ratio water	1.00	21.00	7.50	9.15
Silica water mg/L	5.47	16.80	11.64	4.29
Cadmium water mg/L	0.02	0.02	0.02	0.00
Lead water mg/L	0.03	0.20	0.10	0.08
Soil pH	7.40	8.10	7.84	0.26
Soil EC dS	8.60	140.00	51.27	48.89
Soil organic carbon %	1.28	12.80	6.09	3.60
Soil total nitrogen %	0.08	0.57	0.21	0.14
Soil CN ratio	12.13	67.37	33.96	22.10
Cadmium mg/kg	0.02	0.10	0.05	0.02
Lead mg/kg	0.44	5.22	2.40	1.79

Dominant species

1st dominant - *Distichlis stricta* (desert salt grass) is always the first dominant in reference sites with average cover of .56.

2nd / 3rd dominant – *Salicornia utahensis* (Utah samphire) (average cover .02) in 18 % of sites, *Scirpus americanus* (Olney's threesquare) (average cover .07) in 73% of sites, *Juncus arcticus* (wiregrass) (average cover .11) in 18% or *Eleocharis palustris* (common spikerush) (average cover .07) in 27 % of sites.

4th and 5thdominant – *Triglochin spp* (arrowgrass) (average cover .01) in 27% of sites, *Sporobolus airoides* (alkali saccaton) (average cover .02) in 27% of sites and *Cordylanthus maritimus* (alkali birdsbeak) (average cover .01) in 18% of sites

Other species occurring

Puccinellia nuttalliana (Nuttall's alkaligrass), *Allenrolfea occidentalis* (iodine bush), *Suaeda depressa* (broom seepweed)

Nonnative/invasive species

Bromus tectorum (cheatgrass), *Hordeum jubatum* (foxtail barley) *and glaucum/murinum* (rabbit barley), *Phragmites australis* (common reed)

Vegetation species richness

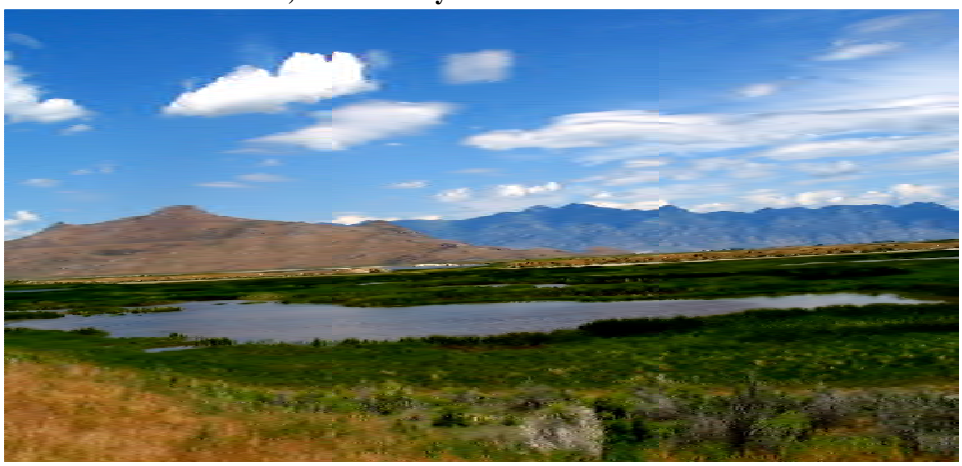
In reference sites, average is 4 species, ranging from 1-7. In disturbed sites, it climbs as high as 11.

Plants list for reference sites
Distichlis stricta (desert salt grass)
Scirpus americanus (Olney's threesquare)
Juncus arcticus/ balticus (wiregrass)
Eleocharis palustris (common spikerush)
Salicornia utahensis (Utah samphire)
Triglochin maritima/ palustris (maritime and marsh arrowgrass)
Sporobolus airoides (alkali saccaton)
Cordylanthus maritimus (alkali birdsbeak)
Scirpus acutus (hardstem bulrush)
Scirpus maritimus (alkali bulrush) *Allenrolfea occidentalis* (iodine bush)
Suaeda depressa (broom seepweed)
Puccinellia nuttalliana (Nuttall's alkaligrass)

Site location and vegetation scores

Site	Easting	Northing	Reference	VIBI	Richness
bluelakepond1	11750755	4487823	1.00	1.00	5.00
horseshoe2	12355359	4497291	0.92	0.47	9.00
bluelakespring2	11750368	4487395	1.00	1.00	7.00
saltwellsm1	12356059	4621998	1.00	1.00	3.00
southhull	12391552	4602077	0.92	0.85	10.00
bullrush	12366021	4507953	0.83	1.00	4.00
cement	12366922	4507159	0.92	1.00	4.00
goshenssalt2	12423251	4427893	1.00	1.00	1.00
goshenssalt1	12423251	4427893	1.00	1.00	1.00
bluelakepond 2	11750755	4487823	1.00	1.00	8.00
bluelakespringu	11750368	4487395	1.00	1.00	7.00
horseshoe 1	12355359	4497291	0.92	0.61	8.00
lowerwest1	12405269	4516670	0.75	0.62	7.00
lowerwest2	12405269	4516670	0.75	0.59	6.00
bluelakepond3	11750779	4487646	1.00	1.00	7.00
lowerwest3	12405269	4516670	0.75	0.50	6.00
saltwellsm 2	12356059	4621998	1.00	1.00	2.00
saltwellsm 3	12356059	4621998	1.00	1.00	4.00
goshensalt3	12423251	4427893	1.00	1.00	1.00
goggin1	12405792	4518993	0.75	0.47	3.00
goggin2	12405792	4518993	0.75	0.68	4.00

South of Goshen, Utah County



South of Hull Lake, Public Shooting Grounds, Box Elder County

Pond in Blue Lake Complex, Tooele County Pond in Blue Lake Complex, Tooele County

Seasonal, semi permanent and permanent depressions – freshwater (EC≤ 7.5 dS)

Note: There are virtually no natural, unimpacted sites in this subclass. All natural sites are impacted to some degree and all other sites are created or 'enhanced'/impounded management areas.

Vegetation index of biological integrity (VIBI) = (native/noninvasive score + index of similarity) / 2

Native/noninvasive score = ratio of native/noninvasive species in the five dominant species / 5 or the total number of dominants if less than 5.

Index of similarity = ratio of number of species at site found in reference standard sites / number of species found at site

Seasonal freshwater depressions

Among the seasonal sites, water quality is least impacted at Duck Lake, Public Shooting Grounds, although lead is elevated (.06), with the average being .02-.03 mg/L. Duck Lake scores a 1.00 for it's vegetation IBI.

Water chemistry Duck Lake	
TDS ppm	4792
TSS mg/L	43
EC dS	6.90
PH	8.90
Nitrate-N mg/L	.05
Phosphates mg/L	.04
NP ratio	1.39
Silica mg/L	5.86
Lead mg/L	.06
Cadmium mg/L	.02

Descriptive Statistics freshwater seasonal reference standard sites

	Minimum	Maximum	Mean	Std. Deviation
Elevation ft	4,205	4,221	4,213.00	11.31
Native species	0.80	1.00	0.90	0.14
Indicator species	0.80	0.92	0.86	0.08
Vegetation cover	0.46	0.50	0.48	0.03
TDS water ppm	3,420.00	4,792.00	4,106.00	970.15
TSS water mg/L	43.00	67.50	55.25	17.32
Water EC dS	5.70	6.90	6.30	0.85
Water pH	8.30	8.90	8.60	0.42
Nitrate-N water mg/L	0.05	0.65	0.35	0.42
Phosphate water mg/L	0.03	0.04	0.03	0.00
NP ratio water	1.39	21.67	11.53	14.34
Silica water mg/L	5.86	14.32	10.09	5.98
Lead water mg/L	0.05	0.06	0.06	0.01
Cadmium water mg/L	0.02	0.02	0.02	0.00
Soil pH	8.52	8.61	8.57	0.06
Soil EC dS	2.00	99.00	50.50	68.59
Soil organic carbon %	3.41	3.49	3.45	0.06
Soil total nitrogen %	0.04	0.10	0.07	0.04
Soil CN ratio	34.10	87.25	60.68	37.58
Cadmium soil mg/kg	0.05	0.10	0.08	0.04
Lead soil mg/kg	7.21	10.80	9.01	2.54

Dominant species
1st dominant **-** *Distichlis stricta* (desert salt grass) (average cover .22) in all reference sites
2nd dominant **-** *Scirpus americanus* (Olney's threesquare) and/or *Scirpus maritimus* (alkali bulrush) (average cover .11) in all reference sites
3rd dominant **-** *Salicornia europaea* (annual samphire) in all reference sites (cover .06)
4th / 5th dominant - In 50 % of sites *Sarcobatus vermiculatus*(greasewood) and/or *Allenrolfea occidentalis* (iodine bush) (cver .01)

Species occasionally occurring
Puccinellia nuttalliana (Nuttall's alkaligrass) *Poa palustris* (fowl bluegrass)

Common nonnative and invasive species
Polypogon monspeliensis (rabbitfoot grass), *Hordeum jubatum* (foxtail barley), *Phragmites australis* (common reed), *Typha spp* (cattail), *Agrostis stolonifera* (redtop bentgrass)

Vegetation species richness
In reference standard sites average species richness is 6. In disturbed sites it climbs as high as 15 species. In general, disturbance increases the species diversity.

Plants list for reference standard sites
Distichlis stricta (desert salt grass)
Scirpus americanus (Olney's threesquare)
Scirpus acutus (hardstem bulrush)
Scirpus maritimus (alkali bulrush)
Eleocharis palustris (common spikerush)
Alisma plantago-aquatica (water plantain)
Salicornia europaea (annual samphire)
Salicornia utahensis (Utah samphire)
*Poa palustris (fowl bluegrass)**
Juncus arcticus (wiregrass)
Allenrolfea occidentalis (iodine bush)
Carex praegracilis (blackcreeper or clustered field sedge)
Carex nebrascensis (Nebraska sedge)
Carex spp.
Iris missouriensis * (Missouri iris)
Nitrophila occidentalis (western boraxweed or niterwort)
Elymus triticoides (beardless or creeping wild rye)
Potamogeton species (pondweed)
Agropyron trachycaulum (slender wheatgrass)
Potentilla anserina (common silverweed)
Senecio hydrophilus (water groundsel)
Solidago missouriensis (goldenrod)
Sarcobatus vermiculatus (greasewood)
Ranunculus spp. (buttercup)
Sagitteria cuneata (arrowleaf)
Sueada depressa (seepweed)
Mentha arvensis (field mint)
Aster chilensis (common California daisy)
Asceplias speciosa (showy milkweed)

Semi-permanent and permanent depressions - freshwater

Note: Among the semi-permanent and permanent sites, water quality is least impacted at Fish Springs. It does not, however, score well on the vegetation IBI and zebra snails were collected from the site.

Water chemistry Fish Springs	
TDS ppm	348
TSS mg/L	6.50
EC dS	5.80
pH	7.70
Nitrate-N mg/L	.12
Phosphates mg/L.	01
NP ratio	12.00
Silica mg/L	9.52
Lead mg/L	.03
Cadmium mg/L	.02

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Descriptive Statistics freshwater semi- permanent and permanent reference standard sites

	Minimum	Maximum	Mean	Std. Deviation
Elevation ft	4,204	4,784	4,441.33	280.78
Native species	0.80	1.00	0.87	0.10
Indicator species	0.92	1.00	0.95	0.03
Vegetation cover	0.62	0.84	0.76	0.09
TDS water ppm	480.00	3,420.00	1,374.67	1,135.75
TSS water mg/L	17.50	169.00	60.60	63.77
EC water dS	0.80	5.70	2.19	1.85
pH water	7.60	9.40	8.47	0.76
Nitrate-N water mg/L	0.04	0.65	0.26	0.27
Phosphates water mg/L	0.02	0.70	0.15	0.27
NP ratio water	0.17	27.50	9.65	11.98
Silica water mg/L	6.22	24.48	13.38	6.91
Lead water mg/L	0.03	0.03	0.03	0.00
Cadmium water mg/L	0.02	0.02	0.02	0.00
Soil pH	7.07	8.52	7.81	0.55
Soil EC dS	1.50	5.40	2.38	1.50
Soil organic carbon %	3.41	11.40	7.35	3.61
Soil Total nitrogen %	0.10	1.02	0.62	0.39
Soil CN ratio	9.27	34.10	15.68	9.48
Cadmium mg/kg	0.02	0.14	0.07	0.05
Lead mg/kg	0.46	25.26	7.99	9.53

Dominant species

1st dominant **-** *Eleocharis palustris* (common spikerush) (average cover .29) in 75% reference sites

2nd dominant **-** *Scirpus spp***.,** usually *Scirpus americanus* (Olney's threesquare) (average cover .23) in all reference sites

3rd dominant - *Juncus arcticus* (wiregrass) in 75% reference sites (average cover .09)

4th / 5th dominant - In 50 % of sites *Distichlis stricta* (desert salt grass) (average cover .14)

Species occasionally occurring
Alisma plantago-aquatica (water plantain), *Potamogeton* spp. (pondweed), *Carex praegracilis* (blackcreeper or clustered field sedge), *Iris missouriensis* (Missouri iris), *Asclepias speciosa* (showy milkweed)

Common nonnative and invasive species
Polypogon monspeliensis (rabbitfoot grass), *Hordeum jubatum* (foxtail barley), *Phragmites australis* (common reed), *Typha spp*(cattail), *Rumex crispus* (curley dock), *Nasturtium officinale* (watercress), *Trifolium repens* (white clover), *Lythrum salicaria*** (purple loosestrife)

Vegetation species richness
In reference standard sites average species richness is 11-12. In disturbed sites it climbs as high as 22-23 or drops as low as 5 species.

Plants list for reference standard sites
Distichlis stricta (desert salt grass)
Scirpus americanus (Olney's threesquare)
Scirpus acutus (hardstem bulrush)
Scirpus maritimus (alkali bulrush)
Eleocharis palustris (common spikerush)
Alisma plantago-aquatica *(water plantain)*
Salicornia europaea (annual samphire)
Salicornia utahensis (Utah samphire)
Poa palustris *(fowl bluegrass)*
Juncus arcticus (wiregrass)
Allenrolfea occidentalis (iodine bush)
Carex praegracilis (blackcreeper or clustered field sedge)
Carex nebrascensis (Nebraska sedge)
Carex spp.
Iris missouriensis (Missouri iris)
Nitrophila occidentalis (western boraxweed or niterwort)
Elymus triticoides (beardless or creeping wild rye)
Potamogeton species (pondweed)
Agropyron trachycaulum (slender wheatgrass)
Potentilla anserina (common silverweed)
Senecio hydrophilus (water groundsel)
Solidago missouriensis (goldenrod)
Sarcobatus vermiculatus (greasewood)
Ranunculus spp. (buttercup)
Sagitteria cuneata (arrowleaf)
Sueada depressa (seepweed)
Mentha arvensis (field mint)
Aster chilensis (common California daisy)
Asceplias speciosa (showy milkweed)
** at one site in the semi-permanent / permanent sites , we found exotic zebra snails which are a vector for a fish killing disease and are reported from another site in this group of surveyed sites
** at one seasonal site – found New Zealand mud snails

Site location and vegetation scores

Site	Easting	Northing	Reference	VIBI	Richness
kayscreekpond	12414754	4541873	0.90	0.61	14.00
towerpond	12413714	4543006	0.95	0.78	8.00
airport24	12411865	4519420	0.83	0.60	5.00
duckplaya	12391505	4604408	0.97	1.00	6.00
lelandharrislow	12251791	4382891	0.93	1.00	11.00
2impoundfbwma2	12423882	4531348	0.85	0.49	7.00
davispond2	12423276	4534161	0.90	0.59	7.00
lelandharrisup	12251791	4382891	0.93	0.79	22.00
davispond	12423291	4533882	0.90	0.40	10.00
2impoundfbwma	12423882	4531348	0.85	0.40	5.00
airportpond	12411607	4518726	0.58	0.51	12.00
nolaneplaya	12422670	4624969	0.90	0.76	7.00
nolaneplaya2	12422670	4624969	0.90	0.59	7.00
loosestrife	12421789	4523685	0.33	0.20	25.00
upperwestpond2	12405451	4516624	0.75	0.39	8.00
upperwestpond	12405451	4516624	0.75	0.39	8.00
dumppond	12422453	4528844	0.58	0.31	14.00
bearriverbottoms1	12424787	4641273	0.92	0.63	12.00
tncpond	12410229	4544016	0.83	0.66	7.00
bearriverbottoms2	12424787	4641273	0.92	0.63	12.00
fishspring1	12293681	4418044	0.87	0.69	12.00

Duck Playa – Public Shooting Grounds

Leland Harris Complex, Juab County

TNC Layton Marsh, Davis County

Ephemeral depressions

Vegetation index of biological integrity (VIBI) = (native/noninvasive score + index of similarity) / 2

Native/noninvasive score = ratio of native/noninvasive species in the five dominant species / 5 or the total number of dominants if less than 5.

Index of similarity = ratio of number of species at site found in reference standard sites / number of species found at site

Descriptive Statistics ephemeral reference standard sites	Minimum	Maximum	Mean	Std. Deviation
Elevation ft	4,205	4,210	4,206.67	2.89
Native species	0.67	1.00	0.89	0.19
Indicator	0.67	1.00	0.89	0.19
Cover	0.05	0.29	0.21	0.14
TDS water ppm	10,100.00	26,400.00	18,250.00	11,525.84
Water EC dS	17.70	46.50	32.10	20.36
Water pH	7.90	7.90	7.90	0.00
Soil pH	8.20	8.30	8.23	0.06
Soil EC dS	93.00	103.00	99.67	5.77
Soil organic carbon %	0.56	1.30	0.81	0.43
Soil total nitrogen %	0.06	0.07	0.06	0.01
Soil CN ratio	9.33	19.00	12.56	5.58
Cadmium soil mg/kg	0.09	0.09	0.09	.
Lead soil mg/kg	15.50	15.50	15.50	.

Dominant species
1st dominant - *Salicornia europaea* (annual samphire) is the dominant species in all reference sites with an average cover of .20
2nd dominant - *Sarcobatus vermiculatus* (greasewood) occurs in 33% of sites with an average cover of .01

Invasive species include
Hordeum jubatum (foxtail barley) and *murinum* (rabbit barley), *Kochia scoparia* (summer cypress), *Puccinellia distans* (weeping alkaligrass)

Species richness
Average species richness is 1-2 species. With disturbance richness climbs to 5-6 species.

Plant list for reference standard sites
Salicornia europaea (annual samphire)
Sarcobatus vermiculatus (greasewood)

Site location and vegetation scores

Site	Easting	Northing	Reference	VIBI
southdryplaya	12405656	4515582	0.75	0.88
woodscross	12420469	4526895	0.75	0.67
airport4	12411809	4519365	0.83	0.80
brownisland	12409199	4520497	1.00	0.84
lakeplaya2	12410247	4544574	1.00	1.00
lakeplaya1	12410247	4544574	1.00	1.00

Playa on The Nature Conservancy Layton Marshes at 4205 ft. It has had water 2 of the last 8 years, water was overflow from GSL.

Freshwater seasonal and persistent slopes

Vegetation index of biological integrity (VIBI) = (native/noninvasive score + index of similarity) / 2

Native/noninvasive score **=** ratio of native/noninvasive species in the five dominant species **/** 5 or the total number of dominants if less than 5

= ratio of number of species at site found in reference standard sites **/** number Index of similarity of species found at site

Dominant species

1st dominant -*Eleocharis palustris* (common spikerush) in all reference sites
2nd dominant -*Distichlis stricta* (desert salt grass) 70% of sites
3rd dominant -*Juncus arcticus* (wiregrass) 60% of sites
4th dominant -*Carex nebrascensis* (Nebraska sedge) and *Scirpus americanus* (Olney's threesquare) 50% of sites
5th dominant -*Carex lanuginosa* (wooley sedge), *praegracilis* (blackcreeper or clustered field sedge) or *microptera* (small wing sedge) 40% of sites

Others species

Puccinellia nuttalliana (Nuttall's alkaligrass), *Carex simulata* (short beaked sedge), *Scirpus acutus* (hardstem bulrush), *Mentha arvense* (field mint), *Mimulus guttatus* (common monkey flower), *Sagattaria cuneata* (arrowleaf), *Ranunculus spp.* (buttercup)

Invasive species

Trifolium repens (white clover), *Polypogon monspeliensis* (rabbitfoot grass), *Polypogon interruptis, Hordeum marinum* (Mediterranean barley), *Nasturtium officinale* (watercress), *Rumex crispus* (curley

dock), *Xanthium strumarium* (cocklebur), *Lactuca serriola* (prickly lettuce), various species of *Elymus/Agropyron* and their hybrids, *Agrostis stolonifera*(redtop bentgrass), *Poa pratensis* (Kentucky bluegrass)

Vegetation species richness
In reference sites, species richness averages 13 and ranges from 10-21 species.

Descriptive Statistics reference standard slopes by salinity				
Water salinity		Minimum	Maximum	Mean
nonsaline	**species richness**	10.00	21.00	13.14
	water EC dS	1.04	7.00	3.69
	native species	1.00	1.00	1.00
	shrub	0.000	0.000	0.00
	herb	0.81	0.95	0.87
	TDS ppm	508.00	3,750.00	2175.60
	water pH	7.30	8.50	7.86
	soil pH	7.60	8.10	7.88
	soil EC dS	1.40	16.00	6.06
	soil organic carbon	1.66	11.80	6.82
	soil total nitrogen	0.09	0.63	0.35
	CN ratio	12.00	48.00	23.33
	Cadium mg/kg	0.050	0.100	0.08
	Lead mg/kg	1.240	2.790	2.02

Plant list for all reference standard slope sites
Carex nebrascensis **(**Nebraska sedge)
Carex praegracilis (blackcreeper or clustered field sedge)
Carex lanuginosa (wooley sedge)
Carex microptera (small wing sedge)
Carex simulate (short beaked sedge)
Eleocharis palustris (common spikerush)
Eleocharis rostellata (Torrey's spikerush)
Scirpus acutus (hardstem bulrush)
Scirpus americanus (Olney's threesquare)
Scirpus maritimus (alkali bulrush)
Juncus arcticus (wiregrass)
Juncus ensifolious (swordleaf rush)
Juncus torreyi (Torrey's rush)
Distichlis stricta (desert salt grass)
Agropyron trachycaulum (slender wheatgrass)
Elymus triticoides (beardless or creeping wild rye)
Sphenopholis obtusato (prairie wedge grass)
Sporobolus airoides (alkali saccaton)
Solidago missouriensis (Missouri goldenrod)
Allenrolfea occidentalis (iodine bush)
Rosa woodsii (Woods rose)
Sarcobatus vermiculatus (greasewood)
Centaurium exaltatum (Great Basin centaury)
Cicuta douglasii (water hemlock)

Comandra umbellate (bastard toadflax)
Cordylanthus maritimus (alkali birdsbeak)
Epilobium ciliatum (northern willowherb)
Iris missouriensis (Missouri iris)
Lycopus asper (rough bungleweed)
Mentha arvense (field mint)
Mimulus guttatus (common monkey flower)
Nitrophilia occidentalis (western boraxweed or niterwort)
Potentilla anserine (common silverweed)
Potamogeton spp (pondweed)
Ranunculus scleleratus/cymbalaria (blister and marsh buttercup)
Sagitteria cuneata (arrowleaf)
Salicornia europea/ utahensis (annual and Utah samphire)
Senecio hydrophilus (water groundsel)
Sium suave (hemlock water parsnip)
Suaeda depressa (broom seepweed)
Triglochin maritime (annual samphire)
Veronica americana (American brookline)

Nonsaline slope location and vegetation scores

Site	Easting	Northing	Reference	Richness	VIBI
bearriverrf2	12,411,624	4,591,521	0.75	19.00	0.67
bearriverrf2b	12,411,624	4,591,521	0.75	18.00	0.66
brigham1	12,412,115	4,594,651	0.75	13.00	0.53
gloverlane	12,423,901	4,534,960	0.67	12.00	0.37
loosestrife	12,421,789	4,523,685	0.42	25.00	0.20
fairgrounda	12,424,094	4,536,103	0.58	16.00	0.55
brigham2	12,412,778	4,594,643	0.75	11.00	0.47
fairgroundc	12,424,094	4,536,103	0.58	16.00	0.45
benjamin2	12,432,138	4,440,077	0.83	13.00	0.85
goshenbay1	12,426,300	4,428,770	0.75	13.00	0.81
goshenbay2	12,426,601	4,428,770	0.75	13.00	0.81
fairgroundb	12,424,094	4,536,103	0.58	22.00	0.52
bearriverrf1a	12,411,738	4,591,329	0.75	15.00	0.87
bearriverrf1b	12,411,738	4,591,329	0.75	15.00	0.87
perry1	12,412,406	4,592,864	0.75	15.00	0.70
perry2	12,412,406	4,592,864	0.75	16.00	0.58
golfb	12,421,732	4,525,130	0.83	10.00	0.80
golfc	12,421,732	4,525,130	0.83	11.00	0.72
quaketnc2	12,414,988	4,543,880	0.83	19.00	0.64
widgeond	12,391,114	4,602,958	0.95	10.00	1.00

deweyville2	12,410,137	4,618,868	0.83	10.00	0.65
quaketnc	12,414,602	4,543,952	0.83	19.00	0.84
deweyville1	12,409,736	4,619,723	0.83	17.00	0.64
deweyville1b	12,409,736	4,619,723	0.83	17.00	0.64
gandy2	12,249,321	4,375,542	0.90	21.00	0.90
gandy1	12,249,321	4,375,542	0.90	21.00	0.90
laytonc	12,414,485	4,543,911	0.83	23.00	0.64
laytona	12,414,485	4,543,911	0.83	18.00	0.71
benjamin1b	12,431,549	4,442,738	0.95	10.00	0.90
benjamin1	12,431,549	4,442,738	0.95	10.00	0.90
laytonb	12,414,485	4,543,911	0.83	20.00	0.70
widgeonc	12,391,114	4,602,958	0.95	4.00	0.75
golfa	12,421,732	4,525,130	0.83	11.00	0.72
widgeonb	12,391,350	4,603,011	0.95	10.00	0.90

Moderately and hypersaline persistent slopes

Vegetation index of biological integrity (VIBI) = (native/noninvasive score + index of similarity) / 2

Native/noninvasive score **=** ratio of native/noninvasive species in the five dominant species / 5 or the total number of dominants if less than 5.

Index of similarity **=** ratio of number of species at site found in reference standard sites / number of species found at site.

Dominant species

1st dominant - *Distichlis stricta* (desert salt grass) in all reference standard sites
2nd dominant -*Scirpus americanus* (Olney's threesquare) in 83% of sites
3rd dominant -*Juncus arcticus* (wiregrass) in 42% of sites
4th dominant -*Scirpus maritimus* (alkali bulrush), *Sporobolus airoides* (alkali saccaton), *Triglochin spp*. (arrowgrass) in 25% of sites
5th dominant -*Salicornia utahensis* (Utah samphire), *Cordylanthus maritimus* (alkali birdsbeak), *Eleocharis palustris* (common spikerush) in 17% of sites

Other species

Suaeda depressa (broom seepweed), *Scirpus acutus* (hardstem bulrush), *Allenrolfea occidentalis*(iodine bush)

Invasive species

Hordeum jubatum (foxtail barley), *Kochia scoparia* (summer cypress), *Elaeagnus angustfolia* (Russian olive), *Helianthus annuus* (common sunflower)

Vegetation species richness

In reference sites average species richness is 4 species, ranging from 1-7 species.

Descriptive Statistics reference standard slopes by salinity				
Water salinity		Minimum	Maximum	Mean
saline				
	water EC dS	12.70	19.90	15.91
	native species	1.00	1.00	1.00
	shrub	0.000	0.030	0.00
	herb	0.48	0.84	0.69
	TDS ppm	7,110.00	11,200.00	8630.00
	water pH	7.60	8.30	7.88
	soil pH	7.40	8.10	7.81
	soil EC dS	4.00	53.00	23.91
	soil organic carbon	1.20	12.67	4.62
	soil total nitrogen	0.08	0.45	0.21
	CN ratio	6.00	67.00	25.22
	Cadium mg/kg	0.050	0.100	0.06
	Lead mg/kg	1.460	6.080	3.18

Saline slope location and vegetation scores

Site	Easting	Northing	Reference	Richness	VIBI
widgeona	12,391,350	4,603,011	0.95	10.00	0.92
bluelake	11,751,442	4,487,440	0.86	5.00	1.00
benjamin3	12,436,336	4,443,966	0.83	6.00	0.67
horseshoeb	12,355,130	4,497,501	0.95	5.00	0.61
saltwellsr2	12,357,605	4,619,010	0.95	4.00	1.00
loco2	12,339,098	4,617,039	0.75	6.00	0.93
bluelakeupper	11,750,454	4,487,219	1.00	5.00	1.00
bluelakeuppond	11,750,965	4,487,491	1.00	7.00	1.00
goshensalta	12,423,251	4,427,893	0.95	1.00	1.00
bluelakeupspring	11,750,454	4,487,219	1.00	7.00	1.00
saltwellsr1	12,357,384	4,619,132	0.92	6.00	0.93
horseshoea	12,355,130	4,497,501	0.95	8.00	0.71
goshenssaltc	12,423,251	4,427,893	0.95	1.00	1.00
saltwellsm	12,356,043	4,621,738	1.00	4.00	1.00
saltwellsm2	12,356,043	4,621,738	1.00	4.00	1.00
goshenssaltb	12,423,251	4,427,893	0.95	1.00	1.00
saltwellsm3	12,356,043	4,621,738	1.00	4.00	1.00
bluelakeplaya	11,751,214	4,487,592	1.00	7.00	0.79
saltcreek1b	12,395,790	4,613,172	0.83	9.00	0.79
saltcreek1	12,395,790	4,613,172	0.83	9.00	0.79
jordon	12,422,106	4,483,009	0.75	7.00	0.61
saltcreek2	12,395,746	4,613,209	0.83	13.00	0.75

Plant list for all reference standard slope sites
Carex nebrascensis (Nebraska sedge)
Carex praegracilis (blackcreeper or clustered field sedge)
Carex lanuginose (wooley sedge)
Carex microptera (small wing sedge)
Carex simulate (short beaked sedge)
Eleocharis palustris (common spikerush) */rostrata*
Scirpus acutus (hardstem bulrush)
Scirpus americanus (Olney's threesquare)
Scirpus maritimus (alkali bulrush)
Juncus arcticus (wiregrass)
Juncus ensifolious (swordleaf rush)
Juncus torreyi (Torrey's rush)
Distichlis stricta (desert salt grass)
Agropyron trachycaulum (slender wheatgrass)
Elymus triticoides (beardless or creeping wild rye)
Sphenopholis obtusato (prairie wedgegrass)
Sporobolus airoides (alkali saccaton)
Solidago missouriensis (Missouri goldenrod)
Allenrolfea occidentalis (iodine bush)
Rosa woodsii (Woods rose)
Centaurium exaltatum (Great Basin centaury)
Cicuta douglasii (water hemlock)
Comandra umbelleta (bastard toadflax)
Cordylanthus maritimus (alkali birdsbeak)
Epilobium ciliatum (northern willowherb)
Iris missouriensis (Missouri iris)
Lycopus asper (rough bungleweed)
Mentha arvense (field mint)
Mimulus guttatus (common monkey flower)
Nitrophilia occidentalis (western boraxweed or niterwort)
Potentilla anserine (common silverweed)
Potamogeton spp (pondweed)
Ranunculus scleleratus/cymbalaria (blister and marsh buttercup)
Sagitteria cuneata (arrowleaf)
Salicornia europea/ utahensis (annual and Utah samphire)
Senecio hydrophilus (water groundsel)
Sium suave (hemlock water parsnip)
Suaeda depressa (broom seepweed)
Triglochin maritime (annual samphire)
Veronica americana (American brookline)

Blue Lake Slope complex, Tooele County

Widgeon Marsh slope complex, managed, Public Shooting Grounds, Box Elder County

Salt Wells Meadow, Box Elder County

Salt Creek WMA, Box Elder County

Nonnative / invasive plant species

Agropyron repens
Agrostis alba
Agrostis stolonifera
Arctium minus
Bassia hyssopifolia
Berula erecta
Bidens cernua
Bromus tectorum
Chenipodium spp
Circium spp
Conium maculatum
Dipsacus sylvestris
Elaeagnus angustifolia
Fescue arundinacea, pratensis
Helianthus annuus
Hordeum jubatum, glaucum, murinum
Kochia scoparia
Lactuca serriola
Lythrum salicaria
Melilotus alba, officinalis
Nasturtium offinale
Phleum pratense
Phragmites australis
Poa pratensis, compressa, trivialis
Polypogon monspeliensis, interruptis
Puccinellia distans
Rumex crispus
Salix babylonica, fragilis
Salsola kali
Solanum dulcamara
Sonchus spp
Stachys palustris
Tamarisk spp.
Taraxacum officinale
Thlaspi arvense
Trifolium repens, fragiferum, pretense
Typha spp
Urtica dioica
Veronica anagallis-aquatica
Xanthium strumarium

APPENDIX E
Rocky Mountain / High Plateaus Depressional and Slope Wetland Profiles

Introduction

The wetland profiles described in this booklet are based on HGM subclasses. The state is divided into three major Ecoregions – Great Basin (13), Rocky Mountain (19), and Colorado Plateau (20).

[The term "Rocky Mountain / High Plateaus" refers to all three Ecoregions that this appendix applies to – Wasatch and Uinta Mountains (19), Colorado Plateaus (20), and Southern Rockies (21).]

The subclasses in Rocky Mountain ecoregion are driven by the water regime and calcium concentration of water (determined through principal components factor analysis of reference standard sites in the entire class) and wetland class.

Water regime classes for depressions are as follows:

4 Ephemeral – surface water is present in some years for brief periods (<3 months)
5 Seasonal – surface water is present in most years for 3-6 months
6 Semi permanent – surface water is common to persistent in most years for 6-12 months
7 Permanent – surface water is continuously present in all years.

Water regime classes for slopes are as follows:

3 Seasonal slope - Average depth to water table > 20 inches
4 Persistent slope - Average depth to water table ≤ 20 inches

The classes of calcium concentration are as follows:

4 poor < 10 mg/l
5 rich > 10 mg/l

As a surrogate for calcium concentrations use water EC as follows:

1 poor ≤ 0 .15 dS
2 rich > 0.15 dS

Poor wetlands are generally not receiving any groundwater.

Hydrogeomorphic Depression and Slope Wetland Class Descriptions

Depressional wetlands are topographic depressions with closed contours. Water sources are precipitation, runoff and/or groundwater. Water flow vectors are toward the center of the depression. The dominant hydrodynamics are vertical. They may or may not have inlets and outlets.

Slope wetlands occur at points of surface changes, breaks in slope or stratigraphic changes. Groundwater and runoff are the primary water sources. Water flow is unidirectional (down slope/ gradient). Water may discharge to a stream, lake or depression.

Rocky Mountain Ecoregion

The Rocky Mountain Ecoregion in Utah includes the north-south trending Wasatch Range and High Plateaus and the Uinta Mountains, which are the longest east-west trending range in North America. In the Wasatch Mountains all peaks are below 12,000 ft. In the High Plateaus higher peaks are found but the tallest, Delano Peak reaches only 12,173 ft. Extensive meadows bordered by aspen are common. In highest peak in the Uinta Mountains is King Peak at 13,498 ft. Much of the backbone of the range is over 11,000 ft. Shallow tarn lakes and grassy meadows are common.

In the winter, snow enters the region as Pacific storms, primarily from the northwest. Summer precipitation, which nearly equals the winter amounts in some locations, results from thunderstorms. The average annual temperature ranges from 35 to 45 F and varies with altitude and latitude. There is a zonation of vegetation, also controlled by

altitude, latitude and exposure. The uppermost zone is alpine tundra noted by the absence of trees. Below is the subalpine zone usually dominated by Engelmann spruce and subalpine fir. Below this is the montane zone, which is characterized by ponderosa pine and Douglas fir. After fires in the subalpine and upper montane zones, forests are often replaced by aspen or lodgepole pine. Below the montane zone is the foothill / woodland zone. Many of these slopes have shrubs dominating which include mountain mahogany and several kinds of scrub oak. Unforested parks are common in the region and are often dominated by grasses. Some are covered by sagebrush and other shrubs, such as antelope bitterbrush.

Soils in the region correspond with the vegetation, ranging from mollisols and alfisols in the montane zone to aridisols in the foothill zone. Many steep slopes and glaciated sites are inceptisols.

Rocky Mountain Depressional Wetlands
Depressional wetland location and vegetation scores

Table 1- Depressional wetland location and vegetation scores

wetland site water class 1	East	North	reference score	VIBI	species richness	elevation
boulder mtn2	12,453,434	4,223,708	0.90	0.60	9.00	11,027
lilypad	12,607,252	4,510,503	1.00	1.00	14.00	9,662
lily lake2	12,505,242	4,503,271	0.93	1.00	19.00	9,955
lily lake1	12,505,242	4,503,271	0.93	1.00	19.00	9,955
summit park	12,604,864	4,515,924	0.95	1.00	16.00	9,823
cook pothole upper	12,452,860	4,226,131	0.90	0.80	14.00	10,570
sims pothole3	12,607,743	4,508,418	1.00	1.00	10.00	9,673
lily lake1a	12,505,242	4,503,271	0.93	1.00	19.00	9,955
sims pothole4	12,607,754	4,508,472	1.00	1.00	20.00	9,813
sims pothole1	12,606,846	4,509,428	0.93	1.00	11.00	9,880
sims pothole2	12,606,846	4,509,428	0.93	1.00	9.00	9,880
boulder mtn1	12,459,403	4,217,775	0.90	0.60	10.00	10,880
big park2	12,606,250	4,513,974	0.95	1.00	26.00	9,711
big park1	12,424,787	4,641,273	0.95	1.00	26.00	9,711
cook pothole lower	12,452,832	4,225,986	0.90	0.80	12.00	10,580
geyser pass	12,654,701	4,260,928	0.98	1.00	14.00	10,530
lake park1	12,624,009	4,515,699	0.95	1.00	11.00	9,178
midway pond	12,457,414	4,493,351	1.00	1.00	15.00	8,335
lake park2	12,624,009	4,515,699	0.95	1.00	15.00	9,178
um pothole3	12,446,632	4,284,659	0.93	1.00	8.00	9,881
mill city2	12,510,926	4,521,760	0.97	1.00	13.00	9,234
gibson lower	12,447,899	4,654,068	0.93	1.00	8.00	8,465
aquarius pothole	12,449,001	4,222,275	0.90	0.70	18.00	9,211

wetland site water class 2	East	North	reference score	VIBI	species richness	elevation
um pothole1	12,447,847	4,281,872	0.95	1.00	15.00	9,467
mill city1	12,511,528	4,521,825	0.97	1.00	17.00	9,236
um pothole2	12,447,727	4,282,347	0.90	1.00	15.00	9,515
um pothole4	12,447,702	4,281,251	0.95	1.00	12.00	9,413
dry lake2	12,419,382	4,602,043	0.95	1.00	15.00	5,645
dry lake	12,419,382	4,602,043	0.95	1.00	15.00	5,645
marsh2	12,550,916	4,533,159	1.00	1.00	14.00	9,400
scad valley	12,479,358	4,371,347	0.90	0.80	9.00	8,720
gibson upper	12,447,283	4,654,476	0.90	1.00	20.00	8,565
goldhollow beaver	12,511,326	4,520,580	0.93	0.70	22.00	9,116
marsh3	12,550,916	4,533,159	1.00	1.00	14.00	9,400
whitney rd pond	12,510,588	4,522,600	0.93	1.00	20.00	9,180
marsh1	12,550,916	4,533,159	1.00	1.00	14.00	9,400
miller flat	12,478,515	4,374,745	0.90	1.00	5.00	8,800
roadhollow pond	12,509,796	4,521,936	1.00	1.00	21.00	9,237
xmas ponds lower	12,516,387	4,519,697	0.95	1.00	24.00	8,603
goldhollow pond	12,511,011	4,520,246	1.00	1.00	16.00	9,177
xmas ponds lower2	12,516,387	4,519,697	0.95	1.00	24.00	8,603
soldier hollow ponds2	12,455,868	4,479,492	0.83	0.50	31.00	5,480
soldier hollow ponds	12,455,868	4,479,492	0.83	0.40	30.00	5,480
soldier hollow ponds3	12,455,868	4,479,492	0.83	0.50	30.00	5,480

Table 2 - Descriptive Statistics Rocky Mountain reference standard depressions

Descriptive Statistics of reference standard depressions by water chemistry class					
water chemistry subclass		Minimum	Maximum	Mean	Std. Deviation
1.00	species richness	10.00	26.00	16.3636	5.42720
	native species	1.00	1.00	1.0000	0.00000
	indicator	0.92	1.00	0.9845	0.02806
	total cover	0.63	0.89	0.7700	0.08614
	TDS water	6.00	78.00	26.6667	26.17250
	TSS water	2.00	170.00	41.0556	51.32522
	EC water	0.01	0.13	0.0345	0.04204
	pH water	5.70	7.20	6.6091	0.53377
	calcium water	2.40	10.70	5.0545	2.17732
	total nitrogen water	0.04	0.16	0.0578	0.04055
	phosphorus water	0.01	0.01	0.0100	0.00000
	lead water	0.03	0.03	0.0300	0.00000
	cadmium water	0.02	0.02	0.0200	0.00000
	pH soil	4.90	6.60	5.2091	0.54673
	EC soil	0.20	1.40	0.4091	0.35058
	total organic carbon	8.00	77.50	31.0045	18.72611
	soil	0.45	1.92	1.2489	0.60843
	cadmium soil	0.06	0.27	0.1344	0.06766
	lead soil	0.05	14.80	6.4433	5.49594

Descriptive Statistics of reference standard depressions by water chemistry class					
water chemistry subclass		Minimum	Maximum	Mean	Std. Deviation
2.00	species richness	12.00	24.00	16.7500	4.02549
	native species	1.00	1.00	1.0000	0.00000
	indicator	0.88	1.00	0.9767	0.03601
	total cover	0.61	0.82	0.7200	0.06481
	TDS water	120.00	2,040.00	642.0909	675.65590
	TSS water	6.70	353.00	156.7833	136.41467
	EC water	0.20	3.40	1.0458	1.06979
	pH water	6.40	7.80	7.1075	0.47024
	calcium water	14.20	52.10	35.5417	13.20933
	total nitrogen water	0.03	0.81	0.1883	0.30740
	phosphorus water	0.01	0.94	0.2100	0.36381
	lead water	0.03	0.03	0.0300	0.00000
	cadmium water	0.02	0.02	0.0200	0.00000
	pH soil	5.60	7.30	6.4083	0.49028
	EC soil	0.30	3.00	0.8500	0.75739
	total organic carbon	1.71	43.30	17.1425	14.65297
	soil	0.15	2.23	1.0130	0.87918
	cadmium soil	0.02	0.24	0.1020	0.06391
	lead soil	0.69	13.10	5.9360	4.01405

Table 3 Dominant vegetation for reference depressions by water class

Wetland site	Species 1	Cover 1	Species 2	Cover 2	Species 3	Cover 3	Species 4	Cover 4	Species 5	Cover 5
Water class 2										
lily pad	carlas	0.17	carros	0.11	carlim	0.11	carcan	0.05	calcan	0.04
summit park	caraqu	0.43	carros	0.13	callep	0.06	calcan	0.03	carcan	0.02
sims	carves	0.66	calcan	0.05	eriper	0.01	carcan	0.01	jundru	0.01
pothole3										
sims	carcan	0.16	caraqu	0.13	carros	0.08	glybor	0.05	carves	0.05
pothole4										
big park2	carlim	0.22	carcan	0.10	callep	0.10	caraqu	0.04	carmur	0.03
big park1	carros	0.21	carlim	0.21	caraqu	0.19	carcan	0.08	callep	0.03
geyser pass	carros	0.53	caraqu	0.30	carebe	0.02	descae	0.02		
lake park1	carros	0.55	carcan	0.04	calneg	0.01	galbif	0.01	caraqu	0.01
midway	elepal	0.33	carves	0.25	spamin	0.12	glybor	0.04	sagcun	0.02
pond										
lake park2	moss	0.27	caraqu	0.19	carlas	0.19	callep	0.10	elepal	0.05
mill city2	carves	0.40	spamin	0.19	ransce	0.08	eleaci	0.08	carros	0.07
Water class 2										
um pothole1	elepal	0.26	carves	0.19	aloaeq	0.06	siusua	0.06	carpac	0.03
mill city1	carros	0.23	aloaeq	0.22	salwol	0.12		0.05	elepal	0.02
um pothole4	elepal	0.29	eleaci	0.14	aloaeg	0.09	siusua	0.07	ranaqu	0.03
dry lake2	elepal	0.33	sciacu	0.12	alipla	0.10	ranaqu	0.03	sagcun	0.01
dry lake	elepal	0.40	sciacu	0.10	ranaqu	0.10	alipla	0.03	sagcun	0.01
marsh2	caraqu	0.40	carros	0.18	calneg	0.06	carval	0.06	elepal	0.01
marsh3	caraqu	0.32	carros	0.30	carsim	0.08	moss	0.04	carpau	0.01
marsh1	caraqu	0.44	carros	0.17	moss	0.16	elepal	0.02	sweper	0.01
roadhollow	carros	0.21	carmic	0.17	elepal	0.12	geumac	0.10	salgey	0.10
pd										

Wetland site	Species 1	Cover 1	Species 2	Cover 2	Species 3	Cover 3	Species 4	Cover 4	Species 5	Cover 5
xmas ponds low	caraqu	0.60	carros	0.25	carneb	0.05				
goldhollow pd	carros	0.37	elepal	0.08	aloaeq	0.06	geumac	0.03	salwol	0.02
xmas ponds low2	caraqu	0.60	carros	0.25	carneb	0.05				

Rocky Mountain Depressional wetland species for reference standard sites

Sedges/Rushes
Carex aquatilis / water sedge
Carex aurea / golden sedge
Carex canenscens / pale sedge
Carex eleocharis / narrowleaf sedge
Carex ebena / ebony sedge
Carex illota / sheep sedge
Carex lanuginosa/ woolly sedge
Carex lasiocarpa / slender sedge
Carex limosa/ mud sedge
Carex microptera / small wing sedge
Carex muricata / boreal sedge
Carex nebrascensis/ Nebraska sedge
Carex pachystachya / Chamisso's sedge
Carex paupercula / poor sedge
Carex rostrata or C. utriculata / beaked sedge
Carex saxatilis / russet sedge
Carex simulata / short-beaked or lookalike sedge
Carex vescaria / blister sedge
Juncus arcticus / wiregrass
Juncus drummondii / Drummond's rush
Juncus longistylis / longstyle spikerush
Juncus nevadensis / Nevada spikerush
Eleocharis palustris / common spikerush
Eleocharis rostellata / Torrey's spikerush
Eleocharis acicularis / slender spikerush
Scirpus acutus / hardstem bulrush

Graminoids
Agrostis scabra / ticklegrass
Alopecurus aequalis / shortawn foxtail
Bromus ciliatus / fringed brome
Calamagrostis Canadensis / bluejoint reedgrass
Calamagrostis neglecta or C. inexpansa / slimstem or northern reedgrass
Danthonia intermedia /timber oatgrass
Deschampsia caespitosa / tufted hairgrass
Glyceria borealis / northern mannagrass
Glyceria stricta / fowl mannagrass
Hierochloe odorata / sweetgrass or vanilla grass
Phleum alpinus / alpine timothy
Poa leptocoma or P. reflexa / bog bluegrass or nodding bluegrass
Trisetum wolfii / Wolf's trisetum

Shrubs
Salix wolfii / planifolia/ geyeriana / boothii – Wolf's, planeleaf, Geyer's, Booth's willow
Potentilla fruticosa / palustris - shrubby cinquefoil / marsh cinquefoil
Vaccinium uliginosum v. occidentale - western huckleberry

Forbs
Aquilegia spp. / columbine
Aconitum columbianum / monkshood
Aster integrifolius / thickstem aster
Antennaria corymbosa / Plains pussytoes
Achillea millefolium / milfoil yarrow
Anemone patens / Pasque flower, wild crocus
Alisma plantago-aquatica / water plantain
Caltha leptosepala / marsh marigold
Dowingia laeta / downingia
Equisteum arvense / meadow horsetail
Epilobium halleanum / Hall's willowherb
Epilobium hornemannii / Hornemann's willowherb
Erigeron speciosus / Oregon daisy
Erigeron peregrinus / strange daisy
Fragaria vesca / stravling strawberry
Geum macrophyllum / large-leaved avens
Galium bifolium / twinleaf bedstraw
Gentiana affinis / algida / calycosa / prostrate – Rocky Mountain, Arctic, explorer, moss gentian
Helenium hoopesii / orange sneezeweed
Mentha arvensis / field mint
Marsilea vestita / pepperwort, water clover
Mimulus guttatus / common monkey flower
Nuphar polysepalum / yellow pondlily, spatterdock
Polygonum amphibium / water smartweed
Polemonium caeruleum / blue or western Jacob's ladder
Polygonum viviparum / alpine bistort
Pedicularis groenlandica / elephanthead
Polygonum bistortoides / American bistort
Potamogeton gramineus/nodosus/natans / grass, longleaf, floating pondweed
Pedicularis racemosa / leafy loosewort
Porterella carnuloosa / fleshy porterella
Rorippa carvipes / common yellowcress
Ranunculus sceleratus/ aquatilis / blister buttercup, water crowsfoot
Sium suave / hemlock water parsnip
Swertia perennis / felwort
Sedum rhodanthum / pink stonecrop
Sagittaria cunenata / arrowleaf
Sparganium spp. / bur-reed
Stellaria calycantha, longifolia, obtuse, umbellate / calyx, long-leaved, blunt, umbellate starwort
Senecio spp - grounsel
Utricularis vulgaris – common bladderwort
Vicia Americana – American vetch
Veronica wormskjoldii, peregrine, americana – speedwell

Lilypad Lake, south slope Uintas, Ashley NF

Scad Valley pond, Wasatch Plateau, Manti-LaSal NF

Dry Lake, Sardine Canyon Wasatch Cache NF

Whitney Road pond, Northwest slope Uinta Mountains

Mill City road pond, northwest slope Uinta Mountains

Sims pothole3, southeast slope Uinta Mountains

UM pothole3, Fishlake Plateau

Miller Flat pothole – Wasatch Plateau

Boulder Mountain pothole, Aquarius Plateau – not a reference standard site

Gold Hill pond, North slope Uintas Wasatch-Cache NF

Lily Lake, South slope Uintas, Wasatch-Cache NF

Lower Gibson Lake, Northern Wasatch-Cache NF

Marsh pond, north slope Uintas, Wasatch-Cache NF

Rocky Mountain Slope Wetlands

Table 4 - Slope wetland locations and vegetation scores for reference standard sites

NAME	EASTING	NORTHING	Elevation ft	VIBI
Reader Creek 1	12,581,945	4,513,034	10,500	1.00
Reader Creek 3	12,581,097	4,513,300	10,560	1.00
China Meadows	12,550,352	4,531,066	9400	0.96
Reader Creek 4	12,581,297	4,513,316	10,600	1.00
Christmas Meadows 2	12,516,494	4,519,605	8,775	0.92
Smith's Fork	12,550,707	4,532,269	9,340	0.96
Christmas Meadows 1	12,516,494	4,519,605	8,770	0.93
East Marsh Meadows	12,550,916	4,533,159	9,375	0.96

NAME	Species1	COVER1	Species2	COVER2	Species3	COVER3	Species4	COVER4	Species5	COVER5
Reader Creek 1	caraqu	0.40	carlim	0.20	salpla	0.11	elepau	0.04	eripol	0.03
Reader Creek 3	caraqu	0.47	salpla	0.32	moss	0.34	carlim	0.03	descae	0.02
China Meadows	caraqu	0.45	carros	0.20	salpla	0.11	eleros	0.05	callep	0.02
Reader Creek 4	caraqu	0.16	carlim	0.15	salpla	0.14	calcan	0.08	descae	0.03
Christmas Meadows 2	callep	0.30	caraqu	0.24	descae	0.14	carbux	0.09	salwol	0.08
Smith's Fork	carros	0.48	carsax	0.14	salwol	0.10	descae	0.08	carlen	0.03
Christmas Meadows 1	caraqu	0.41	salwol	0.21	carros	0.17	fraves	0.04	carneb	0.03
East Marsh Meadows	caraqu	0.32	carros	0.30	carsim	0.08	salwol	0.04	moss	0.04

Table 5 - Descriptive Statistics for reference standard slope wetlands by water class

water class		Minimum	Maximum	Mean	Std. Deviation
1.00	Shrub cover	0.00	0.23	0.0767	0.08426
	Shrub height	0.00	30.00	17.5556	11.83333
	Herb cover	0.60	0.94	0.8200	0.12359
	Herb height	11.00	31.00	17.8889	6.45067
	Moss cover	0.02	0.11	0.0611	0.03855
	Total cover	0.82	1.10	0.9567	0.07416
	Obligate	0.60	1.00	0.8444	0.16667
	pH soil	4.80	6.20	5.1778	0.49441
	total organic carbon soil	2.00	73.00	25.0000	20.91650
	EC soil	0.20	0.70	0.3333	0.17500
	Zinc soil	0.46	10.90	2.3563	3.49025
	pH water	5.80	6.90	6.3556	0.37454
	EC water	0.01	0.09	0.0400	0.02828
	depth to water table	2.00	14.40	5.6222	3.99086
2.00	Shrub cover	0.04	0.26	0.1333	0.11372
	Shrub height	19.00	30.00	23.0000	6.08276
	Herb cover	0.62	0.85	0.7233	0.11676
	Herb height	14.00	23.00	18.3333	4.50925
	Moss cover	0.01	0.16	0.0700	0.07937
	Total cover	0.82	1.00	0.9267	0.09452
	Obligate	0.80	1.00	0.8667	0.11547
	pH soil	6.20	6.70	6.4667	0.25166
	total organic carbon soil	6.00	40.00	20.0000	17.77639
	EC soil	0.60	0.80	0.7333	0.11547
	Zinc soil	1.60	5.70	3.8667	2.08407
	pH water	6.70	7.80	7.2333	0.55076
	EC water	0.22	0.45	0.3267	0.11590
	depth to water table	0.50	11.30	7.5333	6.09617

Rocky Mountain Slope Wetland species

Sedges/Rushes
Carex aquatilis / water sedge
Carex aurea / golden sedge
Carex buxbaumii / Buxbaum's sedge
Carex canenscens / pale sedge
Carex eleocharis / narrowleaf sedge
Carex ebena / ebony sedge
Carex illota / sheep sedge
Carex lanuginosa / woolly sedge
Carex lasiocarpa / slender sedge
Carex lenticularis /lens sedge
Carex limosa / mud sedge
Carex microptera / small wing sedge
Carex muricata / boreal sedge
Carex nebrascensis / Nebraska sedge
Carex pachystachya / Chamisso's sedge
Carex paupercula / poor sedge
Carex rostrata or C. utricularia / beaked sedge
Carex saxatilis / russet sedge
Carex simulata / short beaked or lookalike sedge
Carex vescaria / blister sedge
Eleocharis palustris / common spikerush
Eleocharis pauciflora / few flowered spikerush
Eleocharis rostellata / Torrey's spikerush
Eleocharis acicularis / slender spikerush
Eriophorum polystachion / cottongrass
Juncus arcticus / wiregrass
Juncus bufonius / toad rush
Juncus drummondii / Drummond's rush
Juncus ensifolius / swordleaf rush
Jincus filiformis / filiform rush
Juncus halli / Hall's rush
Juncus longistylis / longstyle rush
Juncus nevadensis / Nevada rush
Luzula campestris / hairy wood rush
Luzula spicata / spike woodrush
Scirpus acutus / hardstem bulrush

Graminoids
Agrostis scabra / ticklegrass
Calamagrostis canadensis / bluejoint reedgrass
Calamagrostis neglecta or inexpansa / slim stem or northern reedgrass
Danthonia intermedia / timber oatgrass
Deschampsia caespitosa / tufted hairgrass
Hierochloe odorata / sweetgrass or vanilla grass
Hordeum brachyantherum / meadow barley
Phleum alpinus / alpine timothy
Trisetum wolfii / Wolf's trisetum

Shrubs
Betula glandulosa / glandular or bog birch
Potentilla fruticosa / palustris /- shrubby cinquefoil / marsh cinquefoil
Salix wolfii / planifolia/ geyeriana / boothii/ drummondii – Wolf's/planeleaf/ Geyer's / Booth's willow
Vaccinium myrtillus / scoparium – dwarf bilberry / grouseberry

Forbs
Antennaria corymbosa, umbrinella / Plains pussytoes, mountain pussytoes
Achillea millefolium – milfoil yarrow
Anemone patens – Pasque flower, wild crocus
Caltha leptosepala – marsh marigold
Equisteum arvense – meadow horsetail
Erigeron speciosus – strange daisy
Fragaria vesca – stravling strawberry
Geum aleppicum – erect avens
Geum macrophyllum – large-leaved avens
Galium bifolium – twinleaf bedstraw
Gentiana algida / calycosa / prostrate – Artic, explorer, moss gentian
Geranium richardsonii – Richardson's geranium
Habenaria dilata, sparsiflora, saccata – white, Watson's, slender bog orchid
Ligusticum tenuifolium – small or slenderleaf ligusticum
Mentha arvensis – field mint
Mertensia arizonica, ciliate – tall, mountain bulebells
Polygonum amphibium – water smartweed
Polygonum viviparum – alpine bistort
Pedicularis groenlandica – elephanthead
Polygonum bistortoides – American bistort
Potamogeton gramineus/nodosus/natans / grass, longleaf, floating pondweed
Potentilla gracilis, ovina, diversifolia – slender, sheep, wedgeleaf cinquefoil
Rorippa curvipes – yellow pondlily, spatterdock
Sparganium minimum – small bur-reed
Sedum rhodanthum – pink stonecrop
Senecio spp - groundsel
Sisyrinchium idahoense – Idaho blue-eyed grass
Swertia perennis - felwort
Thalictrum fendleri – Fendler's meadowrue
Veratrum californicum – false hellebore, skunk cabbage
Veronica wormskjoldii, peregrine, americana – speedwell

China Meadows, northwest slope Uintas, Wasatch-Cache NF

East Fork of Smith's Fork, northwest slope Uintas, Wasatch-Cache NF

Marsh pond slope, northwest slope Uintas, Wasatch-Cache NF

Upper Christmas Meadows, northwest slope Uintas, Wasatch-Cache NF

Lower Christmas Meadows, northwest slope Uintas, Wasatch-Cache NF

Reader Creek, patterned fen, southeast slope Uintas, Ashley NF

Gilbert Meadows, northwest slope Uintas, Wasatch-Cache NF

Reader Creek, southwest slope Uintas, Ashley NF

APPENDIX F
Reference Guide: Utah Wetland Classification, Subclassification and Plant Information

Riverine
Subclassification

Subclasses--Single Channel Systems: (be aware that there may be more than one subclass in the AA)

A Very steep gradient, very entrenched (no floodplain), very narrow valley, narrow channel
Entrenchment ratio < 1.4
Width/depth ratio < 12
Gradient 2. .04

G Deeply incised, grade control problems (headcuts), much bank erosion, high sediment supply, virtually no floodplain.
Entrenchment ratio <1.4
Width/depth ratio < 12
Gradient 2. .02

F Entrenched, little floodplain development, low gradient, unstable banks, significant bar deposition, increasing channel width, high sediment supply, channel wide and shallow.
Entrenchment ratio S 1.5
Width/depth ratio 2. 12
Gradient S .02

B Narrow, gently sloping valleys, colluvial deposition from side slopes and/or structural control restrict width of floodplain but there is a small, relatively flat floodplain, low sediment supply, well-vegetated. Entrenchment ratio 1.5-2.0 Width/depth ratio 2. 12
Gradient 2. .02 B
Gradient < .02 Be

C Low gradient, slightly entrenched, well-defined floodplain with terraces, point bars, cut banks, developed in alluvial material, often bare below bankfull/ cottonwood-willow complexes.
Entrenchment ratio 2. 2.0
Gradient < .02
Width/depth ratio 2. 12 C
Width/depth ratio < 12 CG

E Low gradient, narrow, deep channels in broad valleys/meadows, large floodplains, little sediment deposition, well-vegetated willow/sedges, sinuous, overhanging banks.
Entrenchment ratio 2. 2.0
Width/depth ratio < 12
Gradient < .01

Subclasses--Multichannel Systems

D Abundant sediment supply, shifting channels, very broad floodplains. Bold subclass in riparian class may have wetlands

.

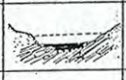
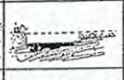
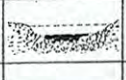
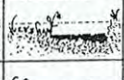
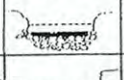
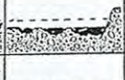
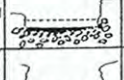
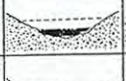
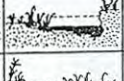
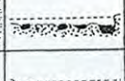
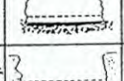
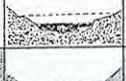
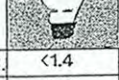
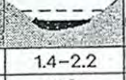
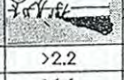
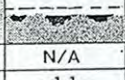
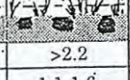
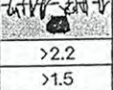
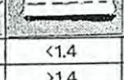
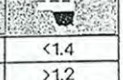
Dominant Bed Material	A	B	C	D	DA	E	F	G
1 BEDROCK								
2 BOULDER								
3 COBBLE								
4 GRAVEL								
5 SAND								
6 SILT/CLAY								
ENTRH.	<1.4	1.4–2.2	>2.2	N/A	>2.2	>2.2	<1.4	<1.4
SIN.	<1.2	>1.2	>1.4	<1.1	1.1-1.6	>1.5	>1.4	>1.2
W/D	<12	>12	>12	>40	<40	<12	>12	<12
SLOPE	.04–.099	.02–.039	<.02	<.02	<.005	<.02	<.02	.02–.039

Fig. 4. Illustrative guide showing cross-sectional configuration, composition and delineative criteria of major stream types.

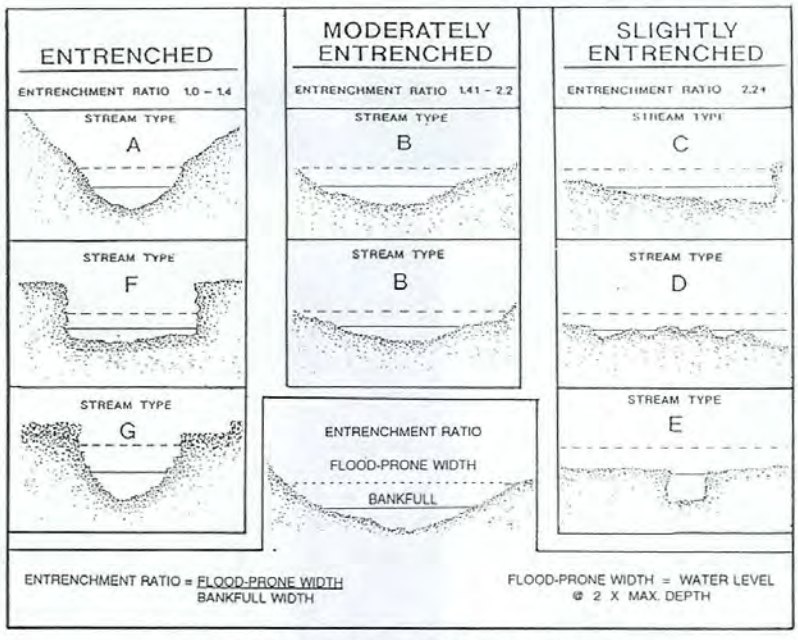


Fig. 6. Examples and calculations of channel entrenchment.

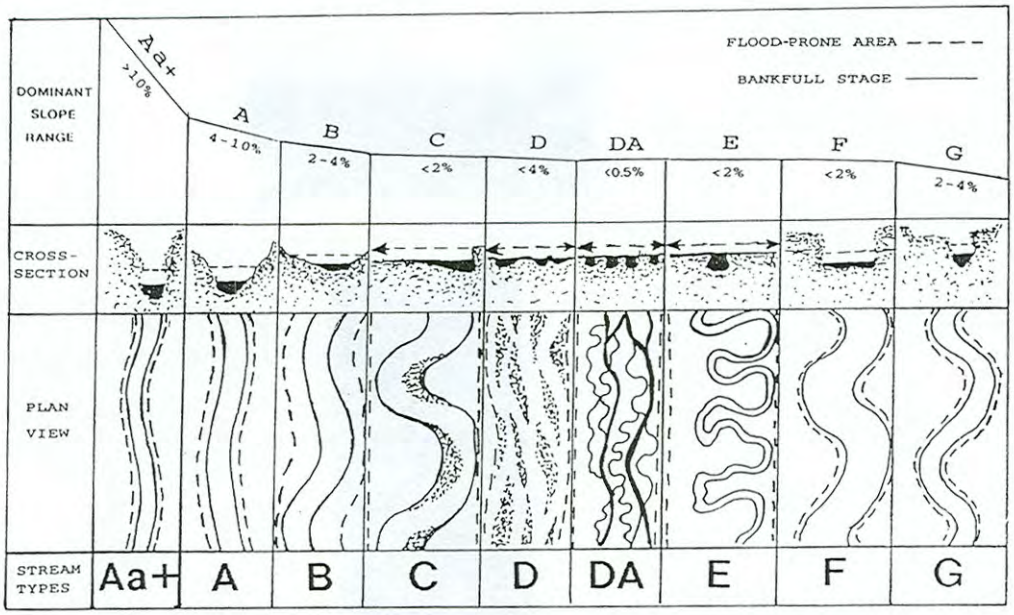


Fig. 1. Longitudinal, cross-sectional and plan views of major stream types.

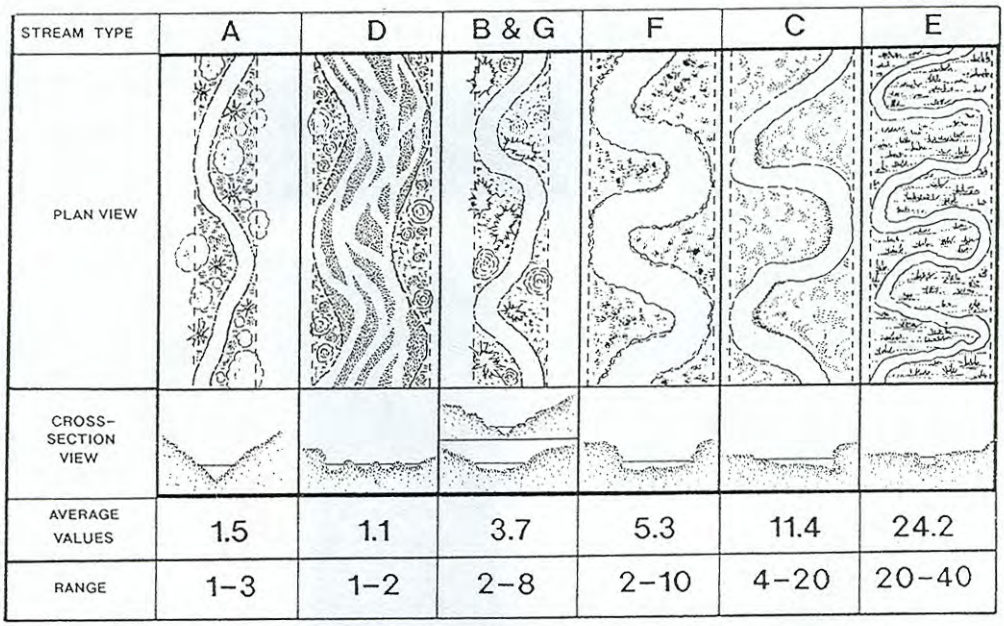
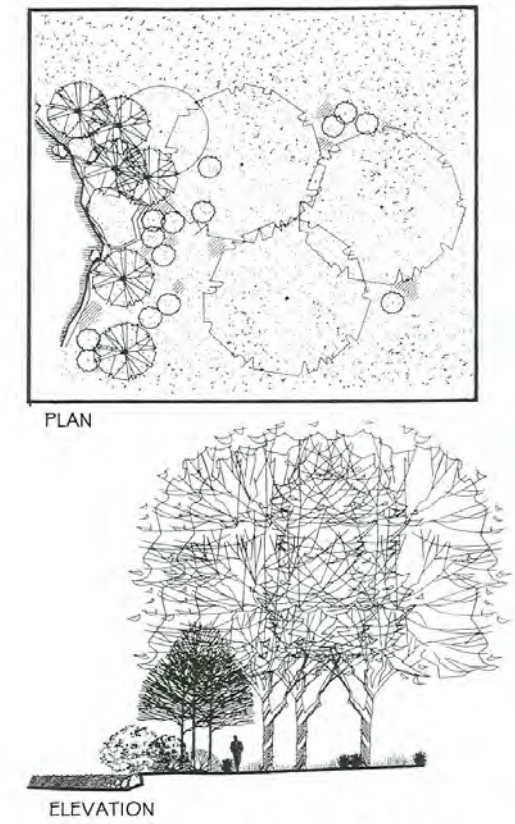


Fig. 3. Meander width ratio (belt width/bankfull width) by stream type categories.

Dominant Native Riverine and Lacustrine Plants organized by life form and elevation 750m – 1500m



Trees

- *Acer negundo*
- *Betula occidentalis*
- *Crataegus douglasii*
- *Populus acuminata*
- *Populus fremontii*
- *Prunus virginiana*

Shrubs

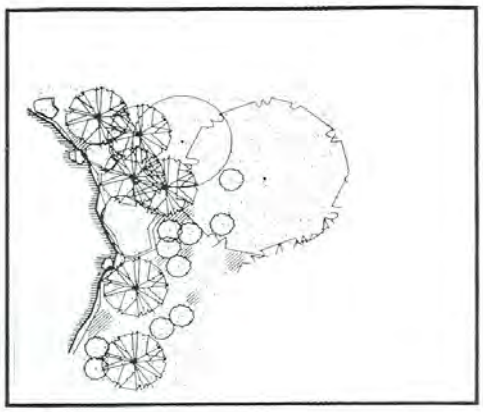
- *Cornus sericea*
- *Ribes aureum*
- *Rosa woodsi*
- *Salix sp.*

Grasses, rushes, sedges and forbs

- *Carex sp.*
- *Distichlis spicata*
- *Eleocharis sp.*
- *Equisetum sp.*
- *Juncus sp.*

Average expected ground cover is highly variable – estimate the percent ground cover observed (0-1).

Dominant Native Riverine and Lacustrine Plants organized by life form and elevation 1500m – 2500m



PLAN

ELEVATION

RIVERINE AND LACUSTRINE PLANTS - ELEVATION 1500M-2500M

Trees

- *Acer negundo*
- *Alnus incana*
- *Betula occidentalis*
- *Populus acuminate*
- *Populus angustifolia*

Shrubs

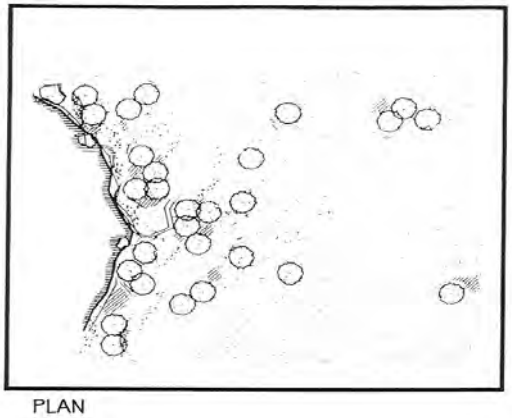
- *Cornus sericea*
- *Potentilla fruiticosa*
- *Prunus virginiana*
- *Salix sp.*
- *Shepherdia argentea*

Grasses, rushes, sedges, and forbs

- *Calamgrostis sp.*
- *Carex sp.*
- *Deschampsia cespitosa*
- *Elecocharis sp.*
- *Equisetem sp.*
- *Juncus sp.*

Average expected ground cover is highly variable – estimate the percent ground cover observed (0-1).

Dominant Native Riverine and Lacustrine Plants organized by life form and elevation 2500m – 3500m



Trees

- *Alnus incana*
- *Betula occidentalis*

Shrubs

- *Artemisia cana*
- *Cornus sericea*
- *Potentilla fruiticosa*
- *Salix sp.*

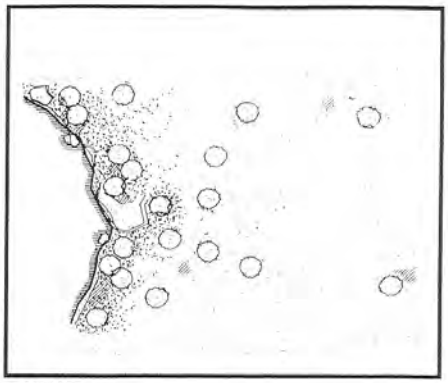
Grasses, rushes, sedges and forbs

- *Carex sp.*
- *Deschampsia cespitosa*

Average expected ground cover is highly variable – estimate the percent ground cover observed (0-1).

RIVERINE AND LACUSTRINE PLANTS – ELEVATION 2500M-3500M

Dominant Native Riverine and Lacustrine Plants organized by life form and elevation 3500m



Shrubs

- *Salix sp.*

Grasses, rushes, sedges and forbs

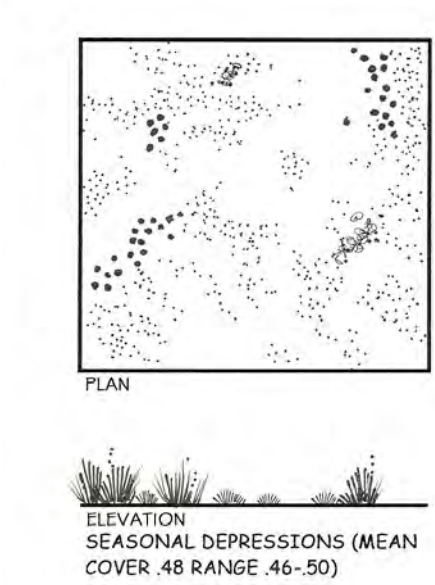
- *Carex sp.*
- *Deshampsia cespitosa*

Average expected ground cover is highly variable – estimate the percent ground cover observed (0-1).

RIVERINE AND LACUSTRINE
PLANTS - ELEVATION 3500M

[Great Basin] Seasonal or semipermanent depressions [mineral flat] these sites may be highly saline (7.5 – 22.5 dS)

Plover Playa, Tooele County



Dominant species
1st dominant - *Distichlis stricta* is always the first dominant in reference sites with average cover of .26 and it makes up an average of 84% of the total vegetative cover

2nd dominant – *Salicornia utahensis* or more often, *Salicornia europaea* are the second dominant in all reference sites with average cover of .03.
3rd dominant - *Triglochin maritimum* or *Cordylanthus maritimus* with average cover of .01 *Scirpus maritimus* at .01 with some disturbance
4th dominant – *Suaeda depressa, Triglochin palustre* with average cover of .01
5th dominant – *Sporobolus airoides* and *Triglochin maritimum* with average cover of .01

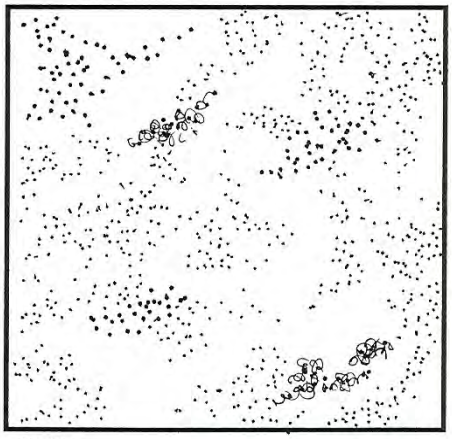
Vegetation species richness
Average species richness is 4 (range 1-5), often including *Distichlis stricta*, *Salicornia europaea* and *Triglochin maritimum*. Species richness tends to increase with disturbance, with average species richness increasing to between 6 and 7 species.

Typical invasive species
Hordeum jubatum, Phragmites australis, Kochia scoparia

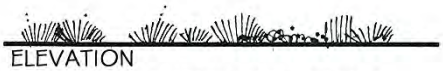
Sites surveyed are located in Box Elder, Salt Lake, Tooele and Utah Counties. All sites in Salt Lake and Tooele Counties are below 4217'.

[See Appendix D for Rocky Mountain / High Plateaus photographs and species data.]

[Great Basin] Seasonal depressions slightly to strongly saline (7.5 – 22.5 dS)



PLAN



ELEVATION

SEMIPERMANENT AND PERMANENT DEPRESSIONS SLIGHTLY TO STRONGLY SALINE (MEAN COVER .69 RANGE .56-.79)

Dominant species
1st dominant - *Distichlis stricta* is always the first dominant in reference sites with average cover of .28.
2nd / 3rd dominant – *Salicornia utahensis* (average cover .01) in 67% of sites, *Scirpus maritimus* (average cover .02) in 83% of sites or *Salicornia europaea* (average cover .05) in 33 % of sites.
4th and 5th dominant – *Triglochin spp* (average cover .01) in 50% of sites, *Allenrolfea occidentalis* (average cover .01) in 16 %, *Sarcobatus vermiculatus* (average cover .01) in 16% of sites.

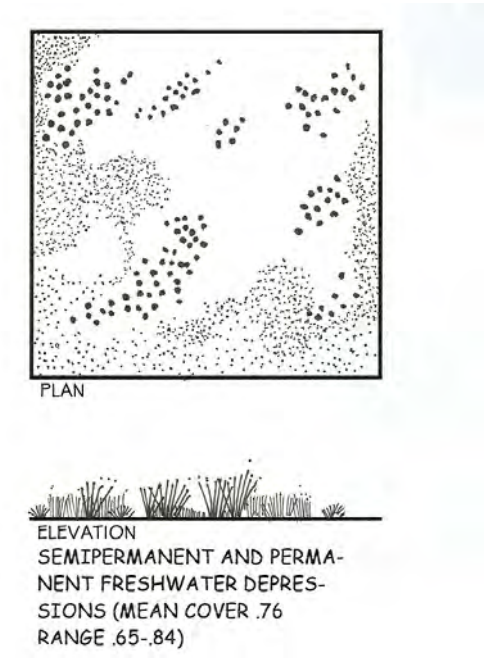
Other species occurring
Puccinellia nuttalliana, Scirpus acutus and *americanus*

Nonnative/ invasive species
Hordeum jubatum, Polypogon monspeliensis

Vegetation species richness
Species richness of plants in reference sites averages 7 species, ranging from 5-7. In disturbed sites, it falls to 3 and climbs as high as 11.

[See Appendix D for Rocky Mountain / High Plateaus photographs and species data.]

[Great Basin] Seasonal, semi-permanent and permanent freshwater depressions (EC< 7.5 dS)



Note: There are virtually no natural, unimpacted sites in this subclass. All natural sites are impacted to Some degree and all other sites are created or 'enhanced'.

The percent cover of vegetation is markedly different for those sites that are seasonal and those that are semi-permanent and permanent.

Semi-permanent and permanent freshwater depressions

Dominant species
1st dominant - *Eleocharis palustris* (average cover .29) in 75% reference sites
2nd dominant - *Scirpus spp*., usually *Scirpus americanus* (average cover .23) in all reference sites
3rd *Juncus arcticus* in 75% reference sites (average cover .09)
4th / 5th dominant - In 50 % of sites *Distichlis stricta*(average cover .14)

Species occasionally occurring
Alisma plantago-aquatica, Potamogeton spp., Carex praegracilis, Iris missouriensis, Asclepias speciosa

Common nonnative and invasive species
*Polypogon monspeliensis, Hordeum jubatum, Phragmites australis, Typha spp., Rumex crispus, Nasturtium officinale, Trifolium repens, Lythrum salicaria** (Purple loosestrife)*
Vegetation species richness
In reference standard sites average species richness is 11-12. In disturbed sites it climbs as high as 22-23 or drops as low as 5 species.

[See Appendix D for Rocky Mountain / High Plateaus photographs and species data.]

[Great Basin] Seasonal freshwater depressions

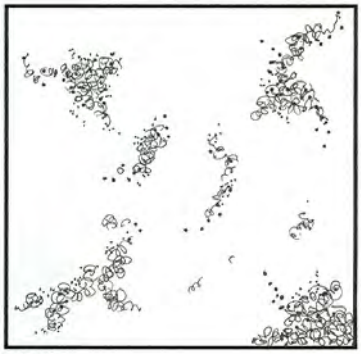
Dominant species
1st dominant - *Distichlis stricta* (average cover .22) in all reference sites
2nd dominant - *Scirpus americanus* and/or Scirpus *maritimus* (average cover .11) in all reference sites
3rd dominant - *Salicornia europaea* in all reference sites (cover .06)
4th / 5th dominant - In 50 % of sites *Sarcobatus vermiculatus* and/or *Allenrolfia occidentalis* (cover .01)

Species occasionally occurring
Puccinellia nuttalliana, Agrostis stolonifera, Poa palustris
Common nonnative and invasive species
Polypogon monspeliensis, Hordeum jubatum, Phragmites australis, Typha spp

Vegetation species richness
In reference standard sites average species richness is 6. In disturbed sites it climbs as high as 15 species. In general, disturbance increases the species diversity.

[See Appendix D for Rocky Mountain / High Plateaus photographs and species data.]

[Great Basin] Ephemeral depressions [mineral flat]



PLAN

ELEVATION
EPHEMERAL DEPRESSION (MEAN COVER .21 RANGE .05-.29)

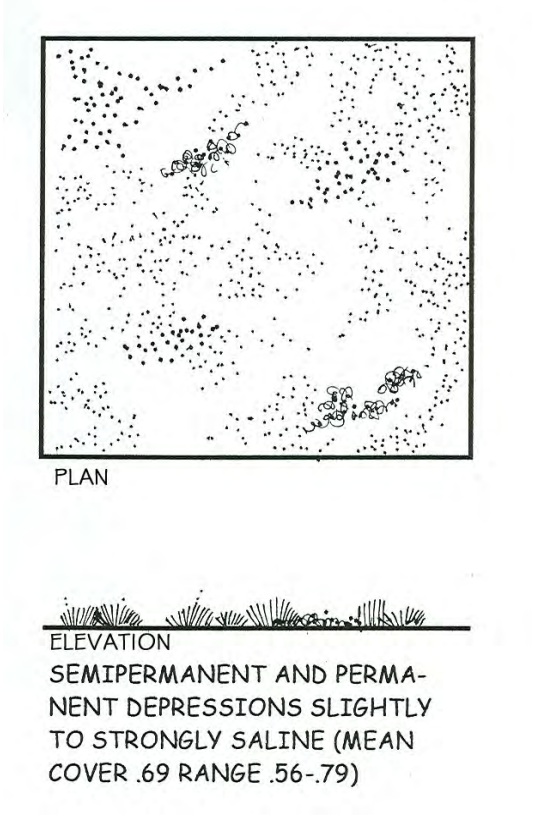
Dominant species
Salicornia europaea is the dominant species in all reference sites with an average cover of .20. *Sarcobatus vermiculatus* occurs in 33% of sites with an average cover of .01

Invasive species
Hordeum jubatum and *murinum, Kochia scoparia*, *Puccinellia distans*

Species richness
Average species richness is 1-2 species. With disturbance richness climbs to 5-6 species.

[See Appendix D for Rocky Mountain / High Plateaus photographs and species data.]

[Great Basin] Semi-permanent and permanent depressions slightly to strongly saline (7.5 – 22.5 dS)



Dominant species

1st dominant - *Distichlis stricta* is always the first dominant in reference sites with average cover of .56.

2nd / 3rd dominant – *Salicornia utahensis* (average cover .02) in 18 of sites, *Scirpus americanus* (average cover .07) in 73% of sites, *Juncus arcticus* (average cover .11) in 18% or *Eleocharis palustris* (average cover .07) in 27 % of sites.

4th and 5th dominant – *Triglochin spp* (average cover .01) in 27% of sites, *Sporobolus airoides* (average cover .02) in 27% of sites and *Cordylanthus maritimus* (average cover .01) in 18% of sites

Other species occurring

Puccinellia nuttalliana, Allenrolfia occidentalis, Suaeda depressa

Nonnative/ invasive species

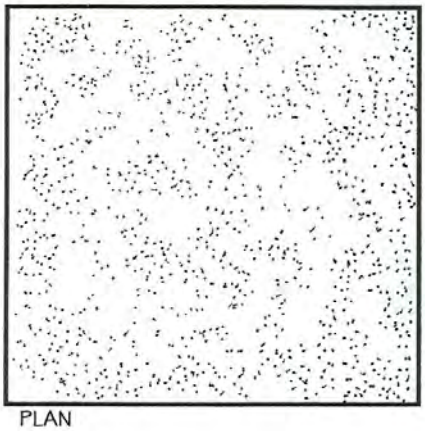
Bromus tectorum, Hordeum jubatum and glaucum/murinum, Phragmites australis

Vegetation species richness

In reference sites, average is 4 species, ranging from 1-7. In disturbed sites, it climbs as high as 11.

[See Appendix D for Rocky Mountain / High Plateaus photographs and species data.]

[Great Basin] Saline and Non Saline Slopes Seasonal and persistent non saline slopes
Seasonal non saline slopes – all sites are irrigation/ surface water induced. Persistent non saline slopes – all reference standard sites are spring/groundwater fed, while others are often irrigation/ surface water induced.



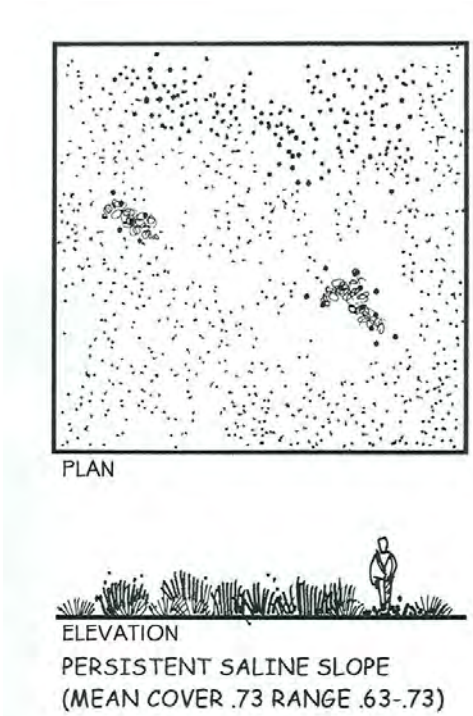
Dominant species
1st dominant - *Eleocharis palustris* in all reference sites
2nd dominant - *Distichlis stricta* 70% of sites
3rd dominant - *Juncus arcticus* 60% of sites
4th dominant - *Carex nebrascensis* and *Scirpus americanus* 50% of sites
5th dominant - *Carex lanuginose, praegracilis* or *microptera* 40% of sites

Others species
Agrostis stolonifera, Puccinellia nuttalliana, Poa pretense, Carex simulata, Scirpus acutus, Mentha arvense, Mimulus guttatus, Sagattaria cuneta, Ranunculus spp
Invasive species – *Trifolium repens, Polypogon monspeliensis, Polypogon interruptis, Hordeum marinum, Nasturtium officinale, Rumex crispus, Xanthium strumarium, Lactuca serriola,* various species of *Elymus/Agropyron* and their hybrids.

Vegetation species richness
In reference sites, species richness averages 7 and ranges from 3-10 species.

[See Appendix D for Rocky Mountain / High Plateaus photographs and species data.]

[Great Basin] Persistent saline slope



Dominant species
1st dominant - *Distichlis stricta* in all reference standard sites
2nd dominant - *Scirpus americanus* in 83% of sites
3rd dominant - *Juncus arcticus* in 42% of sites
4th dominant - *Scirpus maritimus, Sporobulus airoides, Triglochin spp*. in 25% of sites
5th dominant - *Salicornia utahensis, Cordylanthus maritimus, Eleocharis palustris* in 17% of sites

Other species
Helianthus annuus, Suaeda depressa, Scirpus acutus, Allenrolfia occidentalis

Invasive species
Hordeum jubatum, Kochia scoparia, Elaeagnus angustfolia

Vegetation species richness
In reference sites average species richness is 5 species, ranging from 1-9 species.

[See Appendix D for Rocky Mountain / High Plateaus photographs and species data.]

APPENDIX G
Point Sampling Protocol
Mitchell, Wilma A and H Glen Hughes. 1995. Point Sampling, US Army Corps of Engineers, Washington, D.C.

Study Design
The study design presented below is not unique to point sampling but is a general design that may be used with other vegetation sampling techniques. It is a combination of random and systematic sampling and may be altered to fit project needs.

Site Selection
Aerial photographs should be studied and a ground reconnaissance should be conducted to determine the size and characteristics (e.g., terrain, heterogeneity) of the study area. The sites to be sampled should be selected and located on a map of the study area prior to data collection. If the area is large and homogeneous, sites may be randomly selected by using a numbered grid and random number selection. However, if the study area consists of diverse habitats, it may be preferable to select sites representative of the vegetation types in proportion to the amount of area occupied by each.

Transects
Although points may be randomly located across a site, it is logistically easier to establish randomly located transects and to sample at regular intervals along each transect. The random location of transects meets the statistical assumption of sampling unit independence, and systematic sampling along each transect facilitates rapid sampling. Transects selected for sampling should be indicated on the site map. Transects may be of predetermined or indefinite length, and sample points may be continuous or located at stations equally spaced along the transects. If statistical tests are not needed, it may be appropriate to use a grid design in which sampling units are evenly distributed over the entire area (Goodall 1952, Evans and Love 1957).

Sampling Design
At each site, data are collected at 20 stations located at constant intervals along the transects. The distance between stations will be determined by the size of the study area and should be great enough to distribute points over the area. At each station, 10 points of data are collected at 2-m intervals (approximately a man's pace length) along the transect. If other data are being collected on the transect, the points may be located on a line parallel to the main transect and 1 pace to the right or left of it. This procedure may be used with any single-point sampling design.

Sample Size
Sample size is extremely important in habitat studies and should be determined by specific research objectives and the types of habitat sampled. The number of sampling points should be based on the approximate acreage to be included in the study area; at least 10 (preferably 20) samples per unit should be taken (Severinghaus 1980). **Evans and Love (1957) used 100 points per acre for sampling rangeland vegetation with the step-point method.***

Severinghaus (1980) suggested the following guide for determining the number of sample points:

0 to 40 acres (0 to 16 ha) = 1 point/acre (0.5 ha)
41 to 80 acres (16 to 32 ha) = 1 point/2 acres (1 ha)
81 to 200 acres (32 to 80 ha) = 1 point/4 acres (1.6 ha)
>200 acres (80 ha) = 1 point/10 acres (4 ha)

---

*100 sample points per acre should be collected within the AA. (Example: if AA equals .25 acres, then 25 sample points should be taken.) Never use less then 10 sample points within any AA, even when AA is less then .10 acres in size. Placement of transect(s) should accurately represent the AA. Be sure to place transect(s) through different water regimes, vegetative structure, and topographic changes that may exist within the AA. Please note to draw a simple boundary of the AA and illustrate all plant transect locations and approximate distances on page 11 of the form.

Sample size can be calculated if data are separated by points. A formula commonly used to calculate sample size (Snedecor 1950) is:

$$N = \frac{s^2 t^2}{d^2}$$

N = number of sample points required
s = standard deviation
t = t-value with n-1 degree of freedom
d = allowable error (i.e., arithmetic mean of the sample total times the designated percent accuracy)

If a study encompasses many vegetation types, sample size should be determined for each type (e.g., old field, shrub steppe, or evergreen forest) rather than for the total acreage of the study area. Sample size may be modified by increasing or decreasing the number of sites or the number of samples collected at each site. The latter may be achieved by altering the number or length of transects or by changing the number of points sampled at each station.

Preparation
Users should be proficient with point sampling before data collection begins because results may be biased if the technique is learned during the study. The observer should use a compass to pace straight transect lines and practice consistent pacing between points. Consistent pacing is essential for preventing over or underestimation of vegetative cover (Hays et al. 1981). It ensures that intervals between stations and among sample points are consistent throughout the study, thus providing reliable data for statistical analysis.

The sampling procedure should be practice so users can gain confidence with the technique before actual data collection begins. It is recommended that field personnel gain experience with point sampling be conducting trial runs in the types(s) of vegetation that will be sampled in the study. Practice sites should be randomly located in a variety of vegetation types to familiarize personnel with using the technique in diverse habitat conditions.

Sampling Procedures
Cover Categories

Three categories of vegetative cover are herbaceous vegetation, shrubs, and trees. These categories are defined as follows:

1. Herbaceous vegetation: Grasses, grasslike plants such as sedges and rushes, and forbs (broad-leaved flowering plants).

2. Shrubs: Woody plants, branched at or near the base and usually less then 15 ft (4.6 m) in height (Preston 1961); woody vines may be classed as shrubs or placed in a separate category.
3. Trees: Woody plants with a main stem (trunk), numerous branches, and a height of 20 ft (6.1 m) or more (Petrides 1972). A tree may be placed in the shrub category if it is less than 20 ft tall. Criteria for trees and shrubs will be determined by study objectives.

Step Point

Equipment
The only equipment needed is the observer's boot with an indicator to define the sampling point. The tip of one boot should be marked with a small V-shaped notch or narrow permanent line. The marker is placed at the boot tip to provide a consistent sampling point and to minimize disturbance to the vegetation before sampling. The notch or line should be as narrow as possible to avoid overestimation of cover.
Data Collection

The procedure for collecting data at each point on the transect is given below.

1. Pace to the sample point.
2. Examine the vegetation at the tip of your boot.
3. Record the presence (hit) or absence (miss) of each cover category, with 1="hit" 0="miss" (see data recording). If sampling is conducted in non-forested vegetation types, data will be collected for only the first two categories.
    a. Herbaceous vegetation: Record a hit if the mark or notch on you boot tip is touching a grass or forb, identify and record the species "hit". If it is not touching herbaceous vegetation, record a miss. (If the herbaceous vegetation is growing under a shrub canopy, move aside the shrub limbs and foliage to sample the herbs.)
    b. Shrub: Record a hit if the marker on your boot is touching a shrub or is under its canopy, identify and record the species "hit". If not, record a miss.
    c. Tree: Look directly overhead. Record a hit if you are under the canopy of a tree, identify and record the species "hit". If not, record a miss.
4. Visually estimate the percent ground cover of native vegetation in the AA.

Data Recording
Point data from each sampling site can be recorded and calculations can be performed on a single data sheet. The cover data for each point should be placed under the appropriate point number. Hit/miss tabulations should be recorded diagonally for each sample point, with herbaceous at the top, shrub in the middle, and tree at the bottom. If more than one data sheet is needed, it may be convenient to total the numbers on each sheet and do the final calculations on the last sheet.

Data Analysis
Data analysis consists of determining the average percentage herbaceous, shrub, tree, and total cover at a site. This is done by dividing the total number of hits for each cover category or the site by the total number of points sampled and converting the result to percentage.

The calculations for data analysis are given in a stepwise outline.

1. Add the number of hits for each cover category (herbaceous, shrub, tree) at each sampling station and enter these values in the summation columns (H, S, T) under Hits/Station.

2. Add the data in each summation column to find the total number of hits in each cover category and the total number of points with cover at each site. Enter the totals at the bottom of the data sheet.

3. Find the total number of points sampled at each site by multiplying the number of points per station by the total number of stations.
Total points = Number of points per station X number of stations.

4. Calculate the average percent cover for each cover category by dividing the total number of hits for the category by the total number of points sampled and multiplying by 100.

$$X\% \text{ cover} = \frac{\text{Total number of hits}}{\text{Total number of points sampled}} \times 100$$

5. Calculate the average percent total cover for the site by dividing the total number of points with hits by the total number of points sampled and multiplying by 100.

$$X\% \text{ cover} = \frac{\text{Total number of points with hits}}{\text{Total number of points sampled}} \times 100$$

Cautions and Limitations

To prevent error resulting from over or underestimation of cover, attention should be given to detail. The mark on the boot used in step point may fade with exposure to moisture and need to be repenned. This narrow mark should be maintained at exactly the same width throughout the data collection.

Pace length tends to increase with more rapid movement and to shorten as pace slows. Therefore, it may be difficult to maintain consistent pacing over uneven terrain or in vegetation with a high brush component. The observer should check his pace length in such habitat types and readjust it to the standard distances used in the study design.

For best results, point sampling should be suspended when light intensity becomes too low for accurate determination of cover.

Point Sampling

1. Project Name:	2. Project Number:
3. USCOE Permit Number:	Project Pin Nubmer:
4. Evaluation Date:	5. Evaluating Agency:
6. Evaluators:	7. Purpose of Evaluation:
8. Wetland/Site Number(s):	9. Wetland Location(s):
10. Wetland Size:	11. Assessment Area:

Station 1	Species	Hits			Native	Non-Native
		H	S	T		
Herbaceous						
Shrub						
Tree						
Station 2						
Herbaceous						
Shrub						
Tree						
Station 3						
Herbaceous						
Shrub						
Tree						
Station 4						
Herbaceous						
Shrub						
Tree						
Station 5						
Herbaceous						
Shrub						
Tree						
Station 6						
Herbaceous						
Shrub						
Tree						
Station 7						
Herbaceous						
Shrub						
Tree						
Station 8						
Herbaceous						
Shrub						
Tree						
Station 9						
Herbaceous						
Shrub						
Tree						
Station 10						
Herbaceous						
Shrub						
Tree						

% Cover = $\frac{\text{Total Hits}}{\text{Total Points Sampled}}$ x 100

% Native Species = $\frac{\text{Total Number of Native Species}}{\text{Total Number of Plants Sampled}}$ x 100

Total Hits			
% Cover			
Total % Cover			

% Native Species	

UDOT Wetland Assessment Form (Riverine)

1. Project Name:

2. Project Number:

3. USCOE Permit Number: **Project Pin Number:**

4. Evaluation Date (MM/DD/YYYY):

5. Evaluating Agency:

6. Evaluator(s):

7. Purpose of Evaluation (check one): ____Wetlands potentially affected by UDOT project
____ Mitigation wetlands, pre-construction
____ Mitigation wetlands, post-construction
____ Other (explain):

8. Wetland/Site Number(s):

9. Wetland Location(s):
Ecoregion (see map Appendix A):_____
Watershed (see map Appendix A):_____
County (see map Appendix A): _____
Legal: T_____N or S; R_____E or W; S_____;T_____N or S; R_____E or W; S_____
Approximate Stationing or Mileposts:_____
_____
GPS Reference Number:_____
Other Location information:

10. Wetland Size (total acres, measured by GPS if applicable):

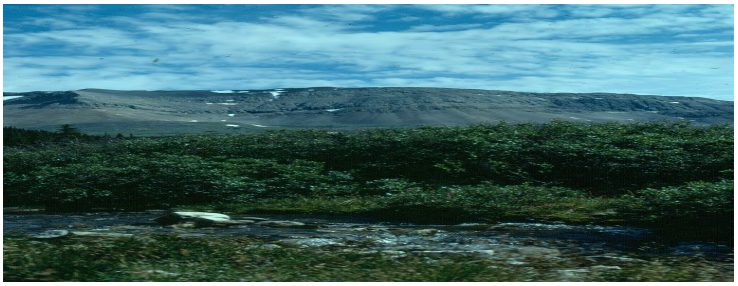
11. Assessment Area (AA) (total acres, measured by GPS if applicable, see appendix):

12. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals or State Listed S1 Species
It is required that the evaluator contact USFWS with regards to the presence or absence of threatened or endangered (T or E) species and UDWR concerning the presence or absence of a state listed S1, S2 or S3 species. The documented habitat of a federally listed or proposed threatened or endangered plant or animal species or a state listed S1 species results in an automatic Red Flag categorization of the assessed site. Coordination with USFWS and UDWR is required. (However, the evaluation proceeds as normal so that the COE receives an assessment of function and value consistent with the UDOT assessment method.)
Is the AA documented to contain primary habitat for T or E or S-1 species? _____Yes _____No
If yes, list the species:
(This field assesses habitat for species receiving protection under provision of the Endangered Species Act and Utah critically imperiled species.)

13. Selecting a Wetland Classification
Refer to the glossary to determine the correct wetland class. Refer to Appendix E for reference photos and lists of the most common native species in each classification. Turn to appropriate colored pages to continue functional assessment as noted below.
Riverine: Blue
Slope: Pink
Depressional: Yellow
Mineral Flat: Green
Lacustrine Fringe: Purple
Roadside Ditch Wetland: If AA qualifies as a non-jurisdictional 'roadside ditch wetland', AA is classified as Category IV. Further assessment is not necessary, although all documentation must be completed.

***Toned questions or functional categories on the assessment form do not apply to this wetland class, do not answer. They are excluded from the individual function rating as well as the final overall functional assessment rating.**

Riverine



Riverine wetlands: Occur in floodplains and riparian corridors in association with stream channels. Water source is river or stream flow or over bank flow at peak hydrological periods. (Overbank flow should occur once every two years or 50% of the time. If flooding does not occur at this minimal rate, it is probably not a riverine based wetland). Dominant hydrodynamics are unidirectional and horizontal. A subsurface hydraulic connection between the wetland and stream does not necessarily indicate a riverine system.

14. Identify subclass _____ (Classification after Rosgen…check appendix for graphic representations)
The evaluator uses the information below together with information in Appendix E to identify the AA subclass. This information is not used directly to rate the AA.

Subclasses--Single Channel Systems: (be aware that there may be more than one subclass in the AA)

A Very steep gradient, very entrenched (no floodplain), very narrow valley, narrow channel
Entrenchment ratio < 1.4 Width/depth ratio < 12 Gradient ≥ .04

G Deeply incised, grade control problems (headcuts), much bank erosion, high sediment supply, virtually no floodplain
Entrenchment ratio <1.4 Width/depth ratio < 12 Gradient ≥ .02

F Entrenched, little floodplain development, low gradient, unstable banks, significant bar deposition, increasing channel width, high sediment supply, channel wide and shallow
Entrenchment ratio ≤ 1.5 Width/depth ratio ≥ 12 Gradient ≤ .02

B Narrow, gently sloping valleys, colluvial deposition from side slopes and/or structural control restrict width of floodplain but there is a small, relatively flat floodplain, low sediment supply, well-vegetated
Entrenchment ratio 1.5-2.0 Width/depth ratio ≥ 12 Gradient ≥ .02 B Gradient < .02 B_C

C Low gradient, slightly entrenched, well-defined floodplain with terraces, point bars, cut banks, developed in alluvial material, often bare below bankfull/ cottonwood-willow complexes
Entrenchment ratio ≥ 2.0 Gradient < .02 Width/depth ratio ≥ 12 C Width/depth ratio < 12 C_G

E Low gradient, narrow, deep channels in broad valleys/meadows, large floodplains, little sediment deposition, well-vegetated willow/sedges, sinuous, overhanging banks
Entrenchment ratio ≥ 2.0 Width/depth ratio < 12 Gradient < .01

Subclasses--Multichannel Systems

D Abundant sediment supply, shifting channels, very broad floodplains. Bold subclass in riparian class may have wetlands

Identify soil type: organic or mineral
Refer to glossary for definitions of organic and mineral soils.

Determine the pH range _____

Organic soils	Mineral soils
≤ 4.9	≤ 6.0
5.0 - 6.5	6.1-7.3
> 6.5	≥ 7.4 - 8.4
	≥ 8.5

Measure the water salinity _____

< 5 dS/m
5-10 dS/m
10-16 dS/m
16-35 dS/m
≥ 35 dS/m

Presence of heavy metals or toxicants?
Yes No

Subclass is:

_____ Single channel A
_____ Single channel G
_____ Single channel F
_____ Single channel B
_____ Single channel C
_____ Single channel E
_____ Multichannel Systems D

Reference Appendix D for definitions of water class and salinity.
Soil type, pH range, salinity and presence of heavy metals are determined using accepted wetland science protocols.

Biological Assessment

Sources of assessment criteria for each field are adopted from MDT, *Montana Wetland Assessment Method* and are listed under methods on page 5. Additional criteria sources are listed with each assessment field.

15a. Level of Disturbance

This field assesses the level of disturbance in the AA and EAA. Source: Soule (1991), Forman and Godron (1986), Fahrig (1997), Buffler (2005), and Spackman and Hughes (1995).

Use matrix below to determine level of disturbance (H = high, M = moderate, or L = low). Circle the appropriate answer.

	Predominant conditions found in EAA (600 feet from perimeter of AA)		
Conditions within AA	Land managed in predominantly natural state; is not grazed, hayed, landscaped, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed; or has been subject to minor clearing, fill placement or hydrological alteration; contains few roads, buildings, ditches or canals.	Land cultivated or heavily grazed or landscaped; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density, and or numerous ditches or canals.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, landscaped, or otherwise converted; does not contain human induced trails.	L	L	M
AA not cultivated, but moderately grazed or hayed; or has been subject to relatively minor clearing or hydrological alteration; contains few human induced trails, ditches or canals.	M	M	H
AA cultivated or heavily grazed or landscaped; subject to relatively substantial grading, clearing, or hydrological alteration; and numerous human induced trails, ditches or canals.	H	H	H

Comments: Note types of disturbance, intensity, season, etc.

15b. Plant Community Composition

This field assesses the plant community within the AA. Source: Keate (2004) and Padgette et al. (1989).

Refer to Appendix E for photographs, plan views, cross sectional diagrams, the range of expected coverage and wetland specific vegetation lists. Refer to Appendix F for transect protocol (step point). Draw a simple boundary of the AA and illustrate all plant transect locations and approximate distances on page 11 of this form. See glossary for definition of native wetland plants.

i. Do you find all layers of vegetation that are expected for this wetland type? Circle: Y N

ii. What is the percent ground cover (within the AA) dominated by native wetland vegetation?

High ≥ 80%, Moderate 79-60%, Low < 60%

iii. What is the percent of native wetland plants to non-native or non-wetland plants observed using the transect protocol?

High ≥ 80%, Moderate 79-60%, Low < 60%

iv. Rating for riverine and lacustrine wetlands.

Layers (i)	Y									N								
Cover (ii)	H			M			L			H			M			L		
Native Wetland Species (iii)	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.1L

iv. Rating for depressional, mineral flat, and slope wetlands.

Cover (ii)	H			M			L		
Native Wetland Species (iii)	H	M	L	H	M	L	H	M	L
Rating	1H	.8H	.6M	.8H	.6M	.4M	.6M	.4M	.2L

Comments:

15c. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals

This field assesses documented or suspected use of the AA by Federally listed or proposed threatened or endangered plants or animals. Source: Consultation with USFWS biologist.

Refer to the U.S. Fish and Wildlife Services website at www.fws.gov or visit the Utah Data Conservation Center website at http://dwrcdc.nr.utah.gov/ucdc/ . Circle one category below based on definitions contained in the instructions and after consultation with USFWS biologist.

i. AA is Documented (D) or Suspected (S) to contain:

*Documented primary habitat for T or E or State listed S-1 species has been addressed in #12

Primary habitat (list species)	*	S _____
Secondary habitat (list species)	D	S _____
Incidental habitat (list species)	D	S _____
No usable habitat	D	S _____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Highest Habitat Level	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.5 M	.3 L	0 L

Sources for documented use (e.g. observations, records, etc):

15d. Habitat for plant or animals rated S2 or S3 by the Utah Natural Heritage Program

This field assesses documented or suspected use of the AA by S2 or S3 species listed by the Utah Natural Heritage Program (UNHP). Source: Consultation with UDWR regional biologist.

Refer to the UNHP website or the Utah Sensitive Species List at http://dwrcdc.nr.utah.gov/ucdc/ .

Do not include species listed in 15c from above. Circle one category below based on definitions contained in the instructions and after consultation with UDWR biologist.

i. AA is Documented (D) or Suspected (S) to contain:

Primary habitat (list species and S rating)	D	S _____
Secondary habitat (list species and S rating)	D	S _____
Incidental habitat (list species and S rating)	D	S _____
No usable habitat	D	S _____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low).

Highest Habitat Level	Primary/D	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.6 M	.2 L	.1 L	0 L

Sources for documented use (e.g. observations, records, etc.):

15e. General Wildlife Habitat

This field assesses general wildlife habitat conditions in the AA. Source: Hammer (1992), Mitch and Gosselink (1993) and Weller and Spatcher (1965).

i. Wildlife habitat features

Working from top to bottom, circle appropriate AA attributes in matrix to arrive at a rating (H = high, M = moderate, or L = low).

Disturbance Level (15a)	L			M			H		
Plant Community (15b)	H	M	L	H	M	L	H	M	L
Rating	H	H	M	H	M	L	M	L	L

Wildlife habitat features rating.	1H	.6M	.2L

ii. Modified Wildlife Habitat Rating

The wildlife habitat features rating may be modified based on documented wildlife use and levels of use of the AA. Consult with the UDWR regional wildlife biologist to determine the level of wildlife use in the AA using the procedures detailed below.

UDWR biologist consulted: Name(s)_____Date(s)_____

First circle the appropriate answer to the following question: Does the UDWR have sufficient knowledge of the AA to determine a level of general wildlife use. Yes No

If the answer is No do not modify your answer to 15e(i) above. If you answer is Yes and after further consultation with a UDWR biologist and using the level of use descriptive categories on page 14. Select the descriptive category (H, M or L) that best describes the level of wildlife use in the AA. Circe the appropriate answer. H M L

If the level of use circled is:
H – add .2 to the wildlife habitat features rating 15e(i)
M – add .1 to the wildlife habitat features rating
L – do not modify the wildlife habitat features rating

iii. Rating

Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Modified wildlife habitat features rating	1H			.6M			.2L		
Rating	1.2H	1.1H	1H	.8H	.7M	.6M	.4M	.3L	.2L

Comments:

15f. General Fish/Aquatic Habitat

This field assesses general fish and aquatic habitat in the AA. Source: Sigler and Miller (1963), Gore (1985), Williams et al (1997) and National Research Council (1992).

Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, etc., circle NA here and proceed to the next function. If fish use occurs in the AA but is not desired from a resource management perspective [such as fish use within an irrigation canal], then Habitat Quality [i below] should be marked as "Low", applied accordingly in ii below, and noted in the comments.)

i. Habitat Quality

Refer to the glossary for further definitions of these terms. Circle appropriate AA attributes in matrix to arrive at the quality rating (H = high, M = moderate, or L = low).

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
Cover: % of water body in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10–25%	<10%	>25%	10–25%	<10%	>25%	10–25%	<10 %
Shading: >75% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	H	H	H	M	M	M	M
Shading: 50 to 75% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	M	M	M	M	M	L	L
Shading: < 50% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality

Circle the appropriate response. If answer is Y, then reduce rating in i above by one level (H = M, M = L, L = L)

Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the water body included on the UDEQ list of water bodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support? Y N

Modified habitat quality rating = (circle) H M L

iii. **Rating**

Refer to the Utah Division of Wildlife Resource website for fish species. Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Types of fish known or suspected within AA	Modified Habitat Quality (ii)		
	H	M	L
Native fish	1 H	.8H	.6 M
Introduced fish*	.5 M	.4 M	.3 L
No fish	.3 L	.2 L	.1 L

Note: reduce the score by .1 if the AA has carp present.

.9H	.7M	.5M	.4M	.3L	.2L	.1L	0L

*Many rivers and streams in Utah have both native and introduced fish species present. For example, non native brown trout introduced into Blacksmith Fork River have become established as a self sustaining population that provides an ecological function to the system as do the native cutthroat trout which persist. Other streams are stocked with hatchery raised rainbow trout on a "put and take" basis for sport fishing. These fish are short lived, seldom reproduce and do not provide ecological function equivalent to native fish species. In AA's where a native/non native mix of fish species exists the evaluator is required to consult with USFWS and UDWR fisheries biologists to determine the appropriate fish/aquatic habitat rating.

15g. General Amphibian Habitat

This field assesses general amphibian habitat within the AA. Source: Consultation with UDWR regional biologist.

UDWR biologist(s) consulted: Name(s)_____Date(s)_____

Circle the appropriate answer to the following question after consulting with UDWR regional biologist. The UDWR has documented the presence of amphibians in the AA or, habitat and water quality characteristics are such that they would support amphibians.

Rating: Yes No

If the answer is Yes, add **.2** under the functional points/rating column in the Functional Assessment Rating Section at the end of this form.

Hydrological/Biophysical Assessment

Draw a simple boundary of the AA on page 12 of this form and illustrate the hydrological conditions found within the AA. Include water source locations, directions of flow (if applicable), approximate depths, and any significant site features that influence site hydrology.

15h. Flood Attenuation

This field assesses the capability of the AA to slow in channel or over bank flow during high water/flood events. This applies to riverine wetlands only. Source: Kleinschmidt Associates (1993), Munson (1974) and Strom et al (2004).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Within the AA, estimate % ground coverage with high surface roughness*	≥65%	64%-50%	49%-35%	>35%
Rating	1H	.8H	.6M	.4M

*See glossary for definition of surface roughness rating criteria.

ii. There are residences, businesses, or other features, which may be significantly damaged by floods located within 0.5 miles downstream of the AA. Yes No

Comments:

15i. Short and Long Term Surface Water Storage

This field assesses the potential of the AA to capture and hold surface water originating from inundation, precipitation, upland surface (sheet flow) or subsurface (groundwater flow). Source: Munson (1974), Strom et al (2004), Hammer (1986) and Mitch and Gosselink (1993).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Duration of surface water is implied in the definition of wetland class or of the subclass and thus reflects the natural function. Circle the appropriate answer.

Wetlands are inundated	≥ 5 out of 10 years		< 5 out of 10 years	
Has the wetland's natural ability to store water been disturbed negatively?	N	Y	N	Y
Rating	1H	.8H	.6M	.4M

In order to properly assess this function, examination of the area down gradient from the AA may aid in determining whether or not dams, water control structures, overflow aprons, ditches, canals, drain tiles or other forms of outlet or modification exist.

Comments:

15j. Sediment/Nutrient/Toxicant Retention and Removal

This field assesses the ability of the AA to retain and capture sediments, nutrients and toxicants. Source: Kleinschmidt Associates (1999), Hammer (1986) and Hammer and Kadlec (1983).

This function applies to wetlands which could receive excess sediments, nutrients or toxicants through influx of surface or groundwater or direct input. If no wetlands in the AA are subject to such input, circle NA here and proceed with evaluation.

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. **Minor** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.	AA is in close proximity to or receives input from or is on UDEQ list of water bodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. **Major** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.

Within the AA, estimate % ground coverage with high to moderate surface roughness*	≥ 50%		<50%		≥ 50%		<50%	
Has the wetland's natural ability to store water been disturbed negatively?	N	Y	N	Y	N	Y	N	Y
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L

*See glossary for definition of surface roughness.

Comments:

15k. Sediment/Shoreline Stabilization

This field assesses the ability of the AA to dissipate flow or wave energy in order to reduce erosion. This applies to riverine and lacustrine wetlands only. Source: Kleinschmidt Associates (1999), Keate (2004), Padgette et al (1989) and Mitch and Gosselink (1993).

Applies only if AA occurs on or within the banks or a river, stream, or other natural (vegetated swale) or man-made drainage, or on the shoreline of a standing water body, which is subject to wave action. It does not apply, circle NA here and proceed to next function)

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function.

Within the AA, estimate % ground coverage with high surface roughness*	Duration of surface water adjacent to rooted vegetation	
	Permanent	Seasonal
≥ 65%	1H	.7M
64% - 50%	.8H	.5M
49% - 35%	.6M	.3L
< 35%	.4M	.1L

Comments:

Social Value Assessment

The following are not functions but values, which are important to society. Plus answers would suggest important societal assets, which should guide any future mitigation planning.

16. Visual Quality*

Refer to the glossary to distinguish between "wildland wetland" and "urban/exurban wetland".
If AA is considered "wildland wetland" answer the following three questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Has wetland experienced moderate to low level of disturbance (refer to glossary)? _____
iii. Is there an absence of human structures or other human induced disturbances (refer to glossary)? _____

If AA is considered to be an "urban/exurban wetland", answer the following six questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is there potentially a large number of viewers? _____
iii. Is the viewing distance in the fore or middle grounds for most viewers (refer to glossary)? _____
iv. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
v. Is there an absence of human structures or other human induced disturbances (refer to glossary)? _____
vi. Is the wetland a part of a larger open space, green space, park, buffer or corridor? _____

17. Recreational/Educational Quality*

Answer the following seven questions for both "wildland wetlands" and "urban/exurban wetlands". Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is the wetland presently used for recreation/education? _____
iii. Is the wetland ¼ mile or less from and elementary school? _____
iv. Is the wetland five miles or less from a high school? _____
v. Is there vehicular, trail, boat or canoe access to the site? _____
vi. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
vii. Is the wetland visible from a county, state or federal highway, heavily used recreation trail, residential development or other situations where large numbers of people would have visual access to the wetland? _____

*Note: In some cases wetlands many contain plant or wildlife species or perform functions that would be diminished by human activity. In these cases recreational and educational activities would be prohibited.

Summary Comments for entire Wetland AA Evaluated

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition			1	
15c. Listed/Proposed T&E Species Habitat			.9	
15d. UT Natural Heritage Program Species Habitat			.9	
15e. General Wildlife Habitat			1	
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat			0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage			1	
15j. Sediment/Nutrient/Toxicant Removal			1	
15k. Sediment/Shoreline Stabilization			1	
Totals:				

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

Note: % total functional points = actual functional points ÷ possible functional points.

	% total functional points

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below**.** **I** **II** **III** **IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Supplemental Diagram A

15b. Plant Community Composition Diagram

Draw a simple boundary of the AA and illustrate all plant transect locations and approximate distances.

Please note that 100 sample points per acre should be collected within the AA. (Example: if AA equals .25 acres, then 25 sample points should be taken.) Never use less then 10 sample points within any AA, even when AA is less then .10 acres in size. Placement of transect(s) should accurately represent the AA. Be sure to place transect(s) through different water regimes, vegetative structure, and topographic changes that may exist within the AA.

Supplemental Diagram B

Hydrological/Biophysical Assessment Diagram

Draw a simple boundary of the AA and illustrate the hydrological conditions found within the AA. Include water source locations, directions of flow (if applicable), approximate depths, and any significant site features that influence site hydrology.

UDOT Wetland Assessment Form (Slope)

1. Project Name:

2. Project Number:

3. USCOE Permit Number: **Project Pin Number:**

4. Evaluation Date (MM/DD/YYYY):

5. Evaluating Agency:

6. Evaluator(s):

7. Purpose of Evaluation (check one): ____Wetlands potentially affected by UDOT project
____ Mitigation wetlands, pre-construction
____ Mitigation wetlands, post-construction
____ Other (explain):

8. Wetland/Site Number(s):

9. Wetland Location(s):
Ecoregion (see map Appendix A):_____
Watershed (see map Appendix A):_____
County (see map Appendix A): _____
Legal: T_____N or S; R_____E or W; S_____;T_____N or S; R_____E or W; S_____
Approximate Stationing or Mileposts:_____
_____
GPS Reference Number:_____
Other Location information:

10. Wetland Size (total acres, measured by GPS if applicable):

11. Assessment Area (AA) (total acres, measured by GPS if applicable, see appendix):

12. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals or State Listed S1 Species
It is required that the evaluator contact USFWS with regards to the presence or absence of threatened or endangered (T or E) species and UDWR concerning the presence or absence of a state listed S1, S2 or S3 species. The documented habitat of a federally listed or proposed threatened or endangered plant or animal species or a state listed S1 species results in an automatic Red Flag categorization of the assessed site. Coordination with USFWS and UDWR is required. (However, the evaluation proceeds as normal so that the COE receives an assessment of function and value consistent with the UDOT assessment method.)
Is the AA documented to contain primary habitat for T or E or S-1 species? _____Yes _____No
If yes, list the species:
(This field assesses habitat for species receiving protection under provision of the Endangered Species Act and Utah critically imperiled species.)

13. Selecting a Wetland Classification
Refer to the glossary to determine the correct wetland class. Refer to Appendix E for reference photos and lists of the most common native species in each classification. Turn to appropriate colored pages to continue functional assessment as noted below.
Riverine: Blue
Slope: Pink
Depressional: Yellow
Mineral Flat: Green
Lacustrine Fringe: Purple
Roadside Ditch Wetland: If AA qualifies as a non-jurisdictional 'roadside ditch wetland', AA is classified as Category IV. Further assessment is not necessary, although all documentation must be completed.

***Toned questions or functional categories on the assessment form do not apply to this wetland class, do not answer. They are excluded from the individual function rating as well as the final overall functional assessment rating.**

Slope

Slope wetlands: Occur at points of surface changes, breaks in slope or stratigraphic changes. Surface water runoff and groundwater outflow (i.e. – spring or seep) are the primary water sources. Water flow is unidirectional (down slope/gradient). Water may discharge to a stream, lake or depression. Wetland complexes can be comprised of a slope wetland with several depressions or low-points interspersed throughout. Relying on topographic maps, aerial photographs, and field evaluation will help determine which classification is dominant and or most appropriate.

14. Identify subclass

The evaluator uses the information below together with information in Appendix D to identify the AA subclass. This information is not used directly to rate the AA.

Identify the soil type (circle): organic or mineral

Refer to glossary for definitions of organic and mineral soils.

What is the depth water table?

Circle appropriate answer.

Water table < 20 in.

Water table ≥ 20 in.

Presence of heavy metals or toxicants?

Yes No

Determine the pH range _____

Soil and water pH range

Organic soils	Mineral soils
≤ 4.9	≤ 6.0
5.0 - 6.5	6.1-7.3
> 6.5	≥ 7.4 - 8.4
≥ 8.5	

Determine the salinity_____

Water salinity

< 5 dS/m

5-10 dS/m

10-16 dS/m

16-35 dS/m

≥ 35 dS/m

Subclass is:

_____ Seasonal and persistent freashwater

_____ Seasonal and persistent saline and very saline

Reference Appendix D for definitions of water class and salinity.

Depth to water table, pH range, salinity and presence of heavy metals are determined using accepted wetland science protocols.

For montane wetlands, salinity is not listed as all are nonsaline.

Biological Assessment

Sources of assessment criteria for each field are adopted from MDT, *Montana Wetland Assessment Method* and are listed under methods on page 5. Additional criteria sources are listed with each assessment field.

15a. Level of Disturbance

This field assesses the level of disturbance in the AA and EAA. Source: Soule (1991), Forman and Godron (1986), Fahrig (1997), Buffler (2005), and Spackman and Hughes (1995).

Use matrix below to determine level of disturbance (H = high, M = moderate, or L = low). Circle the appropriate answer.

	Predominant conditions found in EAA (600 feet from perimeter of AA)		
Conditions within AA	Land managed in predominantly natural state; is not grazed, hayed, landscaped, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed; or has been subject to minor clearing, fill placement or hydrological alteration; contains few roads, buildings, ditches or canals.	Land cultivated or heavily grazed or landscaped; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density, and or numerous ditches or canals.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, landscaped, or otherwise converted; does not contain human induced trails.	L	L	M
AA not cultivated, but moderately grazed or hayed; or has been subject to relatively minor clearing or hydrological alteration; contains few human induced trails, ditches or canals.	M	M	H
AA cultivated or heavily grazed or landscaped; subject to relatively substantial grading, clearing, or hydrological alteration; and numerous human induced trails, ditches or canals.	H	H	H

Comments: Note types of disturbance, intensity, season, etc.

15b. Plant Community Composition

This field assesses the plant community within the AA. Source: Keate (2004) and Padgette et al. (1989).

Refer to Appendix F for photographs, plan views, cross sectional diagrams, the range of expected coverage and wetland specific vegetation lists. Refer to Appendix G for transect protocol (step point). Draw a simple boundary of the AA and illustrate all plant transect locations and approximate distances on page 11 of this form. See glossary for definition of native wetland plants.

i. Do you find all layers of vegetation that are expected for this wetland type? Circle: Y N

ii. What is the percent ground cover (within the AA) dominated by native wetland vegetation?

High ≥ 80%, Moderate 79-60%, Low < 60%

iii. What is the percent of native wetland plants to non-native or non-wetland plants observed using the transect protocol?

High ≥ 80%, Moderate 79-60%, Low < 60%

iv. Rating for riverine and lacustrine wetlands.

Layers (i)	Y									N								
Cover (ii)	H			M			L			H			M			L		
Native Wetland Species (iii)	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.1L

iv. Rating for depressional, mineral flat, and slope wetlands.

Cover (ii)	H			M			L		
Native Wetland Species (iii)	H	M	L	H	M	L	H	M	L
Rating	1H	.8H	.6M	.8H	.6M	.4M	.6M	.4M	.2L

Comments:

15c. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals

This field assesses documented or suspected use of the AA by Federally listed or proposed threatened or endangered plants or animals. Source: Consultation with USFWS biologist.

Refer to the U.S. Fish and Wildlife Services website at www.fws.gov or visit the Utah Data Conservation Center website at http://dwrcdc.nr.utah.gov/ucdc/ . Circle one category below based on definitions contained in the instructions and after consultation with USFWS biologist.

i. AA is Documented (D) or Suspected (S) to contain:

*Documented primary habitat for T or E or State listed S-1 species has been addressed in #12

Primary habitat (list species)	*	S _____
Secondary habitat (list species)	D	S _____
Incidental habitat (list species)	D	S _____
No usable habitat	D	S _____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Highest Habitat Level	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.5 M	.3 L	0 L

Sources for documented use (e.g. observations, records, etc):

15d. Habitat for plant or animals rated S2 or S3 by the Utah Natural Heritage Program

This field assesses documented or suspected use of the AA by S2 or S3 species listed by the Utah Natural Heritage Program (UNHP). Source: Consultation with UDWR regional biologist.

Refer to the UNHP website or the Utah Sensitive Species List at http://dwrcdc.nr.utah.gov/ucdc/ .

Do not include species listed in 15c from above. Circle one category below based on definitions contained in the instructions and after consultation with UDWR biologist.

i. AA is Documented (D) or Suspected (S) to contain:

Primary habitat (list species and S rating)	D	S _____
Secondary habitat (list species and S rating)	D	S _____
Incidental habitat (list species and S rating)	D	S _____
No usable habitat	D	S _____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low).

Highest Habitat Level	Primary/D	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.6 M	.2 L	.1 L	0 L

Sources for documented use (e.g. observations, records, etc.):

15e. General Wildlife Habitat

This field assesses general wildlife habitat conditions in the AA. Source: Hammer (1992), Mitch and Gosselink (1993) and Weller and Spatcher (1965).

i. Wildlife habitat features

Working from top to bottom, circle appropriate AA attributes in matrix to arrive at a rating (H = high, M = moderate, or L = low).

Disturbance Level (15a)	L			M			H		
Plant Community (15b)	H	M	L	H	M	L	H	M	L
Rating	H	H	M	H	M	L	M	L	L

Wildlife habitat features rating.	1H	.6M	.2L

ii. Modified Wildlife Habitat Rating

The wildlife habitat features rating may be modified based on documented wildlife use and levels of use of the AA. Consult with the UDWR regional wildlife biologist to determine the level of wildlife use in the AA using the procedures detailed below.

UDWR biologist consulted: Name(s)_____Date(s)_____

First circle the appropriate answer to the following question: Does the UDWR have sufficient knowledge of the AA to determine a level of general wildlife use. Yes No

If the answer is No do not modify your answer to 15e(i) above. If you answer is Yes and after further consultation with a UDWR biologist and using the level of use descriptive categories on page 14. Select the descriptive category (H, M or L) that best describes the level of wildlife use in the AA. Circe the appropriate answer. H M L

If the level of use circled is:
H – add .2 to the wildlife habitat features rating 15e(i)
M – add .1 to the wildlife habitat features rating
L – do not modify the wildlife habitat features rating

iii. Rating

Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Modified wildlife habitat features rating	1H			.6M			.2L		
Rating	1.2H	1.1H	1H	.8H	.7M	.6M	.4M	.3L	.2L

Comments:

15f. General Fish/Aquatic Habitat

This field assesses general fish and aquatic habitat in the AA. Source: Sigler and Miller (1963), Gore (1985), Williams et al (1997) and National Research Council (1992).

Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, etc., circle NA here and proceed to the next function. If fish use occurs in the AA but is not desired from a resource management perspective [such as fish use within an irrigation canal], then Habitat Quality [i below] should be marked as "Low", applied accordingly in ii below, and noted in the comments.)

i. Habitat Quality

Refer to the glossary for further definitions of these terms. Circle appropriate AA attributes in matrix to arrive at the quality rating (H = high, M = moderate, or L = low).

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
Cover: % of water body in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10–25%	<10%	>25%	10–25%	<10%	>25%	10–25%	<10 %
Shading: >75% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	H	H	H	M	M	M	M
Shading: 50 to 75% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	M	M	M	M	M	L	L
Shading: < 50% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality

Circle the appropriate response. If answer is Y, then reduce rating in i above by one level (H = M, M = L, L = L)

Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the water body included on the UDEQ list of water bodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support? Y N

Modified habitat quality rating = (circle) H M L

iii. **Rating**

Refer to the Utah Division of Wildlife Resource website for fish species. Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Types of fish known or suspected within AA	Modified Habitat Quality (ii)		
	H	M	L
Native fish	1 H	.8H	.6 M
Introduced fish*	.5 M	.4 M	.3 L
No fish	.3 L	.2 L	.1 L
Note: reduce the score by .1 if the AA has carp present.			

.9H	.7M	.5M	.4M	.3L	.2L	.1L	0L

15g. General Amphibian Habitat

This field assesses general amphibian habitat within the AA. Source: Consultation with UDWR regional biologist.

UDWR biologist(s) consulted: Name(s)_____Date(s)_____

Circle the appropriate answer to the following question after consulting with UDWR regional biologist. The UDWR has documented the presence of amphibians in the AA or, habitat and water quality characteristics are such that they would support amphibians.

Rating: Yes No

If the answer is Yes, add **.2** under the functional points/rating column in the Functional Assessment Rating Section at the end of this form.

Hydrological/Biophysical Assessment

Draw a simple boundary of the AA on page 12 of this form and illustrate the hydrological conditions found within the AA. Include water source locations, directions of flow (if applicable), approximate depths, and any significant site features that influence site hydrology.

15h. Flood Attenuation

This field assesses the capability of the AA to slow in channel or over bank flow during high water/flood events. This applies to riverine wetlands only. Source: Kleinschmidt Associates (1993), Munson (1974) and Strom et al (2004).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Within the AA, estimate % ground coverage with high surface roughness*	≥65%	64%-50%	49%-35%	>35%
Rating	1H	.8H	.6M	.4M

*See glossary for definition of surface roughness rating criteria.

ii. There are residences, businesses, or other features, which may be significantly damaged by floods located within 0.5 miles downstream of the AA. Yes No

Comments:

15i. Short and Long Term Surface Water Storage

This field assesses the potential of the AA to capture and hold surface water originating from inundation, precipitation, upland surface (sheet flow) or subsurface (groundwater flow). Source: Munson (1974), Strom et al (2004), Hammer (1986) and Mitch and Gosselink (1993).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Duration of surface water is implied in the definition of wetland class or of the subclass and thus reflects the natural function. Circle the appropriate answer.

Wetlands are inundated	≥ 5 out of 10 years		< 5 out of 10 years	
Has the wetland's natural ability to store water been disturbed negatively?	N	Y	N	Y
Rating	1H	.8H	.6M	.4M

In order to properly assess this function, examination of the area down gradient from the AA may aid in determining whether or not dams, water control structures, overflow aprons, ditches, canals, drain tiles or other forms of outlet or modification exist.

Comments:

15j. Sediment/Nutrient/Toxicant Retention and Removal

This field assesses the ability of the AA to retain and capture sediments, nutrients and toxicants. Source: Kleinschmidt Associates (1999), Hammer (1986) and Hammer and Kadlec (1983).

This function applies to wetlands which could receive excess sediments, nutrients or toxicants through influx of surface or groundwater or direct input. If no wetlands in the AA are subject to such input, circle NA here and proceed with evaluation.

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. **Minor** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.	AA is in close proximity to or receives input from or is on UDEQ list of water bodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. **Major** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.

Within the AA, estimate % ground coverage with high to moderate surface roughness*	≥ 50%		<50%		≥ 50%		<50%	
Has the wetland's natural ability to store water been disturbed negatively?	N	Y	N	Y	N	Y	N	Y
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L

*See glossary for definition of surface roughness.

Comments:

15k. Sediment/Shoreline Stabilization

This field assesses the ability of the AA to dissipate flow or wave energy in order to reduce erosion. This applies to riverine and lacustrine wetlands only. Source: Kleinschmidt Associates (1999), Keate (2004), Padgette et al (1989) and Mitch and Gosselink (1993).

Applies only if AA occurs on or within the banks or a river, stream, or other natural (vegetated swale) or man-made drainage, or on the shoreline of a standing water body, which is subject to wave action. It does not apply, circle NA here and proceed to next function)

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function.

Within the AA, estimate % ground coverage with high surface roughness*	Duration of surface water adjacent to rooted vegetation	
	Permanent	Seasonal
≥ 65%	1H	.7M
64% - 50%	.8H	.5M
49% - 35%	.6M	.3L
< 35%	.4M	.1L

Comments:

Social Value Assessment

The following are not functions but values, which are important to society. Plus answers would suggest important societal assets, which should guide any future mitigation planning.

16. Visual Quality*

Refer to the glossary to distinguish between "wildland wetland" and "urban/exurban wetland".
If AA is considered "wildland wetland" answer the following three questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Has wetland experienced moderate to low level of disturbance (refer to glossary)? _____
iii. Is there an absence of human structures or other human induced disturbances (refer to glossary)? _____

If AA is considered to be an "urban/exurban wetland", answer the following six questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is there potentially a large number of viewers? _____
iii. Is the viewing distance in the fore or middle grounds for most viewers (refer to glossary)? _____
iv. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
v. Is there an absence of human structures or other human induced disturbances (refer to glossary)? _____
vi. Is the wetland a part of a larger open space, green space, park, buffer or corridor? _____

17. Recreational/Educational Quality*

Answer the following seven questions for both "wildland wetlands" and "urban/exurban wetlands". Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is the wetland presently used for recreation/education? _____
iii. Is the wetland ¼ mile or less from and elementary school? _____
iv. Is the wetland five miles or less from a high school? _____
v. Is there vehicular, trail, boat or canoe access to the site? _____
vi. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
vii. Is the wetland visible from a county, state or federal highway, heavily used recreation trail, residential development or other situations where large numbers of people would have visual access to the wetland? _____

*Note: In some cases wetlands many contain plant or wildlife species or perform functions that would be diminished by human activity. In these cases recreational and educational activities would be prohibited.

Summary Comments for entire Wetland AA Evaluated

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition			1	
15c. Listed/Proposed T&E Species Habitat			.9	
15d. UT Natural Heritage Program Species Habitat			.9	
15e. General Wildlife Habitat			1	
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat			0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage			1	
15j. Sediment/Nutrient/Toxicant Removal			1	
15k. Sediment/Shoreline Stabilization			1	
Totals:				

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.
Note: % total functional points = actual functional points ÷ possible functional points.

	% total functional points

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below**.** **I** **II** **III** **IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Supplemental Diagram A

15b. Plant Community Composition Diagram

Draw a simple boundary of the AA and illustrate all plant transect locations and approximate distances.

Please note that 100 sample points per acre should be collected within the AA. (Example: if AA equals .25 acres, then 25 sample points should be taken.) Never use less then 10 sample points within any AA, even when AA is less then .10 acres in size. Placement of transect(s) should accurately represent the AA. Be sure to place transect(s) through different water regimes, vegetative structure, and topographic changes that may exist within the AA.

Supplemental Diagram B

Hydrological/Biophysical Assessment Diagram

Draw a simple boundary of the AA and illustrate the hydrological conditions found within the AA. Include water source locations, directions of flow (if applicable), approximate depths, and any significant site features that influence site hydrology.

UDOT Wetland Assessment Form (Depressional)

1. Project Name:

2. Project Number:

3. USCOE Permit Number: **Project Pin Number:**

4. Evaluation Date (MM/DD/YYYY):

5. Evaluating Agency:

6. Evaluator(s):

7. Purpose of Evaluation (check one): ____Wetlands potentially affected by UDOT project
____ Mitigation wetlands, pre-construction
____ Mitigation wetlands, post-construction
____ Other (explain):

8. Wetland/Site Number(s):

9. Wetland Location(s):
Ecoregion (see map Appendix A):_____
Watershed (see map Appendix A):_____
County (see map Appendix A): _____
Legal: T_____N or S; R_____E or W; S_____;T_____N or S; R_____E or W; S_____
Approximate Stationing or Mileposts:_____
_____
GPS Reference Number:_____
Other Location information:

10. Wetland Size (total acres, measured by GPS if applicable):

11. Assessment Area (AA) (total acres, measured by GPS if applicable, see appendix):

12. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals or State Listed S1 Species
It is required that the evaluator contact USFWS with regards to the presence or absence of threatened or endangered (T or E) species and UDWR concerning the presence or absence of a state listed S1, S2 or S3 species. The documented habitat of a federally listed or proposed threatened or endangered plant or animal species or a state listed S1 species results in an automatic Red Flag categorization of the assessed site. Coordination with USFWS and UDWR is required. (However, the evaluation proceeds as normal so that the COE receives an assessment of function and value consistent with the UDOT assessment method.)
Is the AA documented to contain primary habitat for T or E or S-1 species? _____Yes _____No
If yes, list the species:
(This field assesses habitat for species receiving protection under provision of the Endangered Species Act and Utah critically imperiled species.)

13. Selecting a Wetland Classification
Refer to the glossary to determine the correct wetland class. Refer to Appendix E for reference photos and lists of the most common native species in each classification. Turn to appropriate colored pages to continue functional assessment as noted below.
Riverine: Blue
Slope: Pink
Depressional: Yellow
Mineral Flat: Green
Lacustrine Fringe: Purple
Roadside Ditch Wetland: If AA qualifies as a non-jurisdictional 'roadside ditch wetland', AA is classified as Category IV. Further assessment is not necessary, although all documentation must be completed.

***Toned questions or functional categories on the assessment form do not apply to this wetland class, do not answer. They are excluded from the individual function rating as well as the final overall functional assessment rating.**

Depressional

Depressional wetlands: Occur in topographic depressions with closed contours. Water sources are precipitation, runoff and groundwater. Water flow vectors are toward the center of the depression. Dominant hydrodynamics are vertical. May or may not have inlets or outlets. Depressions that are full, may release water down slope/gradient and tend to be a part of a larger slope complex. Relying on topographic maps, aerial photographs, and field evaluation will help determine which classification is dominant and or most appropriate.

14. Identify subclass

The evaluator uses the information below together with information in Appendix D to identify the AA subclass. This information is not used directly to rate the AA.

Identify water class _____

Ephemeral – surface water is present for brief periods in some years (< 3 mo/yr)
Seasonal – surface water is present for longer periods in most years (3-6 mo/yr)
Semi-permanent – surface water is common to persistent in all years (6-12 mo/yr)
Permanent – surface water is continuously present in all years

Identify the soil Organic or Mineral

Refer to glossary for definitions of organic and mineral soils.

Determine the pH range _____

Organic soils	Mineral soils
≤ 4.9	≤ 6.0
5.0 - 6.5	6.1-7.3
> 6.5	≥ 7.4 - 8.4
≥ 8.5	

Determine the salinity _____ **Presence of heavy metals or toxicants?**

Water Salinity	Yes	No
< 5 dS/m		
5-10 dS/m		
10-16 dS/m		
16-35 dS/m		
≥ 35 dS/m		

Subclass is:

_____ Ephemeral
_____ Seasonal Freshwater
_____ Semi-permanent and permanent freshwater
_____ Semi-permanent and permanent slightly to strongly saline
_____ Seasonal and semi-permanent hypersaline

Water class, soil type, pH range, salinity and presence of heavy metals are determined using accepted wetland science protocols.

Reference Appendix D for definitions of water class and salinity.

Biological Assessment

Sources of assessment criteria for each field are adopted from MDT, *Montana Wetland Assessment Method* and are listed under methods on page 5. Additional criteria sources are listed with each assessment field.

15a. Level of Disturbance

This field assesses the level of disturbance in the AA and EAA. Source: Soule (1991), Forman and Godron (1986), Fahrig (1997), Buffler (2005), and Spackman and Hughes (1995).

Use matrix below to determine level of disturbance (H = high, M = moderate, or L = low). Circle the appropriate answer.

	Predominant conditions found in EAA (600 feet from perimeter of AA)		
Conditions within AA	Land managed in predominantly natural state; is not grazed, hayed, landscaped, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed; or has been subject to minor clearing, fill placement or hydrological alteration; contains few roads, buildings, ditches or canals.	Land cultivated or heavily grazed or landscaped; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density, and or numerous ditches or canals.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, landscaped, or otherwise converted; does not contain human induced trails.	L	L	M
AA not cultivated, but moderately grazed or hayed; or has been subject to relatively minor clearing or hydrological alteration; contains few human induced trails, ditches or canals.	M	M	H
AA cultivated or heavily grazed or landscaped; subject to relatively substantial grading, clearing, or hydrological alteration; and numerous human induced trails, ditches or canals.	H	H	H

Comments: Note types of disturbance, intensity, season, etc.

15b. Plant Community Composition

This field assesses the plant community within the AA. Source: Keate (2004) and Padgette et al. (1989).

Refer to Appendix E for photographs, plan views, cross sectional diagrams, the range of expected coverage and wetland specific vegetation lists. Refer to Appendix F for transect protocol (step point). Draw a simple boundary of the AA and illustrate all plant transect locations and approximate distances on page 11 of this form. See glossary for definition of native wetland plants.

i. Do you find all layers of vegetation that are expected for this wetland type? Circle: Y N

ii. What is the percent ground cover (within the AA) dominated by native wetland vegetation?

High ≥ 80%, Moderate 79-60%, Low < 60%

iii. What is the percent of native wetland plants to non-native or non-wetland plants observed using the transect protocol?

High ≥ 80%, Moderate 79-60%, Low < 60%

iv. Rating for riverine and lacustrine wetlands.

Layers (i)	Y									N								
Cover (ii)	H			M			L			H			M			L		
Native Wetland Species (iii)	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.1L

iv. Rating for depressional, mineral flat, and slope wetlands.

Cover (ii)	H			M			L		
Native Wetland Species (iii)	H	M	L	H	M	L	H	M	L
Rating	1H	.8H	.6M	.8H	.6M	.4M	.6M	.4M	.2L

Comments:

15c. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals

This field assesses documented or suspected use of the AA by Federally listed or proposed threatened or endangered plants or animals. Source: Consultation with USFWS biologist.

Refer to the U.S. Fish and Wildlife Services website at www.fws.gov or visit the Utah Data Conservation Center website at http://dwrcdc.nr.utah.gov/ucdc/ . Circle one category below based on definitions contained in the instructions and after consultation with USFWS biologist.

i. AA is Documented (D) or Suspected (S) to contain:

*Documented primary habitat for T or E or State listed S-1 species has been addressed in #12

Primary habitat (list species)	*	S _____
Secondary habitat (list species)	D	S _____
Incidental habitat (list species)	D	S _____
No usable habitat	D	S _____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Highest Habitat Level	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.5 M	.3 L	0 L

Sources for documented use (e.g. observations, records, etc):

15d. Habitat for plant or animals rated S2 or S3 by the Utah Natural Heritage Program

This field assesses documented or suspected use of the AA by S2 or S3 species listed by the Utah Natural Heritage Program (UNHP). Source: Consultation with UDWR regional biologist.

Refer to the UNHP website or the Utah Sensitive Species List at http://dwrcdc.nr.utah.gov/ucdc/ .

Do not include species listed in 15c from above. Circle one category below based on definitions contained in the instructions and after consultation with UDWR biologist.

i. AA is Documented (D) or Suspected (S) to contain:

Primary habitat (list species and S rating)	D	S _____
Secondary habitat (list species and S rating)	D	S _____
Incidental habitat (list species and S rating)	D	S _____
No usable habitat	D	S _____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low).

Highest Habitat Level	Primary/D	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.6 M	.2 L	.1 L	0 L

Sources for documented use (e.g. observations, records, etc.):

15e. General Wildlife Habitat

This field assesses general wildlife habitat conditions in the AA. Source: Hammer (1992), Mitch and Gosselink (1993) and Weller and Spatcher (1965).

i. Wildlife habitat features

Working from top to bottom, circle appropriate AA attributes in matrix to arrive at a rating (H = high, M = moderate, or L = low).

Disturbance Level (15a)	L			M			H		
Plant Community (15b)	H	M	L	H	M	L	H	M	L
Rating	H	H	M	H	M	L	M	L	L

Wildlife habitat features rating.	1H	.6M	.2L

ii. Modified Wildlife Habitat Rating

The wildlife habitat features rating may be modified based on documented wildlife use and levels of use of the AA. Consult with the UDWR regional wildlife biologist to determine the level of wildlife use in the AA using the procedures detailed below.

UDWR biologist consulted: Name(s)_____Date(s)_____

First circle the appropriate answer to the following question: Does the UDWR have sufficient knowledge of the AA to determine a level of general wildlife use. Yes No

If the answer is No do not modify your answer to 15e(i) above. If you answer is Yes and after further consultation with a UDWR biologist and using the level of use descriptive categories on page 14. Select the descriptive category (H, M or L) that best describes the level of wildlife use in the AA. Circe the appropriate answer. H M L

If the level of use circled is:
H – add .2 to the wildlife habitat features rating 15e(i)
M – add .1 to the wildlife habitat features rating
L – do not modify the wildlife habitat features rating

iii. Rating

Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Modified wildlife habitat features rating	1H			.6M			.2L		
Rating	1.2H	1.1H	1H	.8H	.7M	.6M	.4M	.3L	.2L

Comments:

15f. General Fish/Aquatic Habitat

This field assesses general fish and aquatic habitat in the AA. Source: Sigler and Miller (1963), Gore (1985), Williams et al (1997) and National Research Council (1992).

Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, etc., circle NA here and proceed to the next function. If fish use occurs in the AA but is not desired from a resource management perspective [such as fish use within an irrigation canal], then Habitat Quality [i below] should be marked as "Low", applied accordingly in ii below, and noted in the comments.)

i. Habitat Quality

Refer to the glossary for further definitions of these terms. Circle appropriate AA attributes in matrix to arrive at the quality rating (H = high, M = moderate, or L = low).

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
Cover: % of water body in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10–25%	<10%	>25%	10–25%	<10%	>25%	10–25%	<10 %
Shading: >75% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	H	H	H	M	M	M	M
Shading: 50 to 75% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	M	M	M	M	M	L	L
Shading: < 50% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality

Circle the appropriate response. If answer is Y, then reduce rating in i above by one level (H = M, M = L, L = L)

Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the water body included on the UDEQ list of water bodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support? Y N

Modified habitat quality rating = (circle) H M L

iii. **Rating**

Refer to the Utah Division of Wildlife Resource website for fish species. Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Types of fish known or suspected within AA	Modified Habitat Quality (ii)		
	H	M	L
Native fish	1 H	.8H	.6 M
Introduced fish*	.5 M	.4 M	.3 L
No fish	.3 L	.2 L	.1 L
Note: reduce the score by .1 if the AA has carp present.			

.9H	.7M	.5M	.4M	.3L	.2L	.1L	0L

15g. General Amphibian Habitat

This field assesses general amphibian habitat within the AA. Source: Consultation with UDWR regional biologist.

UDWR biologist(s) consulted: Name(s)_____Date(s)_____

Circle the appropriate answer to the following question after consulting with UDWR regional biologist. The UDWR has documented the presence of amphibians in the AA or, habitat and water quality characteristics are such that they would support amphibians.

Rating: Yes No

If the answer is Yes, add **.2** under the functional points/rating column in the Functional Assessment Rating Section at the end of this form.

Hydrological/Biophysical Assessment

Draw a simple boundary of the AA on page 12 of this form and illustrate the hydrological conditions found within the AA. Include water source locations, directions of flow (if applicable), approximate depths, and any significant site features that influence site hydrology.

15h. Flood Attenuation

This field assesses the capability of the AA to slow in channel or over bank flow during high water/flood events. This applies to riverine wetlands only. Source: Kleinschmidt Associates (1993), Munson (1974) and Strom et al (2004).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Within the AA, estimate % ground coverage with high surface roughness*	≥65%	64%-50%	49%-35%	>35%
Rating	1H	.8H	.6M	.4M

*See glossary for definition of surface roughness rating criteria.

ii. There are residences, businesses, or other features, which may be significantly damaged by floods located within 0.5 miles downstream of the AA. Yes No

Comments:

15i. Short and Long Term Surface Water Storage

This field assesses the potential of the AA to capture and hold surface water originating from inundation, precipitation, upland surface (sheet flow) or subsurface (groundwater flow). Source: Munson (1974), Strom et al (2004), Hammer (1986) and Mitch and Gosselink (1993).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Duration of surface water is implied in the definition of wetland class or of the subclass and thus reflects the natural function. Circle the appropriate answer.

Wetlands are inundated	≥ 5 out of 10 years		< 5 out of 10 years	
Has the wetland's natural ability to store water been disturbed negatively?	N	Y	N	Y
Rating	1H	.8H	.6M	.4M

In order to properly assess this function, examination of the area down gradient from the AA may aid in determining whether or not dams, water control structures, overflow aprons, ditches, canals, drain tiles or other forms of outlet or modification exist.

Comments:

15j. Sediment/Nutrient/Toxicant Retention and Removal

This field assesses the ability of the AA to retain and capture sediments, nutrients and toxicants. Source: Kleinschmidt Associates (1999), Hammer (1986) and Hammer and Kadlec (1983).

This function applies to wetlands which could receive excess sediments, nutrients or toxicants through influx of surface or groundwater or direct input. If no wetlands in the AA are subject to such input, circle NA here and proceed with evaluation.

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. **Minor** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.	AA is in close proximity to or receives input from or is on UDEQ list of water bodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. **Major** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.

Within the AA, estimate % ground coverage with high to moderate surface roughness*	≥ 50%		<50%		≥ 50%		<50%	
Has the wetland's natural ability to store water been disturbed negatively?	N	Y	N	Y	N	Y	N	Y
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L

*See glossary for definition of surface roughness.

Comments:

15k. Sediment/Shoreline Stabilization

This field assesses the ability of the AA to dissipate flow or wave energy in order to reduce erosion. This applies to riverine and lacustrine wetlands only. Source: Kleinschmidt Associates (1999), Keate (2004), Padgette et al (1989) and Mitch and Gosselink (1993).

Applies only if AA occurs on or within the banks or a river, stream, or other natural (vegetated swale) or man-made drainage, or on the shoreline of a standing water body, which is subject to wave action. It does not apply, circle NA here and proceed to next function)

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function.

Within the AA, estimate % ground coverage with high surface roughness*	Duration of surface water adjacent to rooted vegetation	
	Permanent	Seasonal
≥ 65%	1H	.7M
64% - 50%	.8H	.5M
49% - 35%	.6M	.3L
< 35%	.4M	.1L

Comments:

Social Value Assessment

The following are not functions but values, which are important to society. Plus answers would suggest important societal assets, which should guide any future mitigation planning.

16. Visual Quality*

Refer to the glossary to distinguish between "wildland wetland" and "urban/exurban wetland".
If AA is considered "wildland wetland" answer the following three questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Has wetland experienced moderate to low level of disturbance (refer to glossary)? _____
iii. Is there an absence of human structures or other human induced disturbances (refer to glossary)? _____

If AA is considered to be an "urban/exurban wetland", answer the following six questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is there potentially a large number of viewers? _____
iii. Is the viewing distance in the fore or middle grounds for most viewers (refer to glossary)? _____
iv. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
v. Is there an absence of human structures or other human induced disturbances (refer to glossary)? _____
vi. Is the wetland a part of a larger open space, green space, park, buffer or corridor? _____

17. Recreational/Educational Quality*

Answer the following seven questions for both "wildland wetlands" and "urban/exurban wetlands". Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is the wetland presently used for recreation/education? _____
iii. Is the wetland ¼ mile or less from and elementary school? _____
iv. Is the wetland five miles or less from a high school? _____
v. Is there vehicular, trail, boat or canoe access to the site? _____
vi. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
vii. Is the wetland visible from a county, state or federal highway, heavily used recreation trail, residential development or other situations where large numbers of people would have visual access to the wetland? _____

*Note: In some cases wetlands many contain plant or wildlife species or perform functions that would be diminished by human activity. In these cases recreational and educational activities would be prohibited.

Summary Comments for entire Wetland AA Evaluated

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition			1	
15c. Listed/Proposed T&E Species Habitat			.9	
15d. UT Natural Heritage Program Species Habitat			.9	
15e. General Wildlife Habitat			1	
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat			0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage			1	
15j. Sediment/Nutrient/Toxicant Removal			1	
15k. Sediment/Shoreline Stabilization			1	
Totals:				

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

Note: % total functional points = actual functional points ÷ possible functional points.

	% total functional points

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below**.** **I** **II** **III** **IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Supplemental Diagram A

15b. Plant Community Composition Diagram

Draw a simple boundary of the AA and illustrate all plant transect locations and approximate distances.
Please note that 100 sample points per acre should be collected within the AA. (Example: if AA equals .25 acres, then 25 sample points should be taken.) Never use less then 10 sample points within any AA, even when AA is less then .10 acres in size. Placement of transect(s) should accurately represent the AA. Be sure to place transect(s) through different water regimes, vegetative structure, and topographic changes that may exist within the AA.

Supplemental Diagram B

Hydrological/Biophysical Assessment Diagram

Draw a simple boundary of the AA and illustrate the hydrological conditions found within the AA. Include water source locations, directions of flow (if applicable), approximate depths, and any significant site features that influence site hydrology.

UDOT Wetland Assessment Form (Mineral Flat)

1. Project Name:

2. Project Number:

3. USCOE Permit Number: **Project Pin Number:**

4. Evaluation Date (MM/DD/YYYY):

5. Evaluating Agency:

6. Evaluator(s):

7. Purpose of Evaluation (check one): ____Wetlands potentially affected by UDOT project
____ Mitigation wetlands, pre-construction
____ Mitigation wetlands, post-construction
____ Other (explain):

8. Wetland/Site Number(s):

9. Wetland Location(s):
Ecoregion (see map Appendix A):_____
Watershed (see map Appendix A):_____
County (see map Appendix A): _____
Legal: T_____N or S; R_____E or W; S_____;T_____N or S; R_____E or W; S_____
Approximate Stationing or Mileposts:_____
_____
GPS Reference Number:_____
Other Location information:

10. Wetland Size (total acres, measured by GPS if applicable):

11. Assessment Area (AA) (total acres, measured by GPS if applicable, see appendix):

12. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals or State Listed S1 Species
It is required that the evaluator contact USFWS with regards to the presence or absence of threatened or endangered (T or E) species and UDWR concerning the presence or absence of a state listed S1, S2 or S3 species. The documented habitat of a federally listed or proposed threatened or endangered plant or animal species or a state listed S1 species results in an automatic Red Flag categorization of the assessed site. Coordination with USFWS and UDWR is required. (However, the evaluation proceeds as normal so that the COE receives an assessment of function and value consistent with the UDOT assessment method.)
Is the AA documented to contain primary habitat for T or E or S-1 species? _____Yes _____No
If yes, list the species:
(This field assesses habitat for species receiving protection under provision of the Endangered Species Act and Utah critically imperiled species.)

13. Selecting a Wetland Classification
Refer to the glossary to determine the correct wetland class. Refer to Appendix E for reference photos and lists of the most common native species in each classification. Turn to appropriate colored pages to continue functional assessment as noted below.
Riverine: Blue
Slope: Pink
Depressional: Yellow
Mineral Flat: Green
Lacustrine Fringe: Purple
Roadside Ditch Wetland: If AA qualifies as a non-jurisdictional 'roadside ditch wetland', AA is classified as Category IV. Further assessment is not necessary, although all documentation must be completed.

***Toned questions or functional categories on the assessment form do not apply to this wetland class, do not answer. They are excluded from the individual function rating as well as the final overall functional assessment rating.**

Mineral Flat

Mineral flat wetlands: Occur on large relict lakebeds. Dominant water source is precipitation. Dominant hydrodynamics are vertical. Typically are large features in the landscape, associated with old Lake Bonneville bottom deposits with close proximity to GSL or other large permanent, semi-permanent or ephemeral water bodies. (e.g. – Sevier Lake) Only found in basin and range ecoregions. Example: Great Salt Lake mud flats and salt flats. Subclasses are not known.

14. Subclasses not known

Biological Assessment

Sources of assessment criteria for each field are adopted from MDT, *Montana Wetland Assessment Method* and are listed under methods on page 5. Additional criteria sources are listed with each assessment field.

15a. Level of Disturbance

This field assesses the level of disturbance in the AA and EAA. Source: Soule (1991), Forman and Godron (1986), Fahrig (1997), Buffler (2005), and Spackman and Hughes (1995).

Use matrix below to determine level of disturbance (H = high, M = moderate, or L = low). Circle the appropriate answer.

	Predominant conditions found in EAA (600 feet from perimeter of AA)		
Conditions within AA	Land managed in predominantly natural state; is not grazed, hayed, landscaped, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed; or has been subject to minor clearing, fill placement or hydrological alteration; contains few roads, buildings, ditches or canals.	Land cultivated or heavily grazed or landscaped; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density, and or numerous ditches or canals.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, landscaped, or otherwise converted; does not contain human induced trails.	L	L	M
AA not cultivated, but moderately grazed or hayed; or has been subject to relatively minor clearing or hydrological alteration; contains few human induced trails, ditches or canals.	M	M	H
AA cultivated or heavily grazed or landscaped; subject to relatively substantial grading, clearing, or hydrological alteration; and numerous human induced trails, ditches or canals.	H	H	H

Comments: Note types of disturbance, intensity, season, etc.

15b. Plant Community Composition

This field assesses the plant community within the AA. Source: Keate (2004) and Padgette et al. (1989).

Refer to Appendix E for photographs, plan views, cross sectional diagrams, the range of expected coverage and wetland specific vegetation lists. Refer to Appendix F for transect protocol (step point). Draw a simple boundary of the AA and illustrate all plant transect locations and approximate distances on page 11 of this form. See glossary for definition of native wetland plants.

i. Do you find all layers of vegetation that are expected for this wetland type? Circle: Y N

ii. What is the percent ground cover (within the AA) dominated by native wetland vegetation?

High ≥ 80%, Moderate 79-60%, Low < 60%

iii. What is the percent of native wetland plants to non-native or non-wetland plants observed using the transect protocol?

High ≥ 80%, Moderate 79-60%, Low < 60%

iv. Rating for riverine and lacustrine wetlands.

Layers (i)	Y									N								
Cover (ii)	H			M			L			H			M			L		
Native Wetland Species (iii)	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.1L

iv. Rating for depressional, mineral flat, and slope wetlands.

Cover (ii)	H			M			L		
Native Wetland Species (iii)	H	M	L	H	M	L	H	M	L
Rating	1H	.8H	.6M	.8H	.6M	.4M	.6M	.4M	.2L

Comments:

15c. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals

This field assesses documented or suspected use of the AA by Federally listed or proposed threatened or endangered plants or animals. Source: Consultation with USFWS biologist.

Refer to the U.S. Fish and Wildlife Services website at www.fws.gov or visit the Utah Data Conservation Center website at http://dwrcdc.nr.utah.gov/ucdc/ . Circle one category below based on definitions contained in the instructions and after consultation with USFWS biologist.

i. AA is Documented (D) or Suspected (S) to contain:

*Documented primary habitat for T or E or State listed S-1 species has been addressed in #12

Primary (list species)	*	S _____
Secondary habitat (list species)	D	S _____
Incidental habitat (list species)	D	S _____
No usable habitat	D	S _____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Highest Habitat Level	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.5 M	.3 L	0 L

Sources for documented use (e.g. observations, records, etc):

15d. Habitat for plant or animals rated S2 or S3 by the Utah Natural Heritage Program

This field assesses documented or suspected use of the AA by S2 or S3 species listed by the Utah Natural Heritage Program (UNHP). Source: Consultation with UDWR regional biologist.

Refer to the UNHP website or the Utah Sensitive Species List at http://dwrcdc.nr.utah.gov/ucdc/ .

Do not include species listed in 15c from above. Circle one category below based on definitions contained in the instructions and after consultation with UDWR biologist.

i. AA is Documented (D) or Suspected (S) to contain:

Primary (list species and S rating)	D	S _____
Secondary habitat (list species and S rating)	D	S _____
Incidental habitat (list species and S rating)	D	S _____
No usable habitat	D	S _____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low).

Highest Habitat Level	Primary/D	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.6 M	.2 L	.1 L	0 L

Sources for documented use (e.g. observations, records, etc.):

15e. General Wildlife Habitat

This field assesses general wildlife habitat conditions in the AA. Source: Hammer (1992), Mitch and Gosselink (1993) and Weller and Spatcher (1965).

i. Wildlife habitat features

Working from top to bottom, circle appropriate AA attributes in matrix to arrive at a rating (H = high, M = moderate, or L = low).

Disturbance Level (15a)	L			M			H		
Plant Community (15b)	H	M	L	H	M	L	H	M	L
Rating	H	H	M	H	M	L	M	L	L

Wildlife habitat features rating.	1H	.6M	.2L

ii. Modified Wildlife Habitat Rating

The wildlife habitat features rating may be modified based on documented wildlife use and levels of use of the AA. Consult with the UDWR regional wildlife biologist to determine the level of wildlife use in the AA using the procedures detailed below.

UDWR biologist consulted: Name(s)_____Date(s)_____

First circle the appropriate answer to the following question: Does the UDWR have sufficient knowledge of the AA to determine a level of general wildlife use. Yes No

If the answer is No do not modify your answer to 15e(i) above. If you answer is Yes and after further consultation with a UDWR biologist and using the level of use descriptive categories on page 14. Select the descriptive category (H, M or L) that best describes the level of wildlife use in the AA. Circe the appropriate answer. H M L

If the level of use circled is:
H – add .2 to the wildlife habitat features rating 15e(i)
M – add .1 to the wildlife habitat features rating
L – do not modify the wildlife habitat features rating

iii. Rating

Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Modified wildlife habitat features rating	1H			.6M			.2L		
Rating	1.2H	1.1H	1H	.8H	.7M	.6M	.4M	.3L	.2L

Comments:

15f. General Fish/Aquatic Habitat

This field assesses general fish and aquatic habitat in the AA. Source: Sigler and Miller (1963), Gore (1985), Williams et al (1997) and National Research Council (1992).

Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, etc., circle NA here and proceed to the next function. If fish use occurs in the AA but is not desired from a resource management perspective [such as fish use within an irrigation canal], then Habitat Quality [i below] should be marked as "Low", applied accordingly in ii below, and noted in the comments.)

i. Habitat Quality

Refer to the glossary for further definitions of these terms. Circle appropriate AA attributes in matrix to arrive at the quality rating (H = high, M = moderate, or L = low).

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
Cover: % of water body in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10–25%	<10%	>25%	10–25%	<10%	>25%	10–25%	<10 %
Shading: >75% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	H	H	H	M	M	M	M
Shading: 50 to 75% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	M	M	M	M	M	L	L
Shading: < 50% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality

Circle the appropriate response. If answer is Y, then reduce rating in i above by one level (H = M, M = L, L = L)

Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the water body included on the UDEQ list of water bodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support? Y N

Modified habitat quality rating = (circle) H M L

iii. **Rating**

Refer to the Utah Division of Wildlife Resource website for fish species. Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Types of fish known or suspected within AA	Modified Habitat Quality (ii)		
	H	M	L
Native fish	1 H	.8H	.6 M
Introduced fish*	.5 M	.4 M	.3 L
No fish	.3 L	.2 L	.1 L
Note: reduce the score by .1 if the AA has carp present.			

.9H	.7M	.5M	.4M	.3L	.2L	.1L	0L

15g. General Amphibian Habitat

This field assesses general amphibian habitat within the AA. Source: Consultation with UDWR regional biologist.

UDWR biologist(s) consulted: Name(s)_____Date(s)_____

Circle the appropriate answer to the following question after consulting with UDWR regional biologist. The UDWR has documented the presence of amphibians in the AA or, habitat and water quality characteristics are such that they would support amphibians.

Rating: Yes No

If the answer is Yes, add **.2** under the functional points/rating column in the Functional Assessment Rating Section at the end of this form.

Hydrological/Biophysical Assessment

Draw a simple boundary of the AA on page 12 of this form and illustrate the hydrological conditions found within the AA. Include water source locations, directions of flow (if applicable), approximate depths, and any significant site features that influence site hydrology.

15h. Flood Attenuation

This field assesses the capability of the AA to slow in channel or over bank flow during high water/flood events. This applies to riverine wetlands only. Source: Kleinschmidt Associates (1993), Munson (1974) and Strom et al (2004).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Within the AA, estimate % ground coverage with high surface roughness*	≥65%	64%-50%	49%-35%	>35%
Rating	1H	.8H	.6M	.4M

*See glossary for definition of surface roughness rating criteria.

ii. There are residences, businesses, or other features, which may be significantly damaged by floods located within 0.5 miles downstream of the AA. Yes No

Comments:

15i. Short and Long Term Surface Water Storage

This field assesses the potential of the AA to capture and hold surface water originating from inundation, precipitation, upland surface (sheet flow) or subsurface (groundwater flow). Source: Munson (1974), Strom et al (2004), Hammer (1986) and Mitch and Gosselink (1993).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Duration of surface water is implied in the definition of wetland class or of the subclass and thus reflects the natural function. Circle the appropriate answer.

Wetlands are inundated	≥ 5 out of 10 years		< 5 out of 10 years	
Has the wetland's natural ability to store water been disturbed negatively?	N	Y	N	Y
Rating	1H	.8H	.6M	.4M

In order to properly assess this function, examination of the area down gradient from the AA may aid in determining whether or not dams, water control structures, overflow aprons, ditches, canals, drain tiles or other forms of outlet or modification exist.

Comments:

15j. Sediment/Nutrient/Toxicant Retention and Removal

This field assesses the ability of the AA to retain and capture sediments, nutrients and toxicants. Source: Kleinschmidt Associates (1999), Hammer (1986) and Hammer and Kadlec (1983).

This function applies to wetlands which could receive excess sediments, nutrients or toxicants through influx of surface or groundwater or direct input. If no wetlands in the AA are subject to such input, circle NA here and proceed with evaluation.

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. **Minor** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.	AA is in close proximity to or receives input from or is on UDEQ list of water bodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. **Major** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.

Within the AA, estimate % ground coverage with high to moderate surface roughness*	≥ 50%		<50%		≥ 50%		<50%	
Has the wetland's natural ability to store water been disturbed negatively?	N	Y	N	Y	N	Y	N	Y
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L

*See glossary for definition of surface roughness.

Comments:

15k. Sediment/Shoreline Stabilization

This field assesses the ability of the AA to dissipate flow or wave energy in order to reduce erosion. This applies to riverine and lacustrine wetlands only. Source: Kleinschmidt Associates (1999), Keate (2004), Padgette et al (1989) and Mitch and Gosselink (1993).

Applies only if AA occurs on or within the banks or a river, stream, or other natural (vegetated swale) or man-made drainage, or on the shoreline of a standing water body, which is subject to wave action. It does not apply, circle NA here and proceed to next function)

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function.

Within the AA, estimate % ground coverage with high surface roughness*	Duration of surface water adjacent to rooted vegetation	
	Permanent	Seasonal
≥ 65%	1H	.7M
64% - 50%	.8H	.5M
49% - 35%	.6M	.3L
< 35%	.4M	.1L

Comments:

Social Value Assessment

The following are not functions but values, which are important to society. Plus answers would suggest important societal assets, which should guide any future mitigation planning.

16. Visual Quality*

Refer to the glossary to distinguish between "wildland wetland" and "urban/exurban wetland".
If AA is considered "wildland wetland" answer the following three questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Has wetland experienced moderate to low level of disturbance (refer to glossary)? _____
iii. Is there an absence of human structures or other human induced disturbances (refer to glossary)? _____

If AA is considered to be an "urban/exurban wetland", answer the following six questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is there potentially a large number of viewers? _____
iii. Is the viewing distance in the fore or middle grounds for most viewers (refer to glossary)? _____
iv. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
v. Is there an absence of human structures or other human induced disturbances (refer to glossary)? _____
vi. Is the wetland a part of a larger open space, green space, park, buffer or corridor? _____

17. Recreational/Educational Quality*

Answer the following seven questions for both "wildland wetlands" and "urban/exurban wetlands". Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is the wetland presently used for recreation/education? _____
iii. Is the wetland ¼ mile or less from and elementary school? _____
iv. Is the wetland five miles or less from a high school? _____
v. Is there vehicular, trail, boat or canoe access to the site? _____
vi. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
vii. Is the wetland visible from a county, state or federal highway, heavily used recreation trail, residential development or other situations where large numbers of people would have visual access to the wetland? _____

*Note: In some cases wetlands many contain plant or wildlife species or perform functions that would be diminished by human activity. In these cases recreational and educational activities would be prohibited.

Summary Comments for entire Wetland AA Evaluated

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition			1	
15v. Listed/Proposed T&E Species Habitat			.9	
15d. UT Natural Heritage Program Species Habitat			.9	
15e. General Wildlife Habitat			1	
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat			0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage			1	
15j. Sediment/Nutrient/Toxicant Removal			1	
15k. Sediment/Shoreline Stabilization			1	
Totals:				

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

Note: % total functional points = actual functional points ÷ possible functional points.

	% total functional points

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below**. I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Supplemental Diagram A

15b. Plant Community Composition Diagram

Draw a simple boundary of the AA and illustrate all plant transect locations and approximate distances.
Please note that 100 sample points per acre should be collected within the AA. (Example: if AA equals .25 acres, then 25 sample points should be taken.) Never use less then 10 sample points within any AA, even when AA is less then .10 acres in size. Placement of transect(s) should accurately represent the AA. Be sure to place transect(s) through different water regimes, vegetative structure, and topographic changes that may exist within the AA.

Supplemental Diagram B

Hydrological/Biophysical Assessment Diagram

Draw a simple boundary of the AA and illustrate the hydrological conditions found within the AA. Include water source locations, directions of flow (if applicable), approximate depths, and any significant site features that influence site hydrology.

UDOT Wetland Assessment Form (Lacustrine Fringe)

1. Project Name:

2. Project Number:

3. USCOE Permit Number: **Project Pin Number:**

4. Evaluation Date (MM/DD/YYYY):

5. Evaluating Agency:

6. Evaluator(s):

7. Purpose of Evaluation (check one): ____Wetlands potentially affected by UDOT project
____ Mitigation wetlands, pre-construction
____ Mitigation wetlands, post-construction
____ Other (explain):

8. Wetland/Site Number(s):

9. Wetland Location(s):
Ecoregion (see map Appendix A):_____
Watershed (see map Appendix A):_____
County (see map Appendix A): _____
Legal: T_____N or S; R_____E or W; S_____;T_____N or S; R_____E or W; S_____
Approximate Stationing or Mileposts:_____
_____
GPS Reference Number:_____
Other Location information:

10. Wetland Size (total acres, measured by GPS if applicable):

11. Assessment Area (AA) (total acres, measured by GPS if applicable, see appendix):

12. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals or State Listed S1 Species
It is required that the evaluator contact USFWS with regards to the presence or absence of threatened or endangered (T or E) species and UDWR concerning the presence or absence of a state listed S1, S2 or S3 species. The documented habitat of a federally listed or proposed threatened or endangered plant or animal species or a state listed S1 species results in an automatic Red Flag categorization of the assessed site. Coordination with USFWS and UDWR is required. (However, the evaluation proceeds as normal so that the COE receives an assessment of function and value consistent with the UDOT assessment method.)
Is the AA documented to contain primary habitat for T or E or S-1 species? _____Yes _____No
If yes, list the species:
(This field assesses habitat for species receiving protection under provision of the Endangered Species Act and Utah critically imperiled species.)

13. Selecting a Wetland Classification
Refer to the glossary to determine the correct wetland class. Refer to Appendix E for reference photos and lists of the most common native species in each classification. Turn to appropriate colored pages to continue functional assessment as noted below.
Riverine: Blue
Slope: Pink
Depressional: Yellow
Mineral Flat: Green
Lacustrine Fringe: Purple
Roadside Ditch Wetland: If AA qualifies as a non-jurisdictional 'roadside ditch wetland', AA is classified as Category IV. Further assessment is not necessary, although all documentation must be completed.

***Toned questions or functional categories on the assessment form do not apply to this wetland class, do not answer. They are excluded from the individual function rating as well as the final overall functional assessment rating.**

Lacustrine Fringe

Lacustrine Finge wetlands: Adjacent to large lakes and reservoirs whose area is greater than 20 acres / dominant water source is lake water level / hydrodynamics are bidirectional / subject to waves and seiches.

14. Identify subclass
The evaluator uses the information below together with information in Appendix D to identify the AA subclass. This information is not used directly to rate the AA.

Saline lacustrine fringe – Great Salt Lake fringe is the current lake level plus 2 feet.
Fresh lacustrine fringe – fringes of lakes and reservoirs

Subclass is:	**Presence of heavy metals or toxicants?**	
_____ Saline lacustrine fringe	Yes	No
_____ Freshwater lacustrine fringe		

Presence of heavy metals is determined using accepted wetland science protocols.

Reference Appendix D for definitions of water class and salinity.

Biological Assessment

Sources of assessment criteria for each field are adopted from MDT, *Montana Wetland Assessment Method* and are listed under methods on page 5. Additional criteria sources are listed with each assessment field.

15a. Level of Disturbance

This field assesses the level of disturbance in the AA and EAA. Source: Soule (1991), Forman and Godron (1986), Fahrig (1997), Buffler (2005), and Spackman and Hughes (1995).

Use matrix below to determine level of disturbance (H = high, M = moderate, or L = low). Circle the appropriate answer.

	Predominant conditions found in EAA (600 feet from perimeter of AA)		
Conditions within AA	Land managed in predominantly natural state; is not grazed, hayed, landscaped, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed; or has been subject to minor clearing, fill placement or hydrological alteration; contains few roads, buildings, ditches or canals.	Land cultivated or heavily grazed or landscaped; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density, and or numerous ditches or canals.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, landscaped, or otherwise converted; does not contain human induced trails.	L	L	M
AA not cultivated, but moderately grazed or hayed; or has been subject to relatively minor clearing or hydrological alteration; contains few human induced trails, ditches or canals.	M	M	H
AA cultivated or heavily grazed or landscaped; subject to relatively substantial grading, clearing, or hydrological alteration; and numerous human induced trails, ditches or canals.	H	H	H

Comments: Note types of disturbance, intensity, season, etc.

15b. Plant Community Composition

This field assesses the plant community within the AA. Source: Keate (2004) and Padgette et al. (1989).

Refer to Appendix E for photographs, plan views, cross sectional diagrams, the range of expected coverage and wetland specific vegetation lists. Refer to Appendix F for transect protocol (step point). Draw a simple boundary of the AA and illustrate all plant transect locations and approximate distances on page 11 of this form. See glossary for definition of native wetland plants.

i. Do you find all layers of vegetation that are expected for this wetland type? Circle: Y N

ii. What is the percent ground cover (within the AA) dominated by native wetland vegetation?

High $\geq$ 80%, Moderate 79-60%, Low < 60%

iii. What is the percent of native wetland plants to non-native or non-wetland plants observed using the transect protocol?

High $\geq$ 80%, Moderate 79-60%, Low < 60%

iv. Rating for riverine and lacustrine wetlands.

Layers (i)	Y									N								
Cover (ii)	H			M			L			H			M			L		
Native Wetland Species (iii)	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.1L

iv. Rating for depressional, mineral flat, and slope wetlands.

Cover (ii)	H			M			L		
Native Wetland Species (iii)	H	M	L	H	M	L	H	M	L
Rating	1H	.8H	.6M	.8H	.6M	.4M	.6M	.4M	.2L

Comments:

15c. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals

This field assesses documented or suspected use of the AA by Federally listed or proposed threatened or endangered plants or animals. Source: Consultation with USFWS biologist.

Refer to the U.S. Fish and Wildlife Services website at www.fws.gov or visit the Utah Data Conservation Center website at http://dwrcdc.nr.utah.gov/ucdc/ . Circle one category below based on definitions contained in the instructions and after consultation with USFWS biologist.

i. AA is Documented (D) or Suspected (S) to contain:

*Documented primary habitat for T or E or State listed S-1 species has been addressed in #12

Primary habitat (list species)	*	S _____
Secondary habitat (list species)	D	S _____
Incidental habitat (list species)	D	S _____
No usable habitat	D	S _____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Highest Habitat Level	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.5 M	.3 L	0 L

Sources for documented use (e.g. observations, records, etc):

15d. Habitat for plant or animals rated S2 or S3 by the Utah Natural Heritage Program

This field assesses documented or suspected use of the AA by S2 or S3 species listed by the Utah Natural Heritage Program (UNHP). Source: Consultation with UDWR regional biologist.

Refer to the UNHP website or the Utah Sensitive Species List at http://dwrcdc.nr.utah.gov/ucdc/ .

Do not include species listed in 15c from above. Circle one category below based on definitions contained in the instructions and after consultation with UDWR biologist.

i. AA is Documented (D) or Suspected (S) to contain:

Primary habitat (list species and S rating)	D	S _____
Secondary habitat (list species and S rating)	D	S _____
Incidental habitat (list species and S rating)	D	S _____
No usable habitat	D	S _____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low).

Highest Habitat Level	Primary/D	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.6 M	.2 L	.1 L	0 L

Sources for documented use (e.g. observations, records, etc.):

15e. General Wildlife Habitat

This field assesses general wildlife habitat conditions in the AA. Source: Hammer (1992), Mitch and Gosselink (1993) and Weller and Spatcher (1965).

i. Wildlife habitat features

Working from top to bottom, circle appropriate AA attributes in matrix to arrive at a rating (H = high, M = moderate, or L = low).

Disturbance Level (15a)	L			M			H		
Plant Community (15b)	H	M	L	H	M	L	H	M	L
Rating	H	H	M	H	M	L	M	L	L

Wildlife habitat features rating.	1H	.6M	.2L

ii. Modified Wildlife Habitat Rating

The wildlife habitat features rating may be modified based on documented wildlife use and levels of use of the AA. Consult with the UDWR regional wildlife biologist to determine the level of wildlife use in the AA using the procedures detailed below.

UDWR biologist consulted: Name(s)_____Date(s)_____

First circle the appropriate answer to the following question: Does the UDWR have sufficient knowledge of the AA to determine a level of general wildlife use. Yes No

If the answer is No do not modify your answer to 15e(i) above. If you answer is Yes and after further consultation with a UDWR biologist and using the level of use descriptive categories on page 14. Select the descriptive category (H, M or L) that best describes the level of wildlife use in the AA. Circe the appropriate answer. H M L

If the level of use circled is:

H – add .2 to the wildlife habitat features rating 15e(i)

M – add .1 to the wildlife habitat features rating

L – do not modify the wildlife habitat features rating

iii. Rating

Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Modified wildlife habitat features rating	1H			.6M			.2L		
Rating	1.2H	1.1H	1H	.8H	.7M	.6M	.4M	.3L	.2L

Comments:

15f. General Fish/Aquatic Habitat

This field assesses general fish and aquatic habitat in the AA. Source: Sigler and Miller (1963), Gore (1985), Williams et al (1997) and National Research Council (1992).

Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, etc., circle NA here and proceed to the next function. If fish use occurs in the AA but is not desired from a resource management perspective [such as fish use within an irrigation canal], then Habitat Quality [i below] should be marked as "Low", applied accordingly in ii below, and noted in the comments.)

i. Habitat Quality

Refer to the glossary for further definitions of these terms. Circle appropriate AA attributes in matrix to arrive at the quality rating (H = high, M = moderate, or L = low).

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
Cover: % of water body in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10–25%	<10%	>25%	10–25%	<10%	>25%	10–25%	<10 %
Shading: >75% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	H	H	H	M	M	M	M
Shading: 50 to 75% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	M	M	M	M	M	L	L
Shading: < 50% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality

Circle the appropriate response. If answer is Y, then reduce rating in i above by one level (H = M, M = L, L = L)

Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the water body included on the UDEQ list of water bodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support? Y N

Modified habitat quality rating = (circle) H M L

iii. **Rating**

Refer to the Utah Division of Wildlife Resource website for fish species. Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Types of fish known or suspected within AA	Modified Habitat Quality (ii)		
	H	M	L
Native fish	1 H	.8H	.6 M
Introduced fish*	.5 M	.4 M	.3 L
No fish	.3 L	.2 L	.1 L
Note: reduce the score by .1 if the AA has carp present.			

.9H	.7M	.5M	.4M	.3L	.2L	.1L	0L

*Most of the lacustrine wetlands in Utah, with the exception of the Great Salt Lake are reservoir impoundments. Many of these impoundments have been stocked with warm water non native game fish. These warm water species frequently become established as self sustaining populations that provide ecological functions to the reservoir system. In some reservoirs native fish species persist in this artificial environment. Were native and introduced species coexist in impoundments it is required that the evaluator consult with USFWS and UDWR fisheries biologists to determine the appropriate fish/aquatic habitat rating.

15g. General Amphibian Habitat

This field assesses general amphibian habitat within the AA. Source: Consultation with UDWR regional biologist.

UDWR biologist(s) consulted: Name(s)_____Date(s)_____

Circle the appropriate answer to the following question after consulting with UDWR regional biologist. The UDWR has documented the presence of amphibians in the AA or, habitat and water quality characteristics are such that they would support amphibians.

Rating: Yes No

If the answer is Yes, add **.2** under the functional points/rating column in the Functional Assessment Rating Section at the end of this form.

Hydrological/Biophysical Assessment

Draw a simple boundary of the AA on page 12 of this form and illustrate the hydrological conditions found within the AA. Include water source locations, directions of flow (if applicable), approximate depths, and any significant site features that influence site hydrology.

15h. Flood Attenuation

This field assesses the capability of the AA to slow in channel or over bank flow during high water/flood events. This applies to riverine wetlands only. Source: Kleinschmidt Associates (1993), Munson (1974) and Strom et al (2004).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Within the AA, estimate % ground coverage with high surface roughness*	≥65%	64%-50%	49%-35%	>35%
Rating	1H	.8H	.6M	.4M

*See glossary for definition of surface roughness rating criteria.

ii. There are residences, businesses, or other features, which may be significantly damaged by floods located within 0.5 miles downstream of the AA. Yes No

Comments:

15i. Short and Long Term Surface Water Storage

This field assesses the potential of the AA to capture and hold surface water originating from inundation, precipitation, upland surface (sheet flow) or subsurface (groundwater flow). Source: Munson (1974), Strom et al (2004), Hammer (1986) and Mitch and Gosselink (1993).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Duration of surface water is implied in the definition of wetland class or of the subclass and thus reflects the natural function. Circle the appropriate answer.

Wetlands are inundated	≥ 5 out of 10 years		< 5 out of 10 years	
Has the wetland's natural ability to store water been disturbed negatively?	N	Y	N	Y
Rating	1H	.8H	.6M	.4M

In order to properly assess this function, examination of the area down gradient from the AA may aid in determining whether or not dams, water control structures, overflow aprons, ditches, canals, drain tiles or other forms of outlet or modification exist.

Comments:

15j. Sediment/Nutrient/Toxicant Retention and Removal

This field assesses the ability of the AA to retain and capture sediments, nutrients and toxicants. Source: Kleinschmidt Associates (1999), Hammer (1986) and Hammer and Kadlec (1983).

This function applies to wetlands which could receive excess sediments, nutrients or toxicants through influx of surface or groundwater or direct input. If no wetlands in the AA are subject to such input, circle NA here and proceed with evaluation.

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. **Minor** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.	AA is in close proximity to or receives input from or is on UDEQ list of water bodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. **Major** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.

Within the AA, estimate % ground coverage with high to moderate surface roughness*	≥ 50%		<50%		≥ 50%		<50%	
Has the wetland's natural ability to store water been disturbed negatively?	N	Y	N	Y	N	Y	N	Y
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L

*See glossary for definition of surface roughness.

Comments:

15k. Sediment/Shoreline Stabilization

This field assesses the ability of the AA to dissipate flow or wave energy in order to reduce erosion. This applies to riverine and lacustrine wetlands only. Source: Kleinschmidt Associates (1999), Keate (2004), Padgette et al (1989) and Mitch and Gosselink (1993).

Applies only if AA occurs on or within the banks or a river, stream, or other natural (vegetated swale) or man-made drainage, or on the shoreline of a standing water body, which is subject to wave action. It does not apply, circle NA here and proceed to next function)

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function.

Within the AA, estimate % ground coverage with high surface roughness*	Duration of surface water adjacent to rooted vegetation	
	Permanent	Seasonal
≥ 65%	1H	.7M
64% - 50%	.8H	.5M
49% - 35%	.6M	.3L
< 35%	.4M	.1L

Comments:

Social Value Assessment

The following are not functions but values, which are important to society. Plus answers would suggest important societal assets, which should guide any future mitigation planning.

16. Visual Quality*

Refer to the glossary to distinguish between "wildland wetland" and "urban/exurban wetland".
If AA is considered "wildland wetland" answer the following three questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Has wetland experienced moderate to low level of disturbance (refer to glossary)? _____
iii. Is there an absence of human structures or other human induced disturbances (refer to glossary)? _____

If AA is considered to be an "urban/exurban wetland", answer the following six questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is there potentially a large number of viewers? _____
iii. Is the viewing distance in the fore or middle grounds for most viewers (refer to glossary)? _____
iv. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
v. Is there an absence of human structures or other human induced disturbances (refer to glossary)? _____
vi. Is the wetland a part of a larger open space, green space, park, buffer or corridor? _____

17. Recreational/Educational Quality*

Answer the following seven questions for both "wildland wetlands" and "urban/exurban wetlands". Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is the wetland presently used for recreation/education? _____
iii. Is the wetland ¼ mile or less from and elementary school? _____
iv. Is the wetland five miles or less from a high school? _____
v. Is there vehicular, trail, boat or canoe access to the site? _____
vi. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
vii. Is the wetland visible from a county, state or federal highway, heavily used recreation trail, residential development or other situations where large numbers of people would have visual access to the wetland? _____

*Note: In some cases wetlands many contain plant or wildlife species or perform functions that would be diminished by human activity. In these cases recreational and educational activities would be prohibited.

Summary Comments for entire Wetland AA Evaluated

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition			1	
15c. Listed/Proposed T&E Species Habitat			.9	
15d. UT Natural Heritage Program Species Habitat			.9	
15e. General Wildlife Habitat			1	
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat			0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage			1	
15j. Sediment/Nutrient/Toxicant Removal			1	
15k. Sediment/Shoreline Stabilization			1	
Totals:				

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.
Note: % total functional points = actual functional points ÷ possible functional points.

	% total functional points

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below**.** **I** **II** **III** **IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Supplemental Diagram A

15b. Plant Community Composition Diagram

Draw a simple boundary of the AA and illustrate all plant transect locations and approximate distances.

Please note that 100 sample points per acre should be collected within the AA. (Example: if AA equals .25 acres, then 25 sample points should be taken.) Never use less then 10 sample points within any AA, even when AA is less then .10 acres in size. Placement of transect(s) should accurately represent the AA. Be sure to place transect(s) through different water regimes, vegetative structure, and topographic changes that may exist within the AA.

Supplemental Diagram B

Hydrological/Biophysical Assessment Diagram

Draw a simple boundary of the AA and illustrate the hydrological conditions found within the AA. Include water source locations, directions of flow (if applicable), approximate depths, and any significant site features that influence site hydrology.

Report No. UT-06.13

FIELD ANALYSIS OF THE UDOT WETLAND FUNCTIONAL ASSESSMENT METHOD

Prepared For:

Utah Department of Transportation
Research and Development Division
And Environmental Division

Submitted By:

Utah State University
Department of Landscape Architecture and Environmental Planning

Authored By:

Ryan J. Pitts

April 2006

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15. Supplementary Notes

Prepared in cooperation with the Utah Department of Transportation Environmental Division, the U.S. Army Corps of Engineers Utah Division, the U.S. Fish and Wildlife Service, the Utah Department of Wildlife Resources, and the Federal Highway Administration.

16. Abstract

The Utah Department of Transportation (UDOT) Wetland Functional Assessment Method (UDOT Report UT-06.12) has recently been developed to evaluate wetland functions and values along highways and other lineal projects in Utah. This method was developed for UDOT by Utah State University based on a similar method in use by the Montana Department of Transportation. Throughout the development process, concerns have arisen as to whether or not the assessment method will be understood by field evaluators with limited experience and training with regards to wetlands. Additional concerns include whether or not the UDOT Wetland Functional Assessment Method (WFAM) enables evaluators to produce relatively accurate and consistent outcomes that are representative of the wetland sites and to insure compliance with regulatory agency criteria.

This report summarizes a field analysis performed to achieve three goals. First, to field test and evaluate the UDOT WFAM and specifically address the concerns of consistency, usability, and relative accuracy. Second, to compare, in a general way, the UDOT method with three other functional assessment methods being used in the field. Third, to identify, with the help of field evaluators, errors and inadequacies within the method and then make any necessary changes to the method and accompanying document.

17. Key Words Wetland functions, Utah wetland types, field analysis and assessment, jurisdictional wetland evaluation, playa, hydro geomorphic (HGM) assessment method		18. Distribution Statement UDOT Research Division 4501South 2700 West PO Box 148410 Salt Lake City, Utah 84114-8410		23. Registrant's Seal
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Field Analysis of the

Utah Department of Transportation

Wetland Functional Assessment Method

Report No. UT-06.13

April 2006



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INTRODUCTION

Within the United States, it has been calculated that between the years of 1950 to 1970 wetlands were being destroyed at the rate of 500,000 acres per year (FHWA 2000). The main causes of this destruction were agriculture, industrial extraction of natural resources, commercial development, urbanization, and the building of highways and roads (Johnson, Groshart, and Grossl 2001; Stein, Tabatabai, and Ambrose 2000). Specifically, the nine most western states, excluding Alaska and Hawaii, have lost 59% of the original wetlands that once existed (Spain 1997).

In the past 35 years, wetlands have become increasingly recognized for providing beneficial functions and values to society. These functions and values provide habitat for wildlife, plant, and macro-invertebrate species, some of which are considered threatened or endangered. Visual quality and aesthetic beauty are acknowledged wetland values, as well as the educational benefits that can be derived from studying these ecosystems (Turner, Van Den Bergh, and Brouwer 2003.) Wetlands also have hydrological and biophysical significance by attenuating flood waters, stabilizing shorelines, removing toxicants, nutrients, and sediments from water, discharging and recharging groundwater, as well as several other important functions (Turner, Van Den Bergh, and Brouwer 2003).

Armed with evidence of water quality degradation, the Federal Water Pollution Control Act Amendment was passed by Congress in 1972 and was followed five years later in 1977 with another amendment that has become known today as the Clean Water Act (USEPA 2002). Section 404 of the Clean Water Act specifically prohibits the

discharge of dredged or fill material into the navigable waters of the United States, which includes wetlands.

In 1993, the Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (COE) expanded the protection of wetlands to also include regulating mechanized land clearing, ditching, channelization, and excavation of wetlands (NAHB 1993). No alterations to the land may be made to any area that is classified as wetlands under government jurisdiction. Exceptions to these regulations are granted through submission of a proper application form, a wetland delineation of the property, and proposed procedures to mitigate any temporal and permanent impacts to the wetland.

Despite regulatory efforts of the EPA and COE, wetlands continue to decline in the United States. Many studies have been conducted to find solutions to this problem. One of the many discoveries of these research studies was that actual wetland functions and values from impacted sites were not being evaluated and recorded through a watershed framework and therefore, were not being replaced (NRC 2001). Mitigation efforts have primarily focused on replacement of acreage and enhancing wetland vegetation, not wetland functions and values.

In an effort to reverse this trend, the regulatory office of the COE in Bountiful, Utah, is soon going to require that a wetland functional assessment be included with all wetland delineation reports submitted to them by the Utah Department of Transportation (UDOT). This will allow both agencies to better ascertain the total acreage of wetland that potentially could be impacted by transportation projects and which functions, if any, the wetland is performing within the context of its environment.

UDOT awarded funding to Utah State University in 2003 to develop a wetland functional assessment method that would be similar to the Montana Department of Transportation's (MDOT) method and, at the same time, address Utah's unique ecological and hydrological conditions. The authors of the assessment method at Utah State University have completed the initial stage of this project and the method has been extensively reviewed by state and federal agencies and other wetland specialists. Throughout the development process, concerns have arisen as to whether or not the final product will be understood by field evaluators with limited experience and training with regards to wetlands. Additional concerns include whether or not the UDOT Wetland Functional Assessment Method enables evaluators to produce relatively accurate and consistent outcomes that are representative of the wetland sites and to insure compliance with regulatory agency criteria.

PROJECT GOAL

The purpose of this project is three fold. First, it is to field test and evaluate the UDOT Wetland Functional Assessment Method (WFAM) and specifically address the concerns of consistency, usability, and relative accuracy. The second objective is to compare, in a general way, the UDOT method with three other functional assessment methods being used in the field. The third objective is (with the help of field evaluators) to identify errors and inadequacies within the method and then make any necessary changes to the method and accompanying document.

METHODOLOGY

The UDOT Wetland Functional Assessment Method was tested on multiple sites by multiple evaluators. It was evaluated by comparing the results generated by different teams of evaluators for consistency, usability, and relative accuracy. Definitions of each of these terms and a discussion of how they are measured occur later in this section.

UDOT landscape architects were utilized to field test the UDOT WFAM. The landscape architects were selected because they perform and/or review the wetland functional assessments for UDOT. The UDOT landscape architects tested the UDOT WFAM at Site 1, Site 2, Site 3, and Site 4 (see Table 2). All results produced by the landscape architects from all four sites will be reported.

To assist in field testing and comparing the UDOT WFAM to other methods, the regulatory office of the COE in Bountiful, Utah, has assembled the Utah Wetland Assessment Group (UWAG), a group of professionals from other government agencies and from the private sector who work with wetlands on a regular basis. UWAG agreed to test the UDOT WFAM along with three additional wetland functional assessment methods at Site 1 and Site 2. The other methods tested were the California Rapid Assessment Method (CRAM), [Florida] Wetland Rapid Assessment Procedure ([F]WRAP), and the Rapid Assessment (RA) designed by Nancy Keate, PhD., Utah Division of Wildlife Resources. (See Appendix A for a summary of each of the wetland functional assessment methods tested.) The results from all four methods at each of the two sites will be reported. Direct comparisons of the results between methods are difficult because each of the methods is unique, analyzes different functions, and

numerically values functions differently. However, comparisons were made where possible and appropriate.

Sites and wetland classifications are also described in Table 1 and a small aerial photograph of each site appear in Figures 1 through 4. Site descriptions and additional site maps can be found in Appendix B of this document. Table 2 and Table 3 illustrate what methods were tested and what sites were visited by each group of evaluators.

Site 1: Skypark, at 2600 South Redwood Road Woods Cross, Utah, a slope wetland.
Site 2: Bountiful Pond, a slope wetland.
Site 3: Plover Playa in Tooele County, a mineral flat wetland.
Site 4: Jordan River at 3900 South, a riverine wetland.

Table 1: Wetland Sites and Classifications.

	Site 1	Site 2	Site 3	Site 4
Methods				
UDOT Wetland Functional Assessment Method	x	x	x	x
California Rapid Assessment Method				
[Florida] Wetland Rapid Assessment Procedure				
Rapid Assessment				

Table 2: Sites Evaluated by UDOT Landscape Architects.

	Site 1	Site 2	Site 3	Site 4
Methods				
UDOT Wetland Functional Assessment Method	x	x		
California Rapid Assessment Method	x	x		
[Florida] Wetland Rapid Assessment Procedure	x	x		
Rapid Assessment	x	x		

Table 3: Sites Evaluated by Utah Wetland Assessment Group (UWAG).

Figure 1: Site 1 Skypark

Figure 2: Site 2 Bountiful Pond

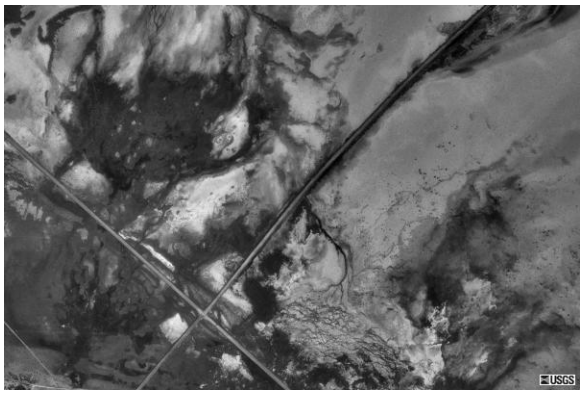

Figure 3: Site 3 Plover Playa

Figure 4: Site 4 Jordan River

Figure 1: Site 1 Skypark-2 km SW of Woods Cross, Utah, United States 10/4/1997. USGS Map provided online through Microsoft TerraServer Imagery. Available at http://terraserver-usa.com.

Figure 2: Bountiful Pond-Bountiful, Utah, United States 10/4/1997. USGS Map provided online through Microsoft TerraServer Imagery. Available at http://terraserver-usa.com.

Figure 3: Plover Playa-58 km W of Salt Lake City, Utah, United States 8/29/1999. USGS Map provided online through Microsoft TerraServer Imagery. Available at http://terraserver-usa.com.

Figure 4: Jordan River-Taylorsville, Utah, United States 9/18/2003. USGS Map provided online through Microsoft TerraServer Imagery. Available at http://terraserver-usa.com.

Consistency of the UDOT WFAM was evaluated by comparing the score provided by each evaluator for each question within the method. Variability between answers was calculated and investigated. Based on the results, a determination was made as to whether or not any changes needed to be made to the question to minimize future occurrences. Usability was determined based on concerns expressed by the evaluators with regards to each question within the UDOT WFAM. The relative accuracy of the UDOT WFAM was measured by looking at the overall results that come from compiling scores to individual questions (wetland scores and categorization) of the method produced by each group of evaluators at each site. Results from groups comprised of only UDOT personnel and groups comprised of only UWAG members were compared for relative accuracy. Results from Site 1 and Site 2 will be placed in a table with similar question results from the three other methods tested to determine the degree of similarity in general characterization of wetland functional condition.

All information gathered throughout field testing were used to ascertain the consistency, usability, and relative accuracy of the UDOT WFAM. Corrections and alterations to the UDOT WFAM were made to reflect the shortcomings and errors discovered in the field test, and prepare the method for future implementation.

THE STUDY

The UDOT WFAM process was designed to systematically assess a wetland and evaluate how proficient it is at performing a particular function or set of functions. This systematic process takes evaluators through a series of questions to determine wetland functionality. Each question that directly impacts the final rating is given a numeric value by the evaluator(s). At the end, each of these values are summed together and divided by the maximum total points possible. This result is then converted to a percent by moving the decimal two places to the left. The percent is used to determine which category the wetland belongs to. There are five possible categories, they are: Red Flag Category, Category I, Category II, Category III, and Category IV. The Red Flag Category is the highest possible categorization and Category IV is the lowest.

The Red Flag Category is for Assessment Areas in which a threatened and or endangered species or its habitat has been documented. Category I wetlands are of exceptionally high quality or are important from a regulatory standpoint; total functional points should be greater than 80%. Category II wetlands are more prevalent than Category I wetlands, and are those that provide habitat for sensitive plants or animals, function at very high levels for wildlife/fish/amphibian habitat or are assigned high ratings for many of the assessed functions and values; total functional points should be greater than 65%. Category III wetlands are more prevalent, they generally have moderate to low Plant Community Composition rating and have a higher level of disturbance than Category I and II wetlands. They can provide many functions and values, although they may not be assigned high ratings for as many parameters as are Category I and II wetlands. Total functional points should be between 30-65%.

Category IV wetlands are generally small, isolated, and are rated low for Plant Community Composition. These sites provide little in the way of wildlife habitat. Total functional points should be less than 30%.

For this study, four wetland sites were visited by multiple groups to evaluate their functionality. The following is the UDOT WFAM Evaluation Form (Slope) for recording field data. This form was used in this study for field testing Site 1 and Site 2. Evaluators at Site 3 and Site 4 used a very similar form that specifically addressed functionality particular to mineral flats (Site 3) and riverine (Site 4) wetlands. Revisions to this and all other forms are discussed throughout and a final revised form is included in Appendix E.

UDOT Wetland Assessment Form (Slope)

1. Project Name:

2. Project Number:

3. USCOE Permit Number: **Project Pin Number:**

4. Evaluation Date (MM/DD/YYYY):

5. Evaluating Agency:

6. Evaluator(s):

7. Purpose of Evaluation (check one): ____Wetlands potentially affected by UDOT project
____ Mitigation wetlands, pre-construction
____ Mitigation wetlands, post-construction
____ Other (explain):

8. Wetland/Site Number(s):

9. Wetland Location(s):
Ecoregion (see map Appendix A):_____
Watershed (see map Appendix A):_____
County (see map Appendix A): _____
Legal: T_____N or S; R_____E or W; S_____;T_____N or S; R_____E or W; S_____
Approximate Stationing or Mileposts:_____
_____
GPS Reference Number:_____
Other Location information:

10. Wetland Size (total acres, measured by GPS if applicable):

11. Assessment Area (AA) (total acres, measured by GPS if applicable, see appendix):

12. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals or State Listed S1 Species
It is required that the evaluator contact USFWS with regards to the presence or absence of threatened or endangered (T or E) species and UDWR concerning the presence or absence of a state listed S1, S2 or S3 species. The documented habitat of a federally listed or proposed threatened or endangered plant or animal species or a state listed S1 species results in an automatic Red Flag categorization of the assessed site. Coordination with USFWS and UDWR is required. (However, the evaluation proceeds as normal so that the COE receives an assessment of function and value consistent with the UDOT assessment method.)
Is the AA documented to contain primary habitat for T or E or S-1 species? _____Yes _____No
If yes, list the species:
(This field assesses habitat for species receiving protection under provision of the Endangered Species Act and Utah critically imperiled species.)

13. Selecting a Wetland Classification
Refer to the glossary to determine the correct wetland class. Refer to Appendix E for reference photos and lists of the most common native species in each classification. Turn to appropriate colored pages to continue functional assessment as noted below.
Riverine: Blue
Slope: Pink
Depressional: Yellow
Mineral Flat: Green
Lacustrine Fringe: Purple
Roadside Ditch Wetland: If AA qualifies as a non-jurisdictional 'roadside ditch wetland', AA is classified as Category IV. Further assessment is not necessary, although all documentation must be completed.

***Toned questions or functional categories on the assessment form do not apply to this wetland class, do not answer. They are excluded from the individual function rating as well as the final overall functional assessment rating.**

Slope

Slope wetlands – Occur at points of surface changes, breaks in slope or stratigraphic changes / groundwater is primary water source / water flow is primarily unidirectional- down gradient / water may discharge to stream, lake, depression.

14. Identify subclass

The evaluator uses the information below together with information in Appendix D to identify the AA subclass. This information is not used directly to rate the AA.

Identify the soil type (circle): organic or mineral

Refer to glossary for definitions of organic and mineral soils.

What is the depth water table?

Circle appropriate answer.

Water table < 20 in.

Water table ≥ 20 in.

Presence of heavy metals or toxicants?

Yes No

Determine the pH range _____

Soil and water pH range

Organic soils	Mineral soils
≤ 4.9	≤ 6.0
5.0 - 6.5	6.1-7.3
> 6.5	≥ 7.4 - 8.4
≥ 8.5	

Determine the salinity_____

Water salinity

< 5 dS/m

very saline

5-10 dS/m

10-16 dS/m

16-35 dS/m

≥ 35 dS/m

Subclass is:

_____ Seasonal and persistent freashwater

_____ Seasonal and persistent saline and

Reference Appendix D for definitions of water class and salinity.

Depth to water table, pH range, salinity and presence of heavy metals are determined using accepted wetland science protocols.

For montane wetlands, salinity is not listed as all are nonsaline.

Biological Assessment

Sources of assessment criteria for each field are adopted from MDT, *Montana Wetland Assessment Method* and are listed under methods on page 5. Additional criteria sources are listed with each assessment field.

15a. Level of Disturbance

This field assesses the level of disturbance in the AA and EAA. Source: Soule (1991), Forman and Godron (1986) and Fahrig (1997).

Use matrix below to determine level of disturbance (H = high, M = moderate, or L = low). Circle the appropriate answer.

	Predominant conditions found in EAA (1,200 feet from perimeter of AA)		
Conditions within AA	Land managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads, buildings, ditches or canals.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density, and or numerous ditches or canals.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	L	L	M
AA not cultivated, but moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads, buildings, ditches or canals.	M	M	H
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density, and or numerous ditches or canals.	H	H	H

Comments: Note types of disturbance, intensity, season, etc.

15b. Plant Community Composition

This field assesses the plant community within the AA. Source: Keate (2004) and Padgette et al. (1989). Refer to Appendix E for photographs, plan views, cross sectional diagrams, the range of expected coverage and wetland specific vegetation lists. Refer to Appendix F for transect protocol (step point).

i. Do you find all layers of vegetation that are expected for this wetland type? Circle: Y N

ii. What is the percent ground cover (within the AA) dominated by native vegetation? High ≥ 80%, Moderate 79-60%, Low < 60%

iii. What is the ratio of native plants to non-native plants observed using the transect protocol? (High ≥ 80%, Moderate 79-60%, Low < 60%)

iv. Rating for riverine and lacustrine wetlands.

Layers (i)	Y									N								
Cover (ii)	H			M			L			H			M			L		
Native Species (iii)	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.1L

iv. Rating for depressional, mineral flat, and slope wetlands.

Cover (ii)	H			M			L		
Native Species (iii)	H	M	L	H	M	L	H	M	L
Rating	1H	.8H	.6M	.8H	.6M	.4M	.6M	.4M	.2L

Comments:

15c. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals

This field assesses documented or suspected use of the AA by Federally listed or proposed threatened or endangered plants or animals. Source: Consultation with USFWS biologist.

Refer to the U.S. Fish and Wildlife Services website at www.fws.gov or visit the Utah Data Conservation Center website at http://dwrcdc.nr.utah.gov/ucdc/. Circle one category below based on definitions contained in the instructions and after consultation with USFWS biologist.

i. AA is Documented (D) or Suspected (S) to contain:

*Documented primary or critical habitat for T or E or State listed S-1 species has been addressed in #12

Primary habitat (list species)	* S	_____
Secondary habitat (list species)	D S	_____
Incidental habitat (list species)	D S	_____
No usable habitat	D S	_____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Highest Habitat Level	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.5 M	.3 L	0 L

Sources for documented use (e.g. observations, records, etc):

15d. Habitat for plant or animals rated S2 or S3 by the Utah Natural Heritage Program

This field assesses documented or suspected use of the AA by S2 or S3 species listed by the Utah Natural Heritage Program (UNHP). Source: Consultation with UDWR regional biologist.

Refer to the UNHP website or the Utah Sensitive Species List at http://dwrcdc.nr.utah.gov/ucdc/.

Do not include species listed in 15c from above. Circle one category below based on definitions contained in the instructions and after consultation with UDWR biologist.

i. AA is Documented (D) or Suspected (S) to contain:

Primary habitat (list species and S rating)	D S	_____
Secondary habitat (list species and S rating)	D S	_____
Incidental habitat (list species and S rating)	D S	_____
No usable habitat	D S	_____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low).

Highest Habitat Level	Primary/D	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.6 M	.2 L	.1 L	0 L

Sources for documented use (e.g. observations, records, etc.):

15e. General Wildlife Habitat Rating

This field assesses general wildlife habitat conditions in the AA. Source: Hammer (1992), Mitch and Gosselink (1993) and Weller and Spatcher (1965).

i. Wildlife habitat features

Working from top to bottom, circle appropriate AA attributes in matrix to arrive at a rating (H = high, M = moderate, or L = low).

Plant Community (15b)	H			M			L		
Disturbance Level (15a)	L	M	H	L	M	H	L	M	H
Rating	H	H	M	H	M	L	M	L	L

Wildlife habitat features rating.	1H	.6M	.2L

ii. Modified Wildlife Habitat Rating

The wildlife habitat features rating may be modified based on documented wildlife use and levels of use of the AA. Consult with the UDWR regional wildlife biologist to determine the level of wildlife use in the AA using the procedures detailed below.

UDWR biologist consulted:

Name(s)_____Date(s)_____

First circle the appropriate answer to the following question: Does the UDWR have sufficient knowledge of the AA to determine a level of general wildlife use. Yes No

If the answer is No do not modify your answer to 15e(i) above. If you answer is Yes and after further consultation with a UDWR biologist and using the level of use descriptive categories on page 14. Select the descriptive category (H, M or L) that best describes the level of wildlife use in the AA. Circe the appropriate answer. H M L

If the level of use circled is:

H – add .2 to the wildlife habitat features rating 15e(i)

M – add .1 to the wildlife habitat features rating

L – do not modify the wildlife habitat features rating

iii. Rating

Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Modified wildlife habitat features rating	1H			.6M			.2L		
Rating	1.2H	1.1H	1H	.8H	.7M	.6M	.4M	.3L	.2L

Comments:

15f. General Fish/Aquatic Habitat Rating

This field assesses general fish and aquatic habitat in the AA. Source: Sigler and Miller (1963), Gore (1985), Williams et al (1997) and National Research Council (1992).

Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, etc., circle NA here and proceed to the next function. If fish use occurs in the AA but is not desired from a resource management perspective [such as fish use within an irrigation canal], then Habitat Quality [i below] should be marked as "Low", applied accordingly in ii below, and noted in the comments.)

i. Habitat Quality

Refer to the glossary for further definitions of these terms. Circle appropriate AA attributes in matrix to arrive at the quality rating (H = high, M = moderate, or L = low).

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
Cover: % of waterbody in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10–25%	<10%	>25%	10–25%	<10%	>25%	10–25%	<10%
Shading: >75% of streambank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	H	H	H	M	M	M	M
Shading: 50 to 75% of streambank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	M	M	M	M	M	L	L
Shading: < 50% of streambank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality

Circle the appropriate response to the following question. If answer is Y, then reduce rating in i above by one level (H = M, M = L, L = L)

Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the waterbody included on the UDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support?Y N

Modified habitat quality rating = (circle) H M L

iii. **Rating**

Refer to the Utah Division of Wildlife Resource website for fish species. Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Types of fish known or suspected within AA	Modified Habitat Quality (ii)		
	H	M	L
Native fish	1 H	.8 M	.5 M
Introduced fish	.9 H	.6 M	.4 M
No fish	.3 L	.2 L	.1 L

Comments: reduce the score by .1 if AA has carp present.

15g. General Amphibian Habitat Rating

This field assesses general amphibian habitat within the AA. Source: Consultation with UDWR regional biologist.

UDWR biologist(s) consulted:

Name(s)_____Date(s)_____

Circle the appropriate answer to the following question after consulting with UDWR regional biologist.

The UDWR has documented the presence of amphibians in the AA or, habitat and water quality characteristics are such that they would support amphibians.

Rating: Yes No

If the answer is Yes, add **.2** under the functional points/rating column in the Functional Assessment Rating Section at the end of this form.

Hydrological/Biophysical Assessment

15h. Flood Attenuation

This field assesses the capability of the AA to slow in channel or overbank flow during high water/flood events. This applies to riverine wetlands only. Source: Kleinschmidt Associates (1993), Munson (1974) and Strom et al (2004).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Within the floodplain of the AA, estimate % ground coverage with high surface roughness*	≥65%	64%-50%	49%-35%	>35%
Rating	1H	.8H	.6M	.4M

*See glossary for definition of surface roughness rating criteria.

ii. There are residences, businesses, or other features, which may be significantly damaged by floods located within 0.5 miles downstream of the AA. Yes No

Comments:

15i. Short and Long Term Surface Water Storage

This field assesses the potential of the AA to capture and hold surface water originating from inundation, precipitation, upland surface (sheet flow) or subsurface (groundwater flow). Source: Munson (1974), Strom et al (2004), Hammer (1986) and Mitch and Gosselink (1993).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Duration of surface water is implied in the definition of wetland class or of the subclass and thus reflects the natural function. Circle the appropriate answer.

Wetlands are inundated	≥ 5 out of 10 years		< 5 out of 10 years	
Has the wetland's natural ability to store water been disturbed?	N	Y	N	Y
Rating	1H	.8H	.9H	.7M

In order to properly assess this function, examination of the area down gradient from the AA may aid in determining whether or not dams, water control structures, overflow aprons, ditches, canals, drain tiles or other forms of outlet or modification exist.

Comments:

15j. Sediment/Nutrient/Toxicant Retention and Removal

This field assesses the ability of the AA to retain and capture sediments, nutrients and toxicants. Source: Kleinschmidt Associates (1999), Hammer (1986) and Hammer and Kadlec (1983).

This function applies to wetlands which could receive excess sediments, nutrients or toxicants through influx of surface or groundwater or direct input. If no wetlands in the AA are subject to such input, circle NA here and proceed with evaluation.

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. **Minor** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on UDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. **Major** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
Within the AA, estimate % ground coverage with high to moderate surface roughness*	≥ 50%		<50%		≥ 50%		<50%	
Has the wetland's natural ability to store water been disturbed?	N	Y	N	Y	N	Y	N	Y
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L

*See glossary for definition of surface roughness.

Comments:

15k. Sediment/Shoreline Stabilization

This field assesses the ability of the AA to dissipate flow or wave energy in order to reduce erosion. This applies to riverine and lacustrine wetlands only. Source: Kleinschmidt Associates (1999), Keate (2004), Padgette et al (1989) and Mitch and Gosselink (1993).

Applies only if AA occurs on or within the banks or a river, stream, or other natural (vegetated swale) or man-made drainage, or on the shoreline of a standing water body, which is subject to wave action. It does not apply, circle NA here and proceed to next function)

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function.

Within the AA, estimate % ground coverage with high surface roughness*	Duration of surface water adjacent to rooted vegetation	
	Permanent	Seasonal
≥ 65%	1H	.7M
64% - 50%	.8H	.5M
49% - 35%	.6M	.3L
< 35%	.4M	.1L

Comments:

Social Value Assessment

The following are not functions but values, which are important to society. Plus answers would suggest important societal assets, which should guide any future mitigation planning.

16. Visual Quality*

Refer to the glossary to distinguish between "wildland wetland" and "urban/exurban wetland".
If AA is considered "wildland wetland" answer the following three questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Has wetland experienced moderate to low level of disturbance (refer to glossary)? _____
iii. Is there an absence of human structures or other human induced disturbances (refer to glossary)? ____

If AA is considered to be an "urban/exurban wetland", answer the following six questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is there potentially a large number of viewers? _____
iii. Is the viewing distance in the fore or middle grounds for most viewers (refer to glossary)? _____
iv. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
v. Is there an absence of human structures or other human induced disturbances (refer to glossary)? _____
vi. Is the wetland a part of a larger open space, green space, park, buffer or corridor? _____

17. Recreational/Educational Quality*

Answer the following seven questions for both "wildland wetlands" and "urban/exurban wetlands". Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is the wetland presently used for recreation/education? _____
iii. Is the wetland ¼ mile or less from and elementary school? _____
iv. Is the wetland five miles or less from a high school? _____
v. Is there vehicular, trail, boat or canoe access to the site? _____
vi. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
vii. Is the wetland visible from a county, state or federal highway, heavily used recreation trail, residential development or other
situations where large numbers of people would have visual access to the wetland? _____

*Note: In some cases wetlands many contain plant or wildlife species or perform functions that would be diminished by human activity. In these cases recreational and educational activities would be prohibited.

Summary Comments for entire Wetland AA Evaluated

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition			1	
15c. Listed/Proposed T&E Species Habitat			.9	
15d. UT Natural Heritage Program Species Habitat			.9	
15e. General Wildlife Habitat			1	
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat Rating			0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage			1	
15j. Sediment/Nutrient/Toxicant Removal			1	
15k. Sediment/Shoreline Stabilization			1	
Totals:				

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

_X_ Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

CONSISTENCY RESULTS AND DISCUSSION

Consistency in this study is defined as achieving reliable and uniform results for each question by multiple groups. A measurement of consistency was applied to the UDOT WFAM and determined as follows. Each site was individually analyzed for consistency by comparing each group's response to each question; only questions that influenced the final rating were considered. Variability that existed between responses was investigated and where evident, the causes of variability were explained. Any actions that were taken to modify or alter the functional assessment in order to minimize variability in the future were noted.

Site 1: Skypark, at 2600 South Redwood Road Woods Cross, Utah, a slope wetland.

Site 1 was tested by five groups. Table 4 illustrates the groups evaluating the wetland site and the composition of each. Table 5 illustrates when each group visited the wetland site to conduct field testing.

Group A	One UDOT environmental manager and one UDOT landscape architect.
Group B	Three UDOT landscape architects.
Group C	One government wetland specialist, one government wildlife biologist, and one private wetland consultant. All are members of the UWAG group.
Group D	One government wetland specialist, one government hydrologist, and one government wildlife biologist. All are members of the UWAG group.
Group E	One UDOT landscape architect manager and one landscape architect student.

Table 4: Site 1 Group Composition.

Group A	June 8, 2005
Group B	June 8, 2005
Group C	May 31, 2005
Group D	May 31, 2005
Group E	May 25, 2005

Table 5: Site 1 Field Test Date.

The following discussion presents results from each question that is influential in the final rating.

Question 15b. Plant Community Composition:

Results:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	M	0.6	1	0.6 x 2.5 = 1.5
B	M	0.6	1	0.6 x 2.5 = 1.5
C	M	0.6	1	0.6 x 2.5 = 1.5
D	M	0.4	1	0.4 x 2.5 = 1
E	M	0.6	1	0.6 x 2.5 = 1.5

Table 6: Site 1 Question 15b. Plant Community Composition Results.

Results from question 15b. Plant Community Composition are consistent. All General Evaluation results are identical. The only variability between Actual Functional Points/Rating is with results reported by Group D. It is important to note that the Actual Functional Points/Rating for this question, in this type of a wetland, is a result of two questions. One question asks about percent ground cover and the other about native species. All groups identified the cover as being moderate. Group D also identified the cover as moderate but identified one less native plant species than the other groups. This is what caused the lower Actual Functional Points/Rating for Group D.

Question 15c. Listed/Proposed T&E Species Habitat:

Results:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	L	0.3	.9	0.3 x 2.5 = 0.75
B	L	0.3	.9	0.3 x 2.5 = 0.75
C	L	0.0	.9	0.0 x 2.5 = 0.00
D	L	0.0	.9	0.0 x 2.5 = 0.00
E	L	0.3	.9	0.3 x 2.5 = 0.75

Table 7: Site 1 Question 15c. Listed/Proposed T&E Species Habitat Results.

Results from question 15c. Listed/Proposed T&E Species Habitat are consistent. All General Evaluation results are identical. The only variability between Actual Functional Points/Rating is with results reported by Groups C and D. These groups responded that the site did not offer any usable habitat for listed and/or proposed threatened and/or endangered species, while Groups A, B, and E responded that the site offered incidental/suspected use by listed and/or proposed threatened and/or endangered species.

This question specifically requires consultation with a wildlife biologist. Groups C and D both included such an individual. The remaining groups did not have access to a wildlife biologist and the responses reflect this fact. This inconsistency illustrates the importance of requiring field evaluators to consult with a wildlife biologist as required by the UDOT WFAM.

Question 15d. UT Natural Heritage Program Species Habitat:

Results:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	L	0.1	.9	0.1 x 2.5 = 0.25
B	L	0.1	.9	0.1 x 2.5 = 0.25
C	L	0.1	.9	0.1 x 2.5 = 0.25
D	L	0.1	.9	0.1 x 2.5 = 0.25
E	L	0.1	.9	0.1 x 2.5 = 0.25

Table 8: Site 1 Question 15d. UT Natural Heritage Program Species Habitat Results.

Results from question 15d. UT Natural Heritage Program Species Habitat are consistent. All General Evaluation results are identical as well as Actual Functional Points/Rating results.

Question 15e. General Wildlife Habitat:

Results:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	L	0.2	1	0.2 x 2.5 = 0.5
B	L	0.2	1	0.2 x 2.5 = 0.5
C	L	0.2	1	0.2 x 2.5 = 0.5
D	L	0.3	1	0.3 x 2.5 = 0.75
E	L	0.3	1	0.3 x 2.5 = 0.75

Table 9: Site 1 Question 15e. General Wildlife Habitat Results.

Results from question 15e. General Wildlife Habitat are consistent. All General Evaluation results are identical. The only variability between Actual Functional Points/Rating is with results reported by Groups D and E. It is important to note that the Actual Functional Points/Rating for this question is based on site disturbance level (question 15a.) and the plant community (question 15b.). However, the difference between 0.2 and 0.3 Actual Functional Points/Rating is because Groups D and E added

0.1 to the Wildlife Habitat features rating based on descriptive categories for high, moderate, and low wildlife use; thus resulting in 0.1 higher rating for the Modified wildlife habitat features rating. Descriptive categories are listed below.

> **High use**:
> AA is regularly used in high numbers relative to local or transient populations.
>
> **Moderate use:**
> AA is regularly used in small to moderate numbers relative to local populations, or infrequently or sporadically used in any numbers relative to local or transient populations.
>
> **Low to No use:**
> AA regularly, infrequently or sporadically used by extremely small numbers relative to local populations, or receives chance, inconsequential use in any numbers relative to local or transient populations.

Question 15f. General Fish/Aquatic Habitat:

This question was not applicable to Site 1 and did not receive any responses.

Question 15g. General Amphibian Habitat:

This question was not applicable to Site 1 and did not receive any responses.

Question 15h. Flood Attenuation:

This question was not applicable to Site 1 and did not receive any responses.

Question 15i. Short and Long Term Surface Water Storage:

Results:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	H	0.8	1	0.8 x 2.5 = 2.0
B	H	0.8	1	0.8 x 2.5 = 2.0
C	H	0.8	1	0.8 x 2.5 = 2.0
D	H	0.8	1	0.8 x 2.5 = 2.0
E	H	0.8	1	0.8 x 2.5 = 2.0

Table 10: Site 1 Question 15i. Short and Long Term Surface Water Storage Results.

Results from question 15i. Short and Long Term Surface Water Storage are consistent. All General Evaluation results are identical as well as Actual Functional Points/Rating results.

Question 15j. Sediment/Nutrient/Toxicant Removal:

Results:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	M	0.5	1	0.5 x 2.5 = 1.25
B	H	0.9	1	0.9 x 2.5 = 2.25
C	H	0.9	1	0.9 x 2.5 = 2.25
D	H	0.9	1	0.9 x 2.5 = 2.25
E	M	0.5	1	0.5 x 2.5 = 1.25

Table 11: Site 1 Question 15j. Sediment/Nutrient/Toxicant Removal Results.

Results from question 15j. Sediment/Nutrient/Toxicant Removal are not consistent. General Evaluation results are not identical nor are the Actual Functional Points/Rating. The variability was found in the first of three questions in the matrix. The first question asks if the water body is on the Utah Department of Environmental Quality's (UDEQ) list of impaired water bodies or if the wetland receives or has the potential to receive high levels of sediments, nutrients, or compounds that may substantially impair other functions. This site does not contain a water body that is on the UDEQ's list (EPA 2006). However, Groups A and E responded that the wetland receives or has the potential to receive high levels of sediments, nutrients or compounds that may substantially impair other functions. Groups B, C, and D responded that the wetland receives or has the potential to receive low to moderate levels of sediments, nutrients or compounds such that other functions are not substantially impaired.

To improve consistency of evaluator response for this question additional text has been added to the question (see Usability Results and Discussion). Also, another step has been added to the UDOT WFAM to improve consistency of evaluator response for this question and other hydrological/biophysical questions. The functional assessment now requires that field evaluators draw a simple boundary that describes the assessment area (AA) and illustrate the hydrological conditions found within that area. This additional step will aid allow evaluators to become more familiar with site hydrology and in turn, be able to better respond to this question. A more detailed description of this modification can be found in Usability Results and Discussion.

Question 15k. Sediment/Shoreline Stabilization:

This question was not applicable to Site 1 and did not receive any responses.

Site 1: Conclusion

Results from Site 1 show that consistency can be achieved with the UDOT WFAM. Responses are reliable and uniform for all but one question, 15j. Sediment/ Nutrient/Toxicant Removal. In response to the inconsistency, this question has been modified to help improve future results.

Site 2: Bountiful Pond, a slope wetland.

Site 2 was tested by the same groups as Site 1. Table 12 illustrates the groups evaluating the wetland site and the composition of each. Table 13 illustrates when each group visited the wetland site to conduct field testing.

Group A	One UDOT environmental manager and one UDOT landscape architect.
Group B	Three UDOT landscape architects.
Group C	One government wetland specialist, one government wildlife biologist, and one private wetland consultant. All are members of the UWAG group.
Group D	One government wetland specialist, one government hydrologist, and one government wildlife biologist. All are members of the UWAG group.
Group E	One UDOT landscape architect manager and one landscape architect student.

Table 12: Site 2 Group Composition.

Group A	June 8, 2005
Group B	June 8, 2005
Group C	May 31, 2005
Group D	May 31, 2005
Group E	May 25, 2005

Table 13: Site 2 Field Test Date.

Question 15b. Plant Community Composition:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	M	0.6	1	0.6 x 0.5 = 0.3
B	M	0.6	1	0.6 x 0.5 = 0.3
C	M	0.6	1	0.6 x 0.5 = 0.3
D	M	0.6	1	0.6 x 0.5 = 0.3
E	M	0.6	1	0.6 x 0.5 = 0.3

Table 14: Site 2 Question 15b. Plant Community Composition Results.

Results from question 15b. Plant Community Composition are consistent. All General Evaluation results are identical as well as Actual Functional Points/Rating results.

Question 15c. Listed/Proposed T&E Species Habitat:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	M	0.5	.9	0.5 x 0.5 = 0.75
B	L	0.3	.9	0.3 x 0.5 = 0.15
C	L	0.3	.9	0.3 x 0.5 = 0.15
D	M	0.5	.9	0.5 x 0.5 = 0.75
E	M	0.5	.9	0.5 x 0.5 = 0.75

Table 15: Site 2 Question 15c. Listed/Proposed T&E Species Habitat Results.

Results from question 15c. Listed/Proposed T&E Species Habitat are not consistent. General Evaluation results are not identical nor are the Actual Functional Points/Rating; however, variability between responses is small. The difference between a Moderate 0.5 rating and a Low 0.3 rating is because the AA is identified as having documented incidental use by a listed and/or proposed threatened and/or endangered species rather then merely suspected incidental use.

This question specifically requires consultation with a wildlife biologist. Groups C and D both included such an individual, yet their responses to the question were not identical. The remaining groups did not have access to such an individual and the responses were just as varied. This variability may illustrate that one wildlife biologist may not be as familiar with a particular area as another or it may suggest that a definitive answer to this question may be impossible to obtain at every site being evaluated.

The UDOT WFAM requires a wildlife biologist (the USFWS biologist most familiar with wildlife use of habitat where the site exists) to answer this question. They are most likely to know levels of habitat use and whether or not it is documented or suspected.

Question 15d. UT Natural Heritage Program Species Habitat:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	L	0.2	.9	0.2 x 0.5 = 0.1
B	L	0.1	.9	0.1 x 0.5 = 0.05
C	L	0.1	.9	0.1 x 0.5 = 0.05
D	M	0.6	.9	0.6 x 0.5 = 0.3
E	L	0.2	.9	0.2 x 0.5 = 0.1

Table 16: Site 2 Question 15d. UT Natural Heritage Program Species Habitat Results.

Results from question 15d. UT Natural Heritage Program Species Habitat are not consistent. General Evaluation results are not identical nor are the Actual Functional Points/Rating; however, the major inconsistency is with Group D. Through review of their evaluation form and reading the notes that were assembled afterwards by a member of UWAG the discrepancy with Group D can clearly be identified. A member of Group D, who is a wildlife biologist, considered the site to have secondary/suspected use by bald eagles (*Haliaeetus leucocephalus)*. However, the site has no old-growth woody vegetation, typically required for nesting and or roosting (Buehler 2000). The only potential use of the site by bald eagles, although very suspect due to the close proximity of development, would be for hunting (Buehler 2000). Any wetland however, may receive incidental use by bald eagles as they prey on waterfowl during the fall and winter seasons. It is suspected that the evaluator may have considered the landscape well beyond the AA, which this question does not address.

This question specifically requires consultation with a wildlife biologist. Groups C and D both included such an individual while in the field, yet their responses to the question were not identical. The remaining groups did not have access to such an individual and the responses were consistent with Group C. The inconsistency appears to

be the result of the wildlife biologist participating with Group D. This result suggests the same concerns that were discussed with the previous question.

Question 15e. General Wildlife Habitat:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	M	0.7	1	0.7 x 0.5 = 0.35
B	M	0.7	1	0.7 x 0.5 = 0.35
C	M	0.6	1	0.6 x 0.5 = 0.3
D	H	1.0	1	1.0 x 0.5 = 0.5
E	M	0.7	1	0.7 x 0.5 = 0.35

Table 17: Site 2 Question 15e. General Wildlife Habitat Results.

Results from question 15e. General Wildlife Habitat are somewhat consistent. General Evaluation results are not identical nor are the Actual Functional Points/Rating; however, the largest variability comes again from one group, Group D. It is important to note that the Actual Functional Points/Rating for this question are based on site disturbance level (question 15a.) and the plant community (question 15b.). Responses to question 15b. Plant Community Composition is identical. Therefore the variability is associated with evaluators' decision about the level of disturbance. Group D identified the level of disturbance as Low, while all remaining groups identified the disturbance as Moderate.

The inconsistency [0.6 (Group C) and 0.7 (Groups A, B, and E)] for Actual Functional Points/Rating is explained by the fact that Groups A, B, and E added 0.1 to the Wildlife Habitat features rating based on descriptive categories (see page 24 to read the descriptive categories) for high, moderate, and low wildlife use; thus resulting in 0.1 higher rating for the Modified wildlife habitat features rating.

Question 15f. General Fish/Aquatic Habitat:

This question was not applicable to Site 2 and did not receive any responses.

Question 15g. General Amphibian Habitat:

This question was not applicable to Site 2 and did not receive any responses.

Question 15h. Flood Attenuation:

This question was not applicable to Site 2 and did not receive any responses.

Question 15i. Short and Long Term Surface Water Storage:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	H	0.8	1	0.8 x 0.5 = 0.4
B	H	1.0	1	1.0 x 0.5 = 0.5
C	M	0.7	1	0.7 x 0.5 = 0.35
D	H	0.9	1	0.9 x 0.5 = 0.45
E	M	0.9	1	0.9 x 0.5 = 0.45

Table 18: Site 2 Question 15i. Short and Long Term Surface Water Storage Results.

Results from question 15i. Short and Long Term Surface Water Storage are not consistent. General Evaluation results are not identical nor are the Actual Functional Points/Rating. This question is comprised of two questions in a matrix. By answering each of the two questions, the evaluator arrives at a rating. The first question asks about the frequency of inundation. Groups A and B answered that the wetland was inundated greater or equal to 5 out of 10 years. Groups C, D, and E answered that inundation occurred less frequently. The inconsistency can be attributed to field evaluators not conducting research about the area prior to the field investigation. Pre-site visit research (e.g. review of aerial photography taken over time, contact individuals living near or who are familiar with the site, study topographic maps, etc.) is recommended in the UDOT WFAM Manual and is general protocol as a matter of course prior to conducting field

work. Unfortunately, it was not done prior to this field test study. Doing pre-site visit research should reduce or eliminate this inconsistency.

The second question in the matrix reads: "Has the wetland's natural ability to store water been disturbed?" Difficulties with the wording of this question arose at the site during the field test and members within each group struggled to arrive at a definitive answer. Groups B, D, and E responded that the wetlands natural ability to store water had not been disturbed and Groups A and C responded that it had. The difficulty is that the question lowers the rating score if evaluators answer in the affirmative, yet some disturbance may actually improve the value of this function. This question has been modified to help increase consistency. (The original and modified questions can be found in Usability Results and Discussion.)

Question 15j. Sediment/Nutrient/Toxicant Removal:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	H	0.9	1	0.9 x 0.5 = 0.45
B	H	1.0	1	1.0 x 0.5 = 0.5
C	H	0.9	1	0.9 x 0.5 = 0.45
D	H	0.9	1	0.9 x 0.5 = 0.45
E	H	1.0	1	1.0 x 0.5 = 0.5

Table 19: Site 2 Question 15j. Sediment/Nutrient/Toxicant Removal Results.

Results from question 15j. Sediment/Nutrient/Toxicant Removal are consistent. All General Evaluation results are identical. The only variability between Actual Functional Points/Rating is with results reported by Groups B and E. The variability is with the response to the whether or not the wetland's natural ability to store water had been disturbed. As previously stated, this question elicited much confusion and has been

modified to help increase the consistency of this question. The modified question can be found in Usability Results and Discussion.

Question 15k. Sediment/Shoreline Stabilization:

This question was not applicable to Site 2 and did not receive any responses.

Site 2: Conclusion

Results from Site 2 show inconsistency with responses to questions 15c. Listed/Proposed T&E Species Habitat, 15d. UT Natural Heritage Program Species Habitat, and 15i. Short and Long Term Surface Water Storage. Questions 15c. Listed/Proposed T&E Species Habitat and 15d. UT Natural Heritage Program Species Habitat both require consultation with a wildlife biologist familiar with the area for these responses. This consultation will eliminate inconsistencies found in this study. Inconsistencies with question 15i. Short and Long Term Surface Water Storage will be reduced or eliminated by evaluators conducting pre-site research and through the modifications that have been made to the second question in the matrix.

Site 3: Plover Playa in Tooele County, a mineral flat wetland.

Site 3 was tested by three groups. Table 20 illustrates the groups evaluating the wetland site and the composition of each. Table 21 illustrates when each group visited the wetland site to conduct field testing.

Group A	Two UDOT landscape architects.
Group B	One UDOT landscape architect and one landscape architect student.
Group C	Two hydrologists and a civil engineer from a private consulting firm.

Table 20: Site 3 Group Composition.

Group A	June 9, 2005
Group B	June 9, 2005
Group C	September 7, 2005

Table 21: Site 3 Field Test Date.

Question 15b. Plant Community Composition:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	H	1.0	1	1 x 2.5 = 2.5
B	H	1.0	1	1 x 2.5 = 2.5
C	H	1.0	1	1 x 2.5 = 2.5

Table 22: Site 3 Question 15b Plant Community Composition Results.

Results from question 15b. Plant Community Composition are consistent. All General Evaluation results are identical as well as Actual Functional Points/Rating results.

Question 15c. Listed/Proposed T&E Species Habitat:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	L	0.3	.9	0.3 x 2.5 = 0.15
B	L	0.3	.9	0.3 x 2.5 = 0.15
C	L	0.3	.9	0.3 x 2.5 = 0.15

Table 23: Site 3 Question 15c Listed/Proposed T&E Species Habitat Results.

Results from question 15c. Listed/Proposed T&E Species Habitat are consistent. All General Evaluation results are identical as well as Actual Functional Points/Rating results.

Question 15d. UT Natural Heritage Program Species Habitat:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	L	0.1	.9	0.1 x 2.5 = 0.25
B	L	0.1	.9	0.1 x 2.5 = 0.25
C	L	0.1	.9	0.1 x 2.5 = 0.25

Table 24: Site 3 Question 15d. UT Natural Heritage Program Species Habitat Results.

Results from question 15d. UT Natural Heritage Program Species Habitat are consistent. All General Evaluation results are identical as well as Actual Functional Points/Rating results.

Question 15e. General Wildlife Habitat:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	H	1.0	1	1.0 x 2.5 = 2.5
B	H	1.0	1	1.0 x 2.5 = 2.5
C	H	1.0	1	1.0 x 2.5 = 2.5

Table 25: Site 3 Question 15e. General Wildlife Habitat Results.

Results from question 15e. General Wildlife Habitat are consistent. All General Evaluation results are identical as well as Actual Functional Points/Rating results.

Question 15f. General Fish/Aquatic Habitat:

This question was not applicable to Site 3 and did not receive any responses.

Question 15g. General Amphibian Habitat:

This question was not applicable to Site 3 and did not receive any responses.

Question 15h. Flood Attenuation:

This question was not applicable to Site 3 and did not receive any responses.

Question 15i. Short and Long Term Surface Water Storage:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	H	1.0	1	1.0 x 2.5 = 2.5
B	H	0.8	1	0.8 x 2.5 = 2
C	H	0.8	1	0.8 x 2.5 = 2

Table 26: Site 3 Question 15i Short and Long Term Surface Water Storage Results.

Results from question 15i. Short and Long Term Surface Water Storage are consistent. All General Evaluation results are identical. The variability between Actual Functional Points/Rating is with results reported by Group A. This group answered that the wetland's natural ability to store water had not been disturbed. However, this is not correct because the wetland's natural ability to store water has been disturbed by the placement of a road. Group A did not want to lower the score because in actuality the wetland, due to the road, has the ability to store an increased amount of water. This question has been modified to address the concern of Group A. (The modified question can be found in Usability Results and Discussion.)

Question 15j. Sediment/Nutrient/Toxicant Removal:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	H	0.8	1	0.8 x 2.5 = 2
B	H	0.8	1	0.8 x 2.5 = 2
C	H	0.9	1	0.9 x 2.5 = 2.25

Table 27: Site 3 Question 15j. Sediment/Nutrient/Toxicant Removal Results.

Results from question 15j. Sediment/Nutrient/Toxicant Removal are consistent. All General Evaluation results are identical. The variability between Actual Functional

Points/Rating is with results reported by Group C. Group C responded that there was ground coverage with high to moderate surface roughness equaling or greater than 50%. Groups A and B responded that there was less than 50%. This inconsistency can be attributed to the time of the year when the evaluations of the site occurred. Groups A and B visited the site June 9, 2005 and Group C visited the Site on September 7, 2005. An increase in ground coverage with high to moderate surface roughness can be expected later in the growing season as plants have had an increased amount of time to mature and develop and new plants are recruited into the plant community.

Like question 15i. Short and Long Term Surface Water Storage, question 15j Sediment/Nutrient/Toxicant Removal asks the same question about whether or not the wetland's natural ability to store water has been disturbed. Groups A and B responded that its natural ability to store water had not been disturbed but it clearly has been due to an adjacent road. These groups acknowledged the road, but insisted that it actually improved the wetland's ability to remove sediment, nutrients, and toxicants and therefore, did not want to lower the rating. Group C answered that the wetland's natural ability to store water had been disturbed in the affirmative (lowering the rating) even though its ability to perform this function had actually improved. This question has been modified to address this concern. The modified question can be found in Usability Results and Discussion.

Question 15k. Sediment/Shoreline Stabilization:

This question was not applicable to Site 3 and did not receive any responses.

Site 3: Conclusion

Results from Site 3 show that consistency can be achieved with the UDOT WFAM. All responses to the questions are reliable and uniform.

Site 4: Jordan River at 3900 South, a riverine wetland.

Site 4 was tested by one group. Table 28 illustrates that one group participated at this wetland site and its composition. Table 29 illustrates when the group visited the wetland site to conduct field testing.

Group A	Three UDOT landscape architects, one UDOT landscape architect manager, and one landscape architect student.

Table 28: Site 4 Group Composition.

Group A	June 9, 2005

Table 29: Site 4 Field Test Date.

Site 4 was only evaluated by one group and therefore, the questions will not be analyzed and compared to determine consistency. Results will simply be reported.

Question 15b. Plant Community Composition:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	L	0.1	1	0.1 x 0.25 = 0.025

Table 30: Site 4 Question 15b Plant Community Composition Results.

Question 15c. Listed/Proposed T&E Species Habitat:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	L	0.0	.9	0.0 x 0.25 = 0.0

Table 31: Site 4 Question 15c Listed/Proposed T&E Species Habitat Results.

Question 15d. UT Natural Heritage Program Species Habitat:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	L	0.1	.9	0.1 x 0.25 = 0.025

Table 32: Site 4 Question 15d. UT Natural Heritage Program Species Habitat Results.

Question 15e. General Wildlife Habitat:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	L	0.2	1	0.2 x 0.25 = 0.05

Table 33: Site 4 Question 15e. General Wildlife Habitat Results.

Question 15f. General Fish/Aquatic Habitat:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	M	0.3	1	0.3 x 0.25 = 0.075

Table 34: Site 4 Question 15f. General Fish/Aquatic Habitat Results.

Question 15g. General Amphibian Habitat:

This question was not applicable to Site 4 and did not receive any responses.

Question 15h. Flood Attenuation:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	M	0.6	1	0.6 x 0.25 = 0.15

Table 35: Site 4 Question 15h. Flood Attenuation Results.

Question 15i. Short and Long Term Surface Water Storage:

This question was not applicable to Site 4 and did not receive any responses.

Question 15j. Sediment/Nutrient/Toxicant Removal:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	L	0.3	1	0.3 x 0.25 = 0.075

Table 36: Site 4 Question 15j. Sediment/Nutrient/Toxicant Removal Results.

Question 15k. Sediment/Shoreline Stabilization:

Group	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units (Actual Points x Estimated AA Acreage
A	M	0.6	1	0.6 x 0.25 = 0.15

Table 37: Site 4 Question 15k. Sediment/Shoreline Stabilization Results.

Site 4: Conclusion

Unfortunately, Site 4 was not field tested by multiple groups and could not be used as a measurement of consistency. On June 9, 2005, when the group that did evaluate the site made their visit, considerable confusion existed as to how to properly assess the function of a riverine wetland system and therefore it was deemed inappropriate to split into multiple groups. A second date, September 8, 2005 was set to field test the riverine site again with a different group of field evaluators. Due to other evaluator commitments, it was not assessed a second time. In the future, it would be important to field test a riverine and/or a lacustrine fringe site by multiple groups so that a measure of consistency can be obtained with those questions that were not applicable to the wetland types found on Sites 1, 2, and 3, specifically, questions 15f. General Fish/Aquatic Habitat, 15g. General Amphibian Habitat, 15h. Flood Attenuation, and 15k. Sediment/Shoreline Stabilization.

It should be noted that the confusion at Site 4 regards application of UDOT WFAM protocol to riverine wetlands and specifically, on the delineation of the

assessment area (AA). Modifications to the appropriate questions have been made based on field applications of the protocol to riverine wetlands. Further discussion about specific modifications is found in the Usability Results and Discussion section.

Consistency Results and Discussion Conclusion

Overall, the responses to the questions at each site were reliable and uniform and therefore, consistent. Those areas that did have levels of variability have been analyzed and explained where the variability occurred and modifications have been made to minimize these inconsistencies in the future.

USABILITY RESULTS AND DISCUSSION

Usability in this study is defined as a method that is understandable, convenient, and ready for use. The measurement of usability was applied to the UDOT WFAM and determined as follows. Each question was analyzed individually based on concerns expressed by all field evaluators assisting in this study. Some questions did not receive any evaluator comments. However, in this discussion the questions themselves will be included in this section for consistency but no discussion will follow. Other questions received several comments from evaluators about their usability in this functional assessment method. These concerns have been summarized and will be included below each question that the concern addresses. In some instances, modifications and/or additions to the functional assessment method and the form have been made to best respond to the concerns made by field evaluators. These modifications will be included, if appropriate, in this section. Any editorial changes that needed to be made to the document have taken place.

Question 1. Project Name:

1. Project Name:

No concerns were expressed by field evaluators specific to this question.

Question 2. Project Number:

2. Project Number:

No concerns were expressed by field evaluators specific to this question.

Question 3. USCOE Permit Number and Project Pin Number:

3. USCOE Permit Number:	**Project Pin Number:**

No concerns were expressed by field evaluators specific to this question.

Question 4. Evaluation Date:

4. Evaluation Date (MM/DD/YYYY):

No concerns were expressed by field evaluators specific to this question.

Question 5. Evaluating Agency:

5. Evaluating Agency:

No concerns were expressed by field evaluators specific to this question.

Question 6. Evaluator(s):

6. Evaluator(s):

No concerns were expressed by field evaluators specific to this question.

Question 7. Purpose of Evaluation:

7. Purpose of Evaluation (check one): ____Wetlands potentially affected by UDOT project ____ Mitigation wetlands, pre-construction ____ Mitigation wetlands, post-construction ____ Other (explain):

No concerns were expressed by field evaluators specific to this question.

Question 8. Wetland/Site Number(s):

8. Wetland/Site Number(s):

No concerns were expressed by field evaluators specific to this question.

Question 9. Wetland Location(s):

9. Wetland Location(s): Ecoregion (see map Appendix A):_____ Watershed (see map Appendix A):_____ County (see map Appendix A): _____ Legal: T_____N or S; R_____E or W; S_____;T_____N or S; R_____E or W; S_____ Approximate Stationing or Mileposts:_____

This question requires the evaluator(s) to determine where the wetland being evaluated is located; this includes: the Ecoregion, Watershed, and County. Evaluators had a difficult time interpreting some of this information based on the maps (Figure 5) provided in Appendix A of the UDOT Wetland Functional Assessment Method Manual. A new Ecoregion map (Figure 6) has been included in the manual that includes major

highways and interstate roads. This will help to reduce the difficulty encountered by the field evaluators. However, it is important that field evaluators research answers to this question prior to going into the field.

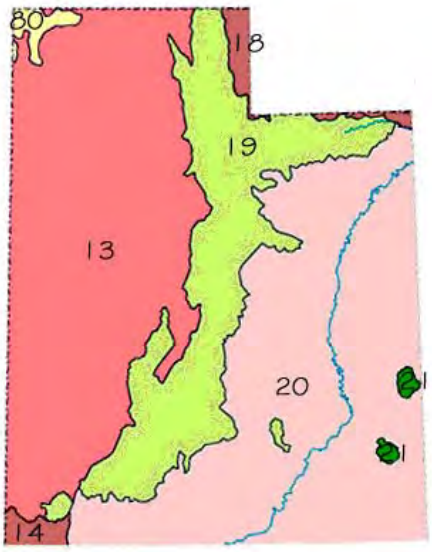

Figure 5: Original Ecoregion Map.

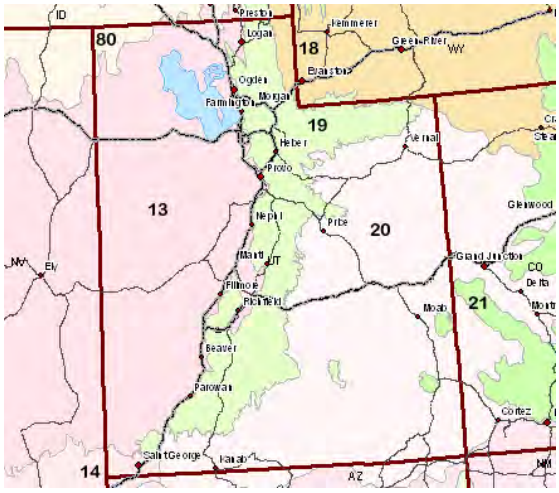

Figure 6: New Ecoregion Map.

Figure 5 - From: National Health and Environmental Effects Research Laboratory U.S. Environmental Protection Agency

Figure 6 - From: Native Seed Network

Question 10. Wetland Size:

10. Wetland Size (total acres, measured by GPS if applicable):

No concerns were expressed by field evaluators specific to this question.

Question 11. Assessment Area (AA):

11. Assessment Area (AA) (total acres, measured by GPS if applicable, see appendix):

This question asks the evaluator(s) to determine the assessment area (AA) that will be considered on the evaluation form. Some field evaluators were confused about how this is determined. The AA can only include the wetland that has been delineated as jurisdictional wetland according to Section 404 of the Clean Water Act and regulated by

the U.S. Army Corps of Engineers. In some instances, if multiple wetland types are present in the same delineation, then multiple forms may need to be used. In cases where open water is present, if it has been delineated as jurisdictional wetland, then it should be included. If the open water has not been delineated as jurisdictional, it should not be included. Open water, in the truest sense of the word, is also regulated by the U.S. Army Corps of Engineers but under Section 10 of the Rivers and Harbors Act, not Section 404 and is therefore not considered as part of the assessment area.

In Appendix B of the UDOT WFAM manual there is a sample assessment area diagrams page (Figure 7) to aid evaluators in determining the assessment area. This page has been modified (Figure 8) to better represent possible assessment areas. It also was modified to address concerns about question 15a. Level of Disturbance, which are discussed later in this section.

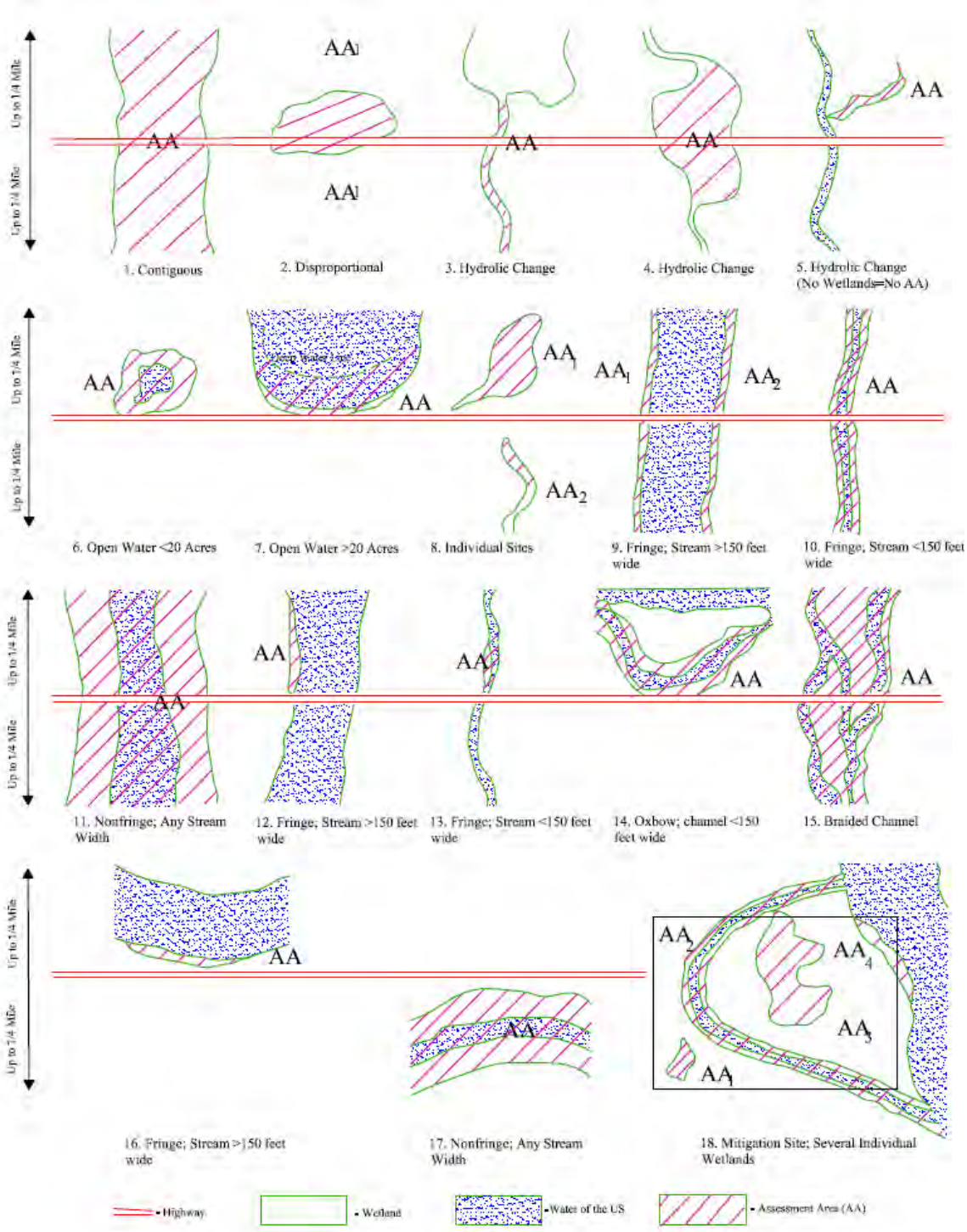

Figure 7: Original Assessment Area (AA) Diagrams

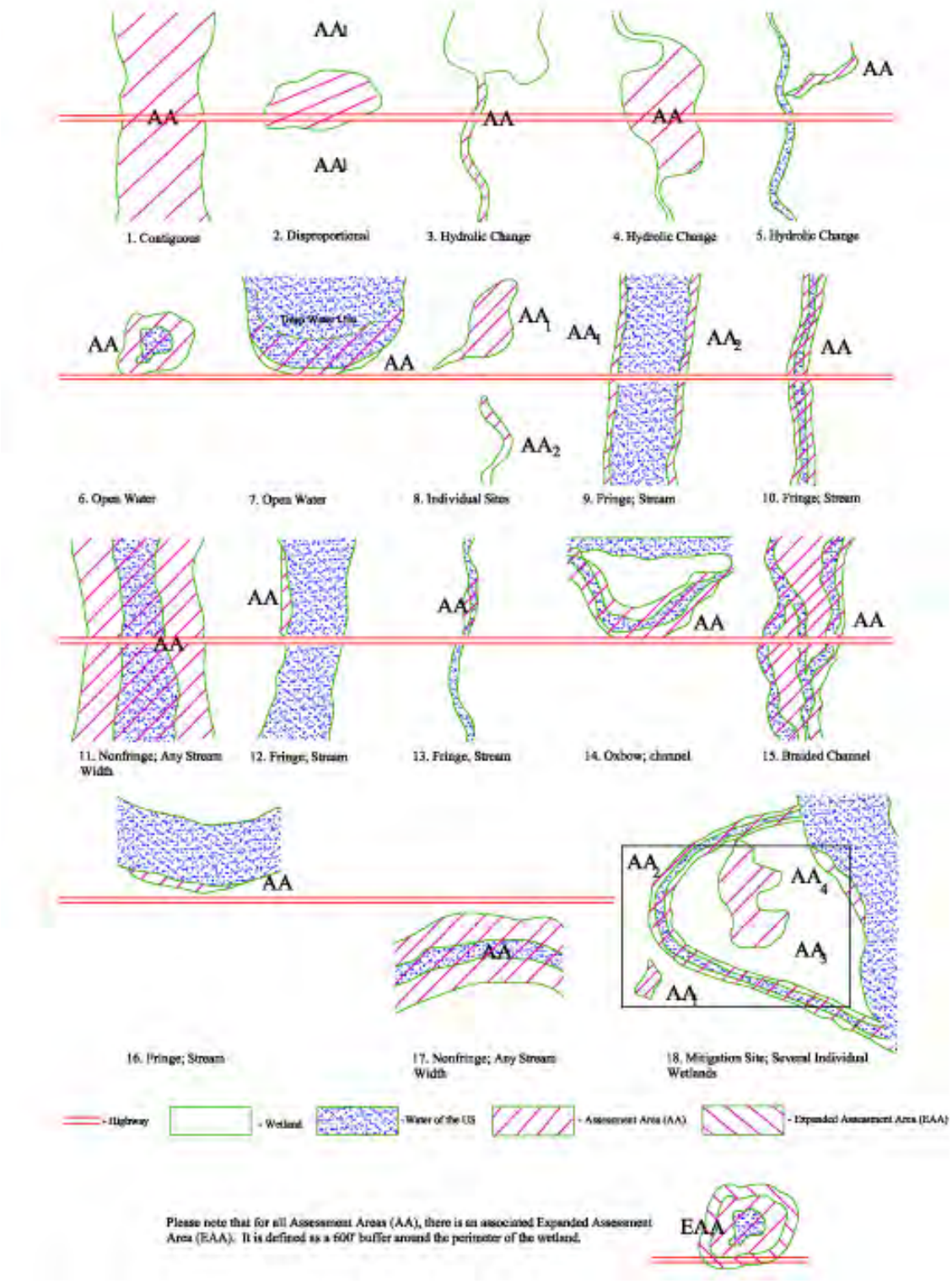

Figure 8: Modified Assessment Area (AA) Diagrams

Question 12. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals or State Listed S1 Species:

12. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals or State Listed S1 Species
It is required that the evaluator contact USFWS with regards to the presence or absence of threatened or endangered (T or E) species and UDWR concerning the presence or absence of a state listed S1, S2 or S3 species. The documented habitat of a federally listed or proposed threatened or endangered plant or animal species or a state listed S1 species results in an automatic Red Flag categorization of the assessed site. Coordination with USFWS and UDWR is required. (However, the evaluation proceeds as normal so that the COE receives an assessment of function and value consistent with the UDOT assessment method.)
Is the AA documented to contain primary habitat for T or E or S-1 species? _____Yes _____No
If yes, list the species:
(This field assesses habitat for species receiving protection under provision of the Endangered Species Act and Utah critically imperiled species.)

No concerns were expressed by field evaluators specific to this question.

Question13. Selecting a Wetland Classification:

13. Selecting a Wetland Classification
Refer to the glossary to determine the correct wetland class. Refer to Appendix E for reference photos and lists of the most common native species in each classification. Turn to appropriate colored pages to continue functional assessment as noted below.
Riverine: Blue
Slope: Pink
Depressional: Yellow
Mineral Flat: Green
Lacustrine Fringe: Purple
Roadside Ditch Wetland: If AA qualifies as a non-jurisdictional 'roadside ditch wetland', AA is classified as Category IV. Further assessment is not necessary, although all documentation must be completed.

The definitions that existed in the manual that was used for field testing were inadequate. Evaluators struggled to determine the difference between a slope and depressional wetland. These definitions, along with the definition for riverine and mineral flat wetlands, have been improved by adding more specific information that will aid in making this determination. These modifications are highlighted and can be seen in the following table.

Original Wetland Classification Definitions	Modified Wetland Classification Definitions
Riverine wetlands: Occur in floodplains and riparian corridors in association with stream channels. Water source is overbank flow or hydraulic connection between the wetland and the stream. Dominant hydrodynamics are unidirectional and horizontal.	**Riverine wetlands:** Occur in floodplains and riparian corridors in association with stream channels. Water source is river or stream flow or overbank flow at peak hydrological periods. (Overbank flow should occur once every two years or 50% of the time. If flooding does not occur at this minimal rate, it is probably not a riverine based wetland). Dominant hydrodynamics are unidirectional and horizontal. A subsurface hydraulic connection between the wetland and stream does not necessarily indicate a riverine system.
Slope wetlands: Occur at points of surface changes, breaks in slope or stratigraphic changes. Groundwater runoff and canal seepage are the primary water sources. Water flow is unidirectional (down slope/gradient). Water may discharge to a stream, lake or depression.	**Slope wetlands:** Occur at points of surface changes, breaks in slope or stratigraphic changes. Surface water runoff and groundwater outflow (i.e. – spring or seep) are the primary water sources. Water flow is unidirectional (down slope/gradient). Water may discharge to a stream, lake or depression. Wetland complexes can be comprised of a slope wetland with several depressions or low-points interspersed throughout. Relying on topographic maps, aerial photographs, and field evaluation will help determine which classification is dominant and or most appropriate.
Depressional wetlands: Occur in topographic depressions with closed contours. Water sources are precipitation, runoff and groundwater. Water flow vectors are toward the center of the depression. Dominant hydrodynamics are vertical. May or may not have inlets or outlets.	**Depressional wetlands:** Occur in topographic depressions with closed contours. Water sources are precipitation, runoff and groundwater. Water flow vectors are toward the center of the depression. Dominant hydrodynamics are vertical. May or may not have inlets or outlets. Depressions that are full, may release water down slope/gradient and tend to be a part of a larger slope complex. Relying on topographic maps, aerial photographs, and field evaluation will help determine which classification is dominant and or most appropriate.
Mineral Flat wetlands: Occur on large relict lakebeds. Dominant water source is precipitation. Dominant hydrodynamics are vertical. Example: Great Salt Lake mud flats and salt flats. Subclasses are not known.	**Mineral Flat wetlands:** Occur on large relict lakebeds. Dominant water source is precipitation. Dominant hydrodynamics are vertical. Typically are large features in the landscape, associated with old Lake Bonneville bottom deposits with close proximity to GSL or other large permanent, semi-permanent or ephemeral water bodies. (e.g. – Sevier Lake) Only found in basin and range ecoregions. Example: Great Salt Lake mud flats and salt flats. Subclasses are not known.

Table 38: Original and Modified Wetland Classification Definitions

Question 14. Identify subclass

14. Identify subclass

This question asks the evaluator(s) to collect information about the wetland that is not scored. Some evaluators expressed concern that if something is not going to be given a value, then time should not be spent to collect this data.

The response to this concern is that by collecting sub-classification information the evaluator will be able to more accurately identify which plant list to refer to in Appendix D and E of the manual. This information will also aid the evaluator and the reviewer of the functional assessment to better understand the site and how to best manage the site in the future.

Question 15a. Level of Disturbance:

15a. Level of Disturbance

This field assesses the level of disturbance in the AA and EAA. Source: Soule (1991), Forman and Godron (1986) and Fahrig (1997).

Use matrix below to determine level of disturbance (H = high, M = moderate, or L = low). Circle the appropriate answer.

Comments: Note types of disturbance, intensity, season, etc.

	Predominant conditions found in EAA (1,200 feet from perimeter of AA)		
Conditions within AA	Land managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads, buildings, ditches or canals.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density, and or numerous ditches or canals.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	L	L	M
AA not cultivated, but moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads, buildings, ditches or canals.	M	M	H
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density, and or numerous ditches or canals.	H	H	H

Comments: Note types of disturbance, intensity, season, etc.

This question asks evaluator(s) to assess the assessment area (AA) and the expanded assessment area (EAA) for disturbances. Throughout field testing, evaluators were asked to add 1,200 feet to the perimeter of the AA as a buffer to arrive at the EAA. Evaluators were concerned that a 1,200 foot buffer around the AA was too far and not necessary to properly evaluate site disturbance.

To respond to these concerns expressed by field evaluators, the 1200 foot distance was reduced to 600 feet. Buffer (2005) states that most pollutants, including nitrogen, are minimized within 60 to 120 feet. Specific site characteristics (soil, slope, vegetation, and ground and surface water) will vary the distance required to adequately protect a water body. In a study conducted by Spackman and Hughes (1995), it is reported that riparian buffers 225 feet to 525 feet in width included 90% of avian species found in the area. Therefore, assessing wetland disturbances at a distance beyond 600 feet would probably not produce additional information sufficient to change the rating of this question. It is believed that an accurate evaluation of site disturbance can be achieved by assessing a 600 foot buffer.

Another concern of field evaluators was that the words used to describe the types of disturbance that might occur did not portray present day disturbances in wetland areas in most Utah landscapes. The wording used to describe the types of disturbances that might occur on or near a site have been updated to more accurately portray potential present day disturbances. Modifications are highlighted below.

15a. Level of Disturbance

This field assesses the level of disturbance in the AA and EAA. Source: Soule (1991), Forman and Godron (1986), Fahrig (1997), Buffler (2005), and Spackman and Hughes (1995).

Use matrix below to determine level of disturbance (H = high, M = moderate, or L = low). Circle the appropriate answer.

	Predominant conditions found in EAA (600 feet from perimeter of AA)		
Conditions within AA	Land managed in predominantly natural state; is not grazed, hayed, landscaped, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed; or has been subject to minor clearing, fill placement or hydrological alteration; contains few roads, buildings, ditches or canals.	Land cultivated or heavily grazed or landscaped; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density, and or numerous ditches or canals.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, landscaped, or otherwise converted; does not contain human induced trails.	L	L	M
AA not cultivated, but moderately grazed or hayed or selectively landscaped; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few human induced trails, buildings, ditches or canals.	M	M	H
AA cultivated or heavily grazed or landscaped; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; and numerous human induced trails, ditches or canals.	H	H	H

Comments: Note types of disturbance, intensity, season, etc.

Question 15b. Plant Community Composition:

15b. Plant Community Composition

This field assesses the plant community within the AA. Source: Keate (2004) and Padgette et al. (1989). Refer to Appendix E for photographs, plan views, cross sectional diagrams, the range of expected coverage and wetland specific vegetation lists. Refer to Appendix F for transect protocol (step point).

i. Do you find all layers of vegetation that are expected for this wetland type? Circle: Y N

ii. What is the percent ground cover (within the AA) dominated by native vegetation? High ≥ 80%, Moderate 79-60%, Low < 60%

iii. What is the ratio of native plants to non-native plants observed using the transect protocol? (High ≥ 80%, Moderate 79-60%, Low < 60%)

iv. Rating for riverine and lacustrine wetlands.

Layers (i)	Y									N								
Cover (ii)	H			M			L			H			M			L		
Native Species (iii)	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.1L

iv. Rating for depressional, mineral flat, and slope wetlands.

Cover (ii)	H			M			L		
Native Species (iii)	H	M	L	H	M	L	H	M	L
Rating	1H	.8H	.6M	.8H	.6M	.4M	.6M	.4M	.2L

Comments:

Evaluators expressed concern that they were not sure how to set up and sample vegetation along a plant transect. Instructions on how to do this were included in the manual but few evaluators had taken the time to familiarize themselves with the protocol prior to field testing. Another concern expressed by field evaluators was that there was no space on the form to illustrate where the transect(s) they were establishing were located in relation to the entire AA. To address both of these concerns, an additional page was added to the form (page 11). The title and instructions to this new page as it is shown on the form is in Table 39.

Supplemental Diagram A
15b. Plant Community Composition Diagram Draw a simple boundary of the AA and illustrate all plant transect locations and approximate distances. Please note that 100 sample points per acre should be collected within the AA. (Example: if AA equals .25 acres, then 25 sample points should be taken.) Never use less then 10 sample points within any AA, even when AA is less then .10 acres in size. Placement of transect(s) should accurately represent the AA. Be sure to place transect(s) through different water regimes, vegetative structure, and topographic changes that may exist within the AA.

Table 39: Supplemental Diagram A (Title and Instructions).

Another concern expressed by evaluators was use of the word "ratio" appeared in question 15b. iii. The word "ratio" has now been revised with the word "percent".

It was also pointed out that the protocol implies that all native plants were considered to be desirable, even if the native plant species found in the AA were not considered to be a wetland obligate or facultative species. To address this concern, the word "wetland" has been included to indicate that only native obligate or facultative wetland species will increase the Plant Community Composition rating. All non-native species and non-wetland species will decrease the Plant Community Composition rating. Indeed, the presence of native upland species in a wetland typically suggests wetland degradation (Keate 2001).

Evaluators pointed out that in some instances, it will not be possible to use the transect protocol method as described in the appendix of the manual, due to heavily wooded areas along a riparian corridor, the small size of the AA or fragmented pieces of jurisdictional wetland scattered throughout the site. In these circumstances the evaluator(s) must visually assess the vegetation and use their best professional judgment. This information has been added to the updated assessment method.

Changes to the form are highlighted in the question below.

15b. Plant Community Composition

This field assesses the plant community within the AA. Source: Keate (2004) and Padgette et al. (1989). Refer to Appendix F for photographs, plan views, cross sectional diagrams, the range of expected coverage and wetland specific vegetation lists. Refer to Appendix G for transect protocol (step point). Draw a simple boundary of the AA and illustrate all plant transect locations and approximate distances on page 11 of this form. See glossary for definition of native wetland plants.

i. Do you find all layers of vegetation that are expected for this wetland type? Circle: Y N

ii. What is the percent ground cover (within the AA) dominated by native wetland vegetation?
High ≥ 80%, Moderate 79-60%, Low < 60%

iii. What is the [redacted] of native [redacted] plants to non-native or [redacted] plants observed using the transect protocol?
High ≥ 80%, Moderate 79-60%, Low < 60%

iv. Rating for riverine and lacustrine wetlands.

Layers (i)	Y									N								
Cover (ii)	H			M			L			H			M			L		
Native Wetland Species (iii)	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.1L

iv. Rating for depressional, mineral flat, and slope wetlands.

Cover (ii)	H			M			L		
Native Wetland Species (iii)	H	M	L	H	M	L	H	M	L
Rating	1H	.8H	.6M	.8H	.6M	.4M	.6M	.4M	.2L

Comments:

Question 15c. Listed/Proposed T&E Species Habitat:

15c. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals
This field assesses documented or suspected use of the AA by Federally listed or proposed threatened or endangered plants or animals. Source: Consultation with USFWS biologist.
Refer to the U.S. Fish and Wildlife Services website at www.fws.gov or visit the Utah Data Conservation Center website at http://dwrcdc.nr.utah.gov/ucdc/. Circle one category below based on definitions contained in the instructions and after consultation with USFWS biologist.
i. AA is Documented (D) or Suspected (S) to contain:
*Documented primary or critical habitat for T or E or State listed S-1 species has been addressed in #12

Primary habitat (list species)	* S	_____
Secondary habitat (list species)	D S	_____
Incidental habitat (list species)	D S	_____
No usable habitat	D S	_____

ii. Rating
Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Highest Habitat Level	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.5 M	.3 L	0 L

Sources for documented use (e.g. observations, records, etc):

Question 15c. asks if there is "Primary or critical habitat" present for listed and or proposed threatened and or endangered species. Evaluators asked that the word "critical" be removed from this question. The word could potentially lead evaluators to not consider a species primary habitat but just habitat that is imperiled. The word "critical" has now been removed from this question on the form.

Question 15d. UT Natural Heritage Program Species Habitat:

15d. Habitat for plant or animals rated S2 or S3 by the Utah Natural Heritage Program
This field assesses documented or suspected use of the AA by S2 or S3 species listed by the Utah Natural Heritage Program (UNHP). Source: Consultation with UDWR regional biologist.
Refer to the UNHP website or the Utah Sensitive Species List at http://dwrcdc.nr.utah.gov/ucdc/.
Do not include species listed in 15c from above. Circle one category below based on definitions contained in the instructions and after consultation with UDWR biologist.
i. AA is Documented (D) or Suspected (S) to contain:

Primary habitat (list species and S rating)	D S	_____
Secondary habitat (list species and S rating)	D S	_____
Incidental habitat (list species and S rating)	D S	_____
No usable habitat	D S	_____

ii. Rating
Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low).

Highest Habitat Level	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.5 M	.3 L	0 L

Sources for documented use (e.g. observations, records, etc.):

Question 15d. asks if there is "Primary or critical habitat" present for species appearing on the Utah Natural Heritage list. Evaluators asked that the word "critical" be removed from this question, for reasons explained previously. The word "critical" has now been removed from this question on the form.

Question 15e. General Wildlife Habitat:

15e. General Wildlife Habitat Rating
This field assesses general wildlife habitat conditions in the AA. Source: Hammer (1992), Mitch and Gosselink (1993) and Weller and Spatcher (1965).
i. Wildlife habitat features
Working from top to bottom, circle appropriate AA attributes in matrix to arrive at a rating (H = high, M = moderate, or L = low).

Plant Community (15b)	H			M			L		
Disturbance Level (15a)	L	M	H	L	M	H	L	M	H
Rating	H	H	M	H	M	L	M	L	L

Wildlife habitat features rating.	1H	.6M	.2L

ii. Modified Wildlife Habitat Rating
The wildlife habitat features rating may be modified based on documented wildlife use and levels of use of the AA. Consult with the UDWR regional wildlife biologist to determine the level of wildlife use in the AA using the procedures detailed below.
UDWR biologist consulted:
Name(s)_____Date(s)_____
First circle the appropriate answer to the following question: Does the UDWR have sufficient knowledge of the AA to determine a level of general wildlife use. Yes No

If the answer is No do not modify your answer to 15e(i) above. If you answer is Yes and after further consultation with a UDWR biologist and using the level of use descriptive categories on page 14. Select the descriptive category (H, M or L) that best describes the level of wildlife use in the AA. Circe the appropriate answer. H M L

If the level of use circled is:
H – add .2 to the wildlife habitat features rating 15e(i)
M – add .1 to the wildlife habitat features rating
L – do not modify the wildlife habitat features rating

iii. Rating
Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Modified wildlife habitat features rating	1H			.6M			.2L		
Rating	1.2H	1.1H	1H	.8H	.7M	.6M	.4M	.3L	.2L

Comments:

No concerns were expressed by field evaluators specific to this question.

Question 15f. General Fish/Aquatic Habitat:

15f. General Fish/Aquatic Habitat Rating

This field assesses general fish and aquatic habitat in the AA. Source: Sigler and Miller (1963), Gore (1985), Williams et al (1997) and National Research Council (1992).

Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, etc., circle NA here and proceed to the next function. If fish use occurs in the AA but is not desired from a resource management perspective [such as fish use within an irrigation canal], then Habitat Quality [i below] should be marked as "Low", applied accordingly in ii below, and noted in the comments.)

i. Habitat Quality

Refer to the glossary for further definitions of these terms. Circle appropriate AA attributes in matrix to arrive at the quality rating (H = high, M = moderate, or L = low).

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
Cover: % of waterbody in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10–25%	<10%	>25%	10–25%	<10%	>25%	10–25%	<10%
Shading: >75% of streambank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	H	H	H	M	M	M	M
Shading: 50 to 75% of streambank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	M	M	M	M	M	L	L
Shading: < 50% of streambank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality

Circle the appropriate response to the following question. If answer is Y, then reduce rating in i above by one level (H = M, M = L, L = L)

Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the waterbody included on the UDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support? Y N

Modified habitat quality rating = (circle) H M L

iii. **Rating**

Refer to the Utah Division of Wildlife Resource website for fish species. Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Types of fish known or suspected within AA	Modified Habitat Quality (ii)		
	H	M	L
Native fish	1 H	.8 M	.5 M
Introduced fish	.9 H	.6 M	.4 M
No fish	.3 L	.2 L	.1 L

Comments: reduce the score by .1 if AA has carp present.

No concerns were expressed by field evaluators specific to this question.

Question 15g. General Amphibian Habitat:

15g. General Amphibian Habitat Rating
This field assesses general amphibian habitat within the AA. Source: Consultation with UDWR regional biologist.
UDWR biologist(s) consulted:
Name(s)_____Date(s)_____
Circle the appropriate answer to the following question after consulting with UDWR regional biologist.
The UDWR has documented the presence of amphibians in the AA or, habitat and water quality characteristics are such that they would support amphibians.
Rating: Yes No

If the answer is Yes, add **.2** under the functional points/rating column in the Functional Assessment Rating Section at the end of this form.

No concerns were expressed by field evaluators specific to this question.

Question 15h. Flood Attenuation:

15h. Flood Attenuation
This field assesses the capability of the AA to slow in channel or overbank flow during high water/flood events. This applies to riverine wetlands only. Source: Kleinschmidt Associates (1993), Munson (1974) and Strom et al (2004).
i. Rating
Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Within the floodplain of the AA, estimate % ground coverage with high surface roughness*	≥65%	64%-50%	49%-35%	>35%
Rating	1H	.8H	.6M	.4M

*See glossary for definition of surface roughness rating criteria.
ii. There are residences, businesses, or other features, which may be significantly damaged by floods located within 0.5 miles downstream of the AA. Yes No
Comments:

No concerns were expressed by field evaluators specific to this question.

Question 15i. Short and Long Term Surface Water Storage:

15i. Short and Long Term Surface Water Storage
This field assesses the potential of the AA to capture and hold surface water originating from inundation, precipitation, upland surface (sheet flow) or subsurface (groundwater flow). Source: Munson (1974), Strom et al (2004), Hammer (1986) and Mitch and Gosselink (1993).
i. Rating
Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Duration of surface water is implied in the definition of wetland class or of the subclass and thus reflects the natural function. Circle the appropriate answer.

Wetlands are inundated	≥ 5 out of 10 years		< 5 out of 10 years	
Has the wetland's natural ability to store water been disturbed?	N	Y	N	Y
Rating	1H	.8H	.9H	.7M

In order to properly assess this function, examination of the area down gradient from the AA may aid in determining whether or not dams, water control structures, overflow aprons, ditches, canals, drain tiles or other forms of outlet or modification exist.
Comments:

Evaluators expressed concern with all questions regarding site hydrology because the method did not ask them to illustrate hydrological conditions. Evaluators said it would be difficult, no matter what an individual's level of expertise, to answer hydrological questions without walking the site, illustrating what they found, and making notes about the conditions observed. To address this concern an additional page was added to the form (page 12). The title and instructions for this new page are shown in Table 40.

Supplemental Diagram B
Hydrological/Biophysical Assessment Diagram Draw a simple boundary of the AA and illustrate the hydrological conditions found within the AA. Include water source locations, directions of flow (if applicable), approximate depths, and any significant site features that influence site hydrology.

Table 40: Supplemental Diagram B (Title and Instructions)

As previously mentioned in the Consistency Results and Discussion section, this question caused usability concerns for several evaluators. The question is about whether or not the wetland being evaluated serves as short and long term surface water storage. The second question in the matrix asks "Has the wetland's natural ability to store water been disturbed?" If the evaluator was to respond in the affirmative to this question, the

point value was lower then if they responded in the negative. However, evaluators felt that when a wetland's natural ability to store water has been disturbed it does not always negatively affect the wetland's ability to perform this function. To address this concern the question has been modified. It now reads "Has the wetland's natural ability to store water been disturbed negatively?" This modification allows the evaluator to use best professional judgment to assess the disturbance, if any, occurred and make a judgment about the positive or negative impact of the disturbance of the water storage function.

Question 15j. Sediment/Nutrient/Toxicant Removal:

15j. Sediment/Nutrient/Toxicant Retention and Removal
This field assesses the ability of the AA to retain and capture sediments, nutrients and toxicants. Source: Kleinschmidt Associates (1999), Hammer (1986) and Hammer and Kadlec (1983).
This function applies to wetlands which could receive excess sediments, nutrients or toxicants through influx of surface or groundwater or direct input. If no wetlands in the AA are subject to such input, circle NA here and proceed with evaluation.
i. Rating
Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. **Minor** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on UDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. **Major** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
Within the AA, estimate % ground coverage with high to moderate surface roughness*	≥ 50%		<50%		≥ 50%		<50%	
Has the wetland's natural ability to store water been disturbed?	N	Y	N	Y	N	Y	N	Y
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L

*See glossary for definition of surface roughness.
Comments:

The same concern was expressed with this question as with question 15i. Short and Long Term Surface Water Storage. Evaluators felt that disturbance to the wetland's natural ability to store water may or may not affect its capacity to remove sediments, nutrients, and toxicants. In response to evaluator concerns, the question has been

modified in the same way and now reads “Has the wetland’s natural ability to store water been disturbed negatively?”

Additionally, more descriptive wording has been added to the box that asks whether or not a water body is considered to be impaired. The additional wording that has been added to the form is highlighted in the question below.

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. **Minor** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				AA is in close proximity to or receives input from or is on UDEQ list of water bodies in need of TMDL development for “probable causes” related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. **Major** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
Within the AA, estimate % ground coverage with high to moderate surface roughness*	≥ 50%		<50%		≥ 50%		<50%	
Has the wetland’s natural ability to store water been disturbed negatively?	N	Y	N	Y	N	Y	N	Y
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L

Question 15k. Sediment/Shoreline Stabilization:

No concerns were expressed by field evaluators specific to this question.

Question 16. Visual Quality

This question asks the evaluator(s) to answer a series of questions about the wetland but responses to these questions are only recorded, not scored. Some evaluators expressed concern that if something is not going to be given a value, then time should not be spent assessing it.

The response to this concern is that by answering this series of questions the evaluator(s) in the field and those reviewing the functional assessment will better understand the significance of whether or not any impacts to this site could potentially have social implications that might not otherwise be considered. Often the general public

is more concerned about the visual aspects of a wetland in their neighborhood than their function. Answering the questions gives the reviewing agencies an estimate of the visual sensitivity of the site and thus potential public concerns.

Question 17. Recreational/Educational Quality:

This question asks the evaluator(s) to answer a series of questions about the wetland but responses to these questions are only recorded, not scored. Some evaluators expressed concern that if something is not going to be given a value, then time should not be spent assessing it.

The response to this concern is that by answering this series of questions the evaluator(s) in the field and those reviewing the functional assessment will better understand the significance of whether or not any impacts to this site could potentially have social implications that might not otherwise be considered. Answers to these questions provide a relative measure of public recreational use of the area and indirectly suggest potential issues of public concern about wetland loss. It may also suggest that if sensitive plant or wildlife species are present and recreational use of the wetland is high that it may be necessary to exclude the public to protect the resource.

Usability Results and Discussion Conclusion

Usability of the wetland assessment method is important. If it does not appear logical or the questions are overly complicated, if detail beyond what is needed to make an accurate assessment is required or if the method is unnecessarily cumbersome, the method will not get used or it will not be used in the manner in which it was designed. Evaluators of this method felt that it was excellent and that the usability issues that were found could be easily overcome. They also reported that the method is generally

understandable and easy to follow because of its format. Test evaluators considered the method to be convenient, in that it can be completed with relative ease. They stated that it is not too time consuming nor is it overly burdensome.

RELATIVE ACCURACY RESULTS AND DISCUSSION

Determining the accuracy of a wetland functional assessment method can be difficult. Ideally, reference wetland sites that have been studied for an extended period of time would be used as a baseline measurement. Reference wetland sites are well understood and evaluating these sites with a new method would produce results that can be compared to what is already known. This provides a level of accuracy when field testing a new method. Unfortunately, none of the sites evaluated for this study can be considered reference sites. In fact, there are few, if any, reference sites in Utah that have been studied over an extended period of time. Therefore, an evaluation of relative accuracy will be conducted, as opposed to accuracy because no measures of "exact" wetland functions on previously studied sites exist.

Relative accuracy for this study is defined as the similarity in final results gathered at each site. Relative accuracy of the UDOT WFAM was measured by looking at the overall results (wetland scores and categorization) produced by each group of evaluators at each site. Results from groups comprising of only UDOT personnel and groups comprising of only UWAG members were also compared.

Site 1: Skypark, at 2600 South Redwood Road Woods Cross, Utah, a slope wetland.

Site 1 was tested by five groups. Table 41 illustrates how many groups participated at the wetland site and the composition of each. Table 42 shows group results as Percent Total Functional Points and the Overall Assessment Category assigned.

Group A	One UDOT environmental manager and one UDOT landscape architect.
Group B	Three UDOT landscape architects.
Group C	One government wetland specialist, one government wildlife biologist, and one private wetland consultant. All are members of the UWAG group.
Group D	One government wetland specialist, one government hydrologist, and one government wildlife biologist. All are members of the UWAG group.
Group E	One UDOT landscape architect manager and one landscape architect student.

Table 41: Site 1Group Composition.

	Percent	Category
Group A	43%	III
Group B	50%	III
Group C	45%	III
Group D	43%	III
Group E	45%	III

Table 42: Site 1 Group Percent Total Functional Points and Overall Assessment Category.

Site 1 results show that Groups A, B, C, D, and E all arrived at similar Percent Total Functional Points and placed the wetland in the same Overall Assessment Category, Category III. Group B gave the wetland a 50%. This is 5% higher than any of the other groups. This higher score is attributed to that fact that this group rated functions slightly higher throughout the assessment process. There was no score for a single question that varied significantly from the other four groups. Groups A and D gave the wetland 43% and Groups C and E gave the wetland 45%.

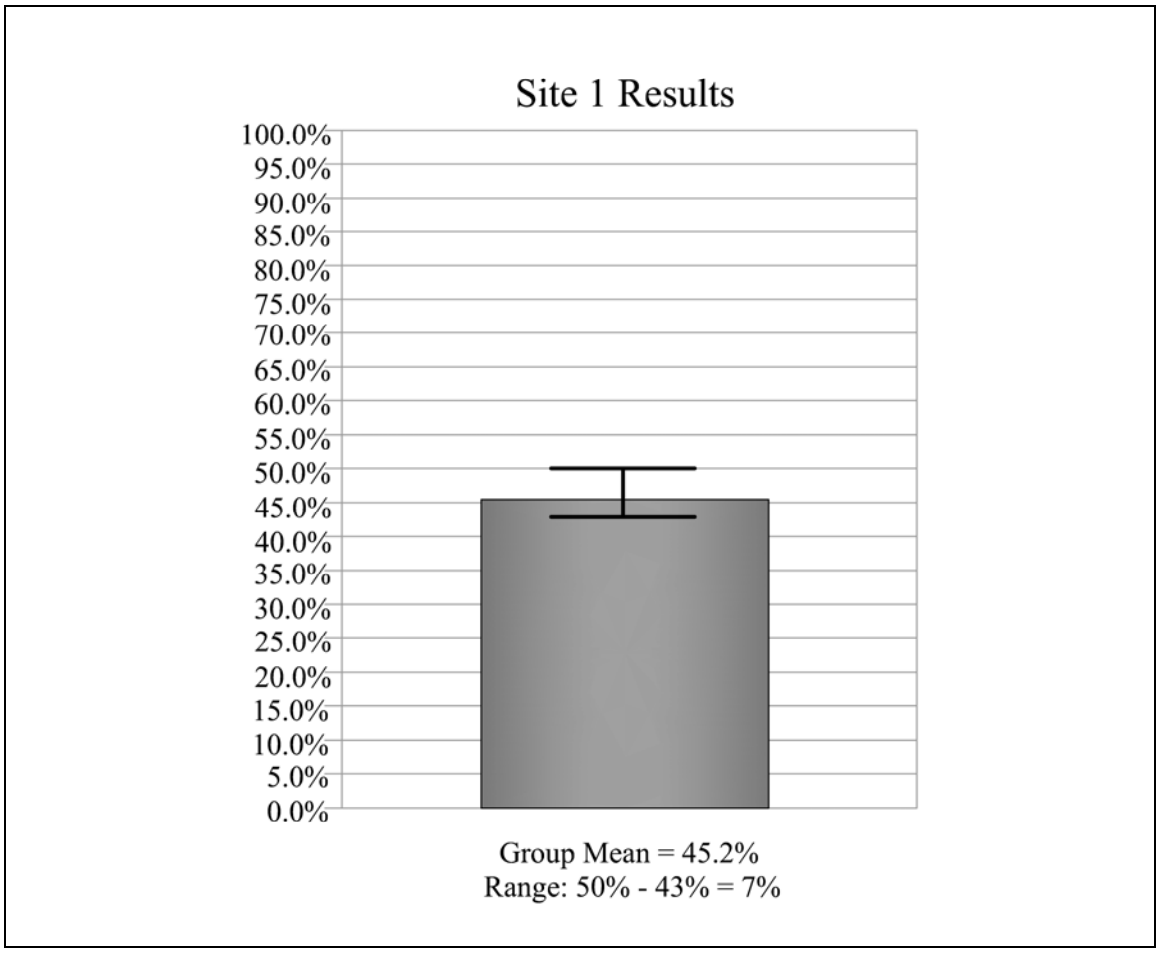

Figure 9: Site 1 Results

Figure 9 shows the mean and the range for Total Functional Assessment points for Site 1. Four of the five groups score the wetland within a couple of percentage points and another group only slightly higher. This shows that the UDOT UFAM can achieve relative accurate results.

Site 2: Bountiful Pond, a slope wetland.

Site 2 was tested by five groups. Table 43 illustrates how many groups participated at the wetland site and the composition of each. Table 44 shows group results as Percent Total Functional Points and the Overall Assessment Category assigned.

Group A	One UDOT environmental manager and one UDOT landscape architect.
Group B	Three UDOT landscape architects.
Group C	One government wetland specialist, one government wildlife biologist, and one private wetland consultant. All are members of the UWAG group.
Group D	One government wetland specialist, one government hydrologist, and one government wildlife biologist. All are members of the UWAG group.
Group E	One UDOT landscape architect manager and one landscape architect student.

Table 43: Site 2 Group Composition.

	Percent	Category
Group A	64%	III
Group B	64%	III
Group C	55%	III
Group D	78%	II
Group E	67%	II

Table 44: Site 2 Group Percent Total Functional Points and Overall Assessment Category.

Site 2 results show that Groups A, B, and E all arrived at similar Percent Total Functional Points but placed the wetland in the two different Overall Assessment Categories, Category III and Category II. The reason the wetland ratings were separated into two different categories is because 65% is the transition between Category III and Category II. It could be stated that this wetland was scored as a very high Category III for Groups A and B and a low Category II for Group E. Results from these three groups can all be considered relatively accurate. Groups C and D produced the largest spread between any two groups at all of the sites tested. Group C gave the wetland a 55%, Category III and Group D gave the wetland a 78%, Category II.

It is interesting to note the both Group C and D were comprised of UWAG members, yet the results of testing this site were different. This variability can be attributed to the fact that Group D scored questions 15d. UT Natural Heritage Program Species Habitat and 15e. General Wildlife Habitat considerably higher than the other UWAG group.

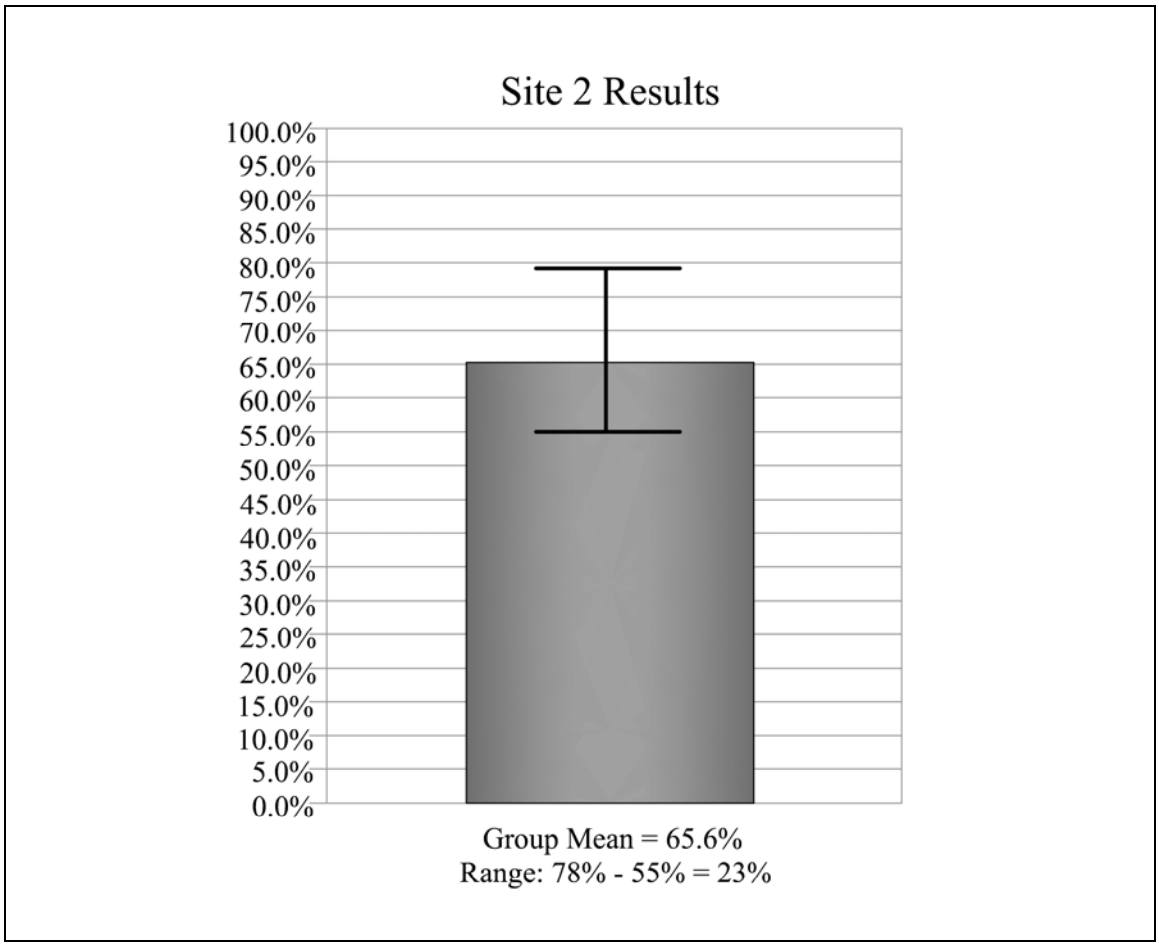

Figure 10: Site 2 Results

Figure 10 shows the mean and the range for Total Functional Assessment points for Site 2.

Site 3: Plover Playa in Tooele County, a mineral flat wetland.

Site 3 was tested by three groups. Table 45 illustrates how many groups participated at the wetland site and the composition of each. Table 46 shows group results as Percent Total Functional Points and the Overall Assessment Category assigned.

Group A	Two UDOT landscape architects.
Group B	One UDOT landscape architect and one landscape architect student.
Group C	Two hydrologists and a civil engineer from a private consulting firm.

Table 45: Site 3 Group Composition.

	Percent	Category
Group A	72%	I
Group B	69%	I
Group C	71%	I

Table 46: Site 3 Group Percent Total Functional Points and Overall Assessment Category.

Site 3 results show that Groups A, B, and C all arrived at similar Percent Total Functional Points and placed the wetland in the same Overall Assessment Category, Category I. These results reflect a relative accurate assessment of the site. Strictly looking at the Percent Total Functional Points given, the site would be categorized as a Category II. However, all three groups scored question 15b. Plant Community Composition a perfect 1.0, thus superceding the Percent Total Functional Points, making it a Category II.

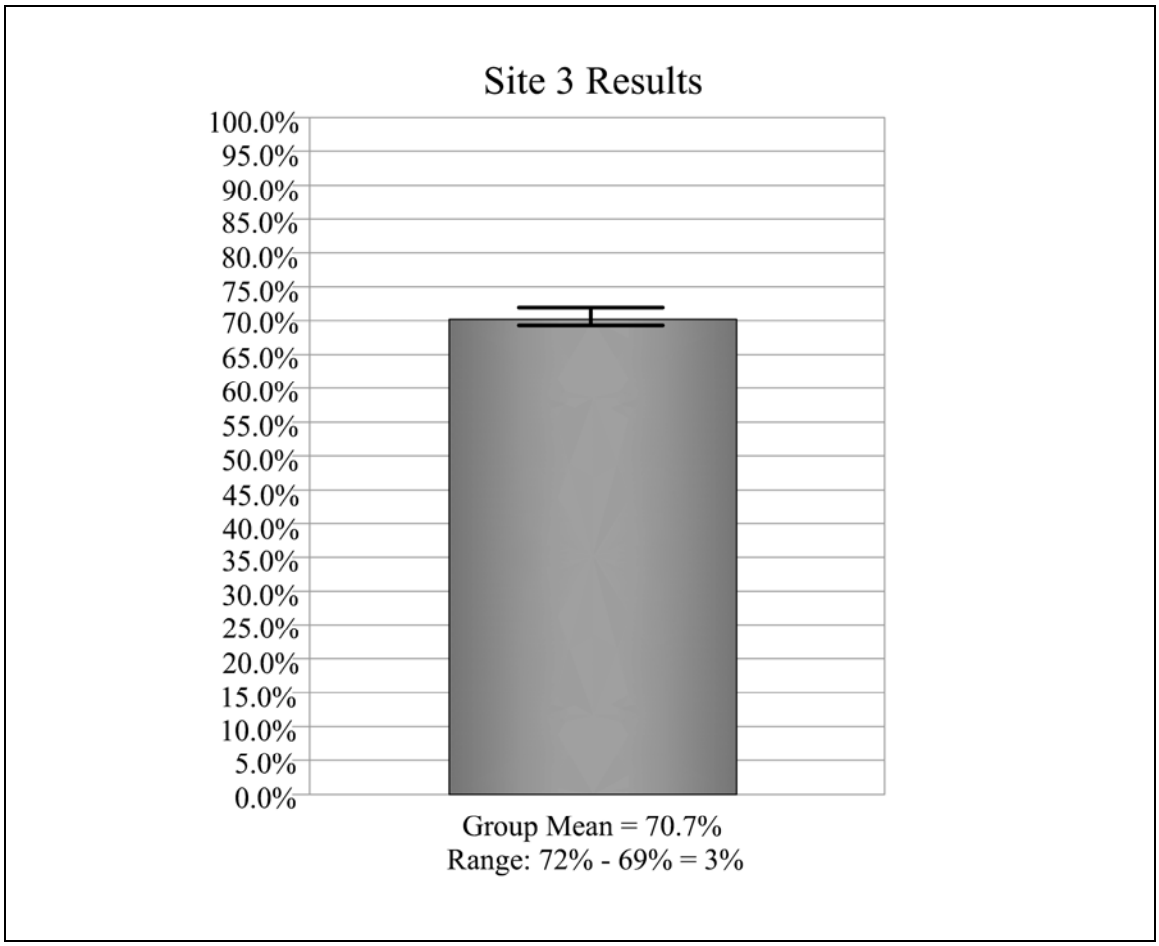

Figure 11: Site 3 Results

Figure 11 shows the mean and the range for Total Functional Assessment points for Site 3.

Site 4: Jordan River at 3900 South, a riverine wetland.

Site 4 was tested by one group. Table 47 illustrates that one group participated at this wetland site and its composition. Table 48 shows the group result as Percent Total Functional Points and the Overall Assessment Category assigned.

Group A	Three UDOT landscape architects, one UDOT landscape architect manager, and one landscape architect student.

Table 47: Site 4 Group Composition.

	Percent	Category
Group A	28%	IV

Table 48: Site 4 Group Percent Total Functional Points and Overall Assessment Category.

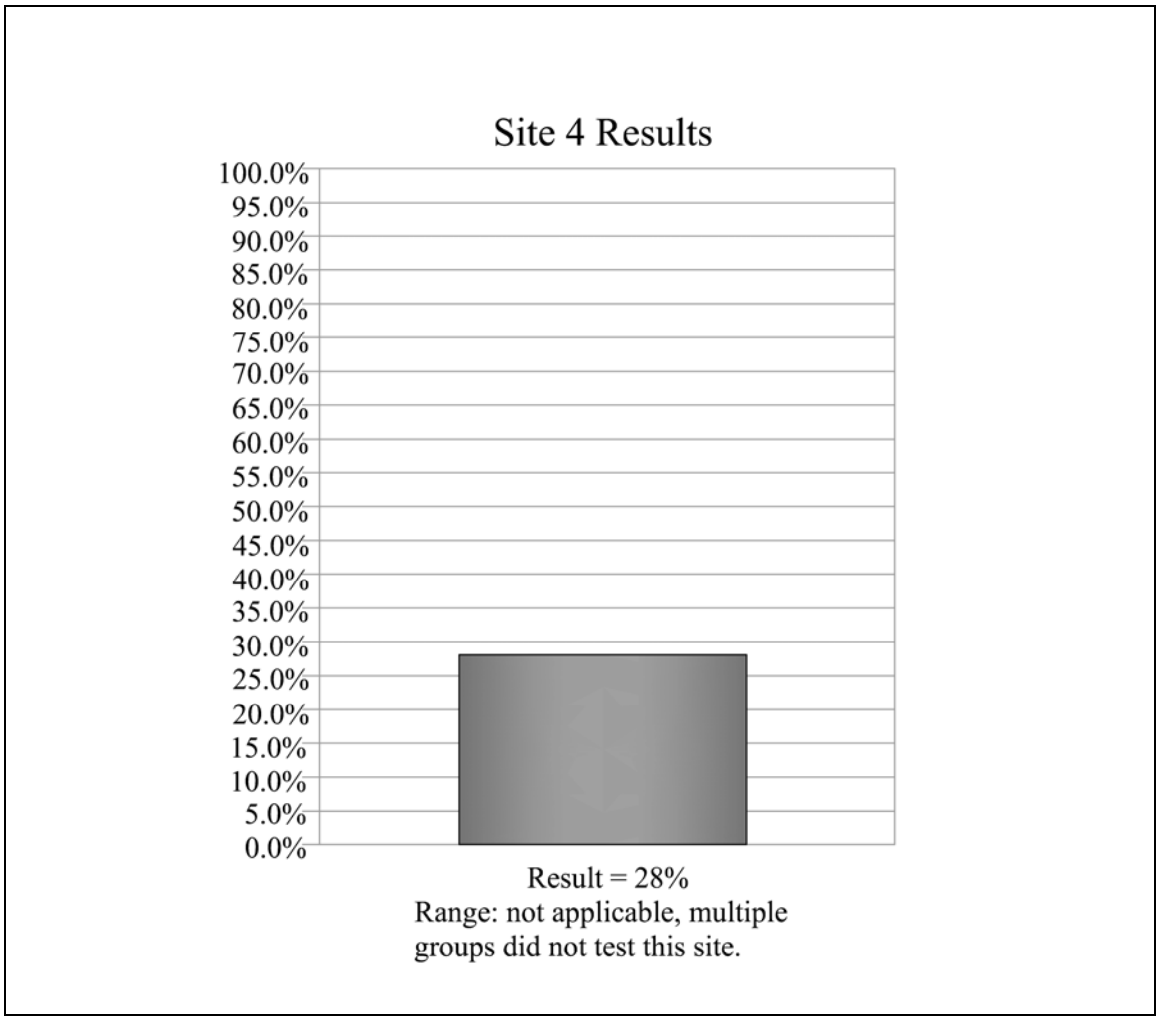

Figure 12: Site 4 Results

It is unfortunate that only one group was able to evaluate Site 4. The final result has been reported but no analysis can be done as to whether or not the results achieved are relatively accurate.

UDOT vs. UWAG Results

In Johnson, Groshart, and Grossl (2001), it is reported that teams of professionals from various disciplines were more successful in design and implementing mitigation wetlands that met the Army Corps of Engineers success criteria after five years than wetlands designed and implemented by individuals within a single discipline. It is reasonable to assume that an interdisciplinary team would also produce a more accurate result of wetland functional assessment than assessments done by a single discipline. Because of this, it may be assumed that results produced be the UWAG groups will be relatively more accurate then results produced by the groups comprising of only UDOT landscape architects.

Site 1: Skypark, at 2600 South Redwood Road Woods Cross, Utah, a slope wetland.

At Site 1 all groups produced very similar results. Comparing results produced by UDOT groups (Groups A and B) with results produced by UWAG groups (Groups C and D), the most similar results were achieved by the two UWAG groups.

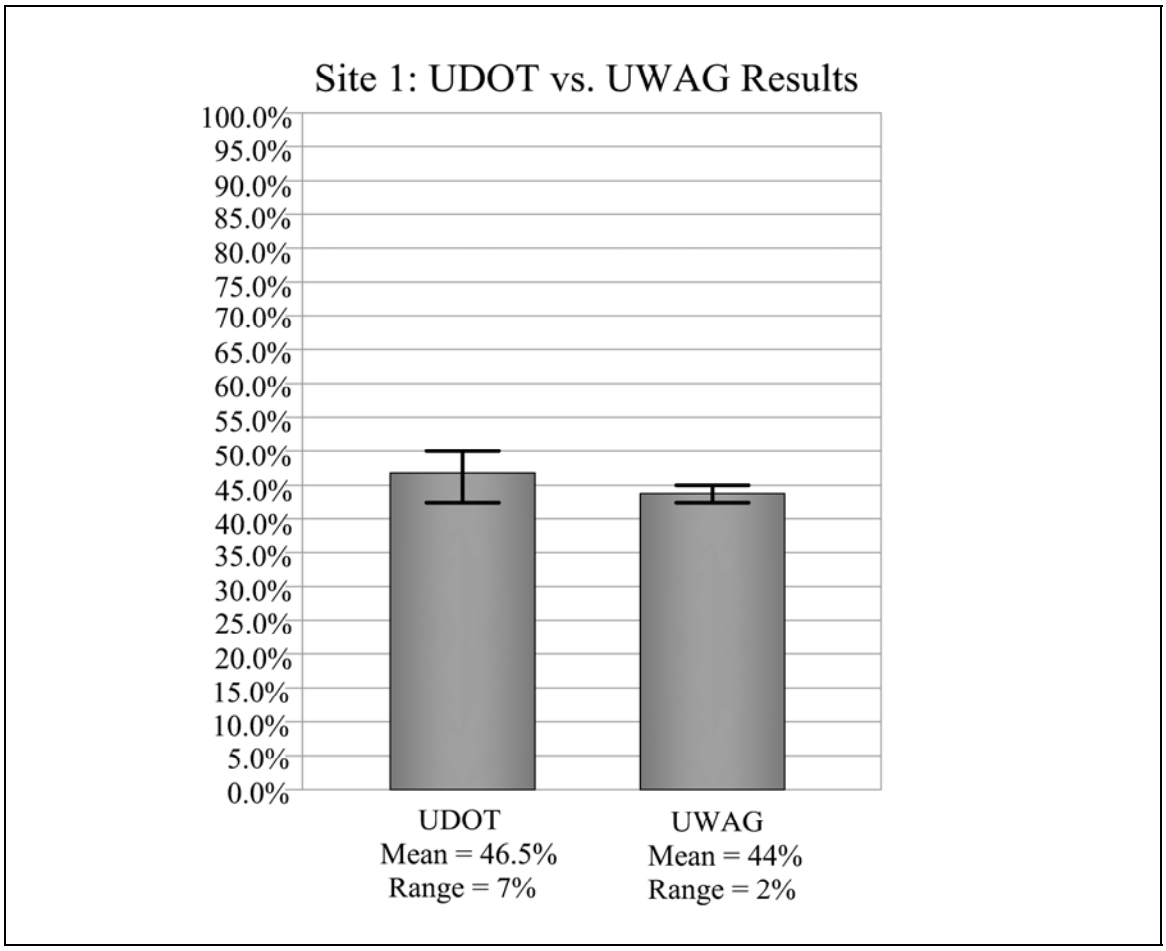

Figure 13: Site 1 UDOT vs. UWAG Results

Figure 13 shows the mean and range for UDOT groups and the mean and range for UWAG groups at Site 1.

Site 2: Bountiful Pond, a slope wetland.

At Site 2 more variability between results were produced than at Site 1. The two UDOT groups (Groups A and B) had less variability then the two UWAG groups (Group C and D).

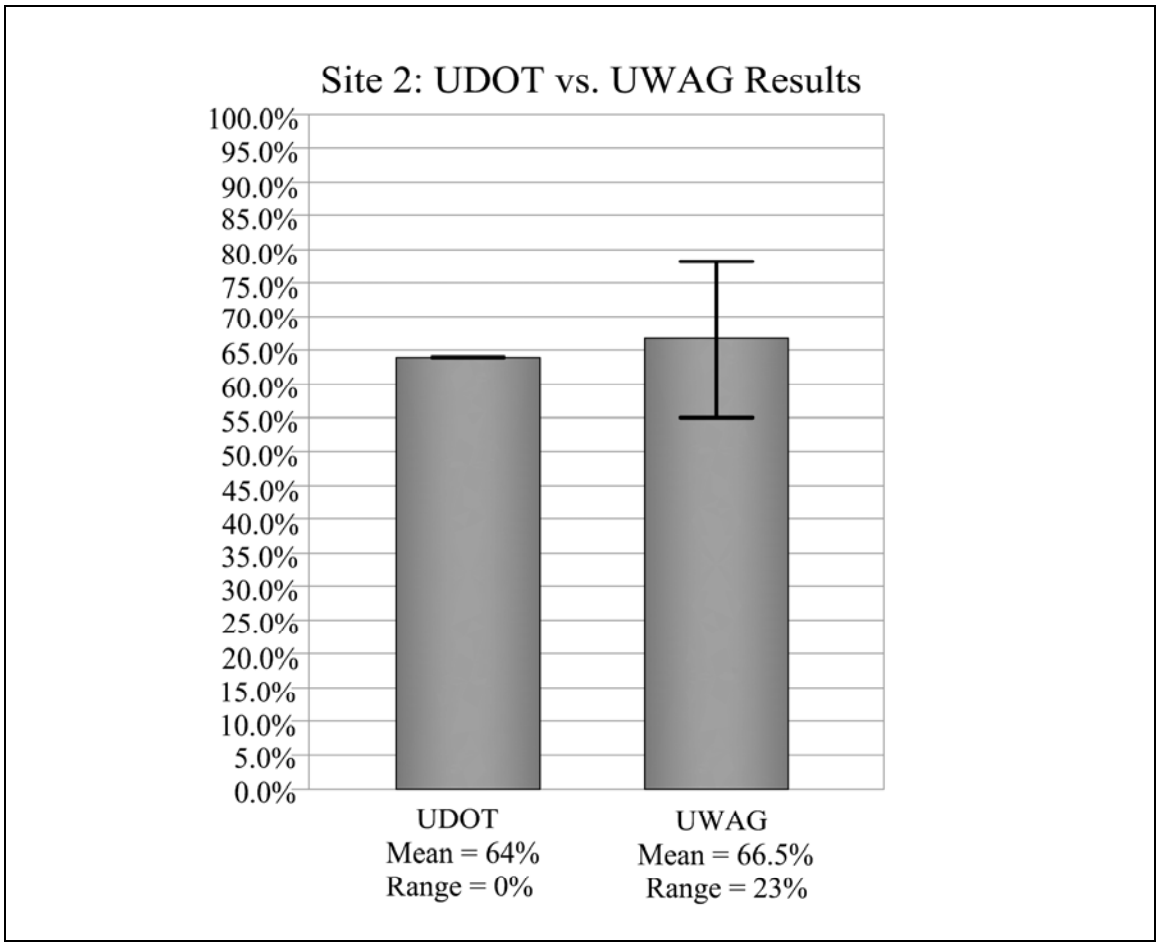

Figure 14: Site 2: UDOT vs. UWAG Results

Figure 14 shows the mean and range for UDOT groups and the mean and range for UWAG groups at Site 2. As previously discussed, this variability can be attributed to the fact that UWAG Group D scored questions 15d. UT Natural Heritage Program Species Habitat and 15e. General Wildlife Habitat considerably higher than the other UWAG group.

The UDOT WFAM was intended to be used by various professionals from natural resources, design, and engineering backgrounds. The creators were aware of inadequacies that some professionals might face when answering some of the questions. That is the reason that it is required that a wildlife biologist be consulted when answering questions 15c., 15d., and 15e.

Results from this study show that UDOT landscape architects (the professional group who does wetland functional assessment for the agency) using the UDOT WFAM achieved functional ratings and categorizations very similar to those achieved by the UWAG interdisciplinary groups. These finding are encouraging and should help alleviate some regulatory agency concerns about consistency and accuracy. They should also answer some of UDOT's concerns about usability. However, this was conducted with a relatively small sample with few replications and should not be seen as a reason to ignore the recommendation in Johnson, Groshart, and Grossl (2001) that UDOT should assemble interdisciplinary teams to conduct wetland related work.

COMPARISONS WITH OTHER ASSESSMENT METHODS

Along with the UDOT WFAM, three other methods were tested at Site 1 and Site 2. These methods were the California Rapid Assessment Method (CRAM), [Florida] Wetland Rapid Assessment Procedure ([F]WRAP), and the Rapid Assessment (RA).

The CRAM was developed in 2004 to help with wetland monitoring and assessment in California. Each function being tested is graded with a letter A, B, C, or D. This is the only method that was tested that uses letters instead of numbers. To aid in the comparison process, numeric values were assigned to each of the letters as follows: A=95%, B=85%, C=75%, and D=65%. Each letter grade remains independent.

The [F]WRAP was developed in the late 1990's to provide a standardized rating index for wetlands throughout the South Florida Water Management District. This method only evaluates six functions. Each is scored between 0 and 3, with 0.5 increments. Each of the six scores is summed and then divided by the total possible maximum score. The final rating is between 0 and 1.

The RA was first developed in 2003 and has undergone many revisions as the author has continued to gather additional field data. This method evaluates a wetland's functional capacity loss, as opposed to its ability to perform a particular function. It specifically evaluates the capacity loss of four functions. These four scores remain independent. A summary of each method can be found in Appendix A and all test results are reported in Appendix D.

It is difficult to make comparisons between methods because each method asks different questions and prescribes different protocols on how to derive an answer. Some of the methods evaluate wetland functions that other methods do not consider.

To compare results for all four methods at Site 1 and Site 2, results have been categorized into four broad wetland functions; they are: plant community, wildlife, hydrology, and water contaminants. Some results have been modified (an average has been used for the UDOT WFAM, the CRAM results have been converted from letters to numbers, and RA results have been subtracted from 1.00 to show actual capacity, instead of capacity loss) in the manner in which they would normally be displayed. This has helped to determine the degree of similarity in general characterization of wetland functional condition. Table 49 and Table 50 have not been made to determine if one method is better or more accurate then another. They are to show how each method rated wetland functionality at the same site.

Site 1: Skypark, at 2600 South Redwood Road Woods Cross, Utah, a slope wetland.

	WFAM	CRAM	[F]WRAP	RA
Plant Community	0.56	0.74	0.33	0.31
Wildlife	0.24	NA	0.33	0.56
Hydrology	0.80	0.65	0.67	0.77
Water Contaminants	0.74	0.85	0.5	0.83

Table 49: Site 1 Comparison Results between Methods Tested.

Site 2: Bountiful Pond, a slope wetland.

	WFAM	CRAM	[F]WRAP	RA
Plant Community	0.60	0.68	0.67	0.50
Wildlife	0.74	NA	0.67	0.61
Hydrology	0.86	0.65	0.33	0.49
Water Contaminants	0.94	0.95	0.37	0.95

Table 50: Site 2 Comparison Results between Methods Tested.

Results show that the UDOT WFAM produced results very similar to at least one of the other methods, in all categories at both sites. At Site 1 the UDOT WFAM reported the highest score by 0.03 points for hydrology and the lowest score by 0.09 points for wildlife. The other two scores reported for Site 1 were not the highest or the lowest in the remaining categories. At Site 2, the UDOT WFAM reported the highest score for wildlife and hydrology by 0.07 and 0.21 respectively. The other two scores reported for Site 2 were not the highest or the lowest in the remaining categories.

These results suggest that the UDOT WFAM tends to score wetland hydrology functions slightly higher then the other methods tested in this study. Although the UDOT WFAM scored the wildlife category the lowest at Site 1 and the highest at Site 2, results do not show a propensity towards scoring the wildlife category too high or too low in comparison to the other methods. Finally, the results show that 7 out of 8 times the UDOT WFAM scored these wetland categories either higher or in the middle in comparison to the other wetland functional assessment methods tested.

CONCLUSION

Through this study, the UDOT WFAM was tested in the field at four different sites by different groups of evaluators. All results have been reported and an analysis was done where appropriate. Overall, the method proved to be consistent, usable and relatively accurate. Inadequacies discovered have been addressed and appropriate modifications to the method have occurred.

Four general conclusions about the method can be made from this study.

1. Requiring a consultation with a wildlife biologist for questions 15c. Listed/Proposed T&E Species Habitat, 15d. UT Natural Heritage Program Species Habitat, and 15e. General Wildlife Habitat is necessary. This requirement allows the experts in this field of study to respond. Even if wildlife biologists differ in their opinions with regards to a particular site, the responses are more reliable than non-experts trying to decide how best to respond.
2. The need for training, pre-site research, and good field investigation while on site became apparent during this study. Field evaluators must be adequately trained on the method they will use in the field and carry out research on or at a particular site before conducting field investigation work. Then on site evaluators must take the time necessary to thoroughly understand what is occurring within and around the wetland to best achieve the most accurate results possible.
3. All results from this study were produced by groups. No site was evaluated by one individual. Concluding that all wetland functional assessments should be conducted by groups, rather then an individual would not be an accurate

conclusion. No individual results were produced to compare to group results. This was not a part of this study. However, the value of having multiple individuals, with different but applicable professional backgrounds work together in groups was easy to recognize in the field. The team approach specifically helped in plant identification and to better understand site hydrology. This conclusion supports the Johnson, Groshart, and Grossl (2001) recommendation that UDOT employ an interdisciplinary team to conduct wetland assessment and prepare mitigation plans.

The results of this study helped to enhance the UDOT WFAM and the method is now considered ready for use in the field. However, all results from future field use should be recorded and evaluated to help determine if future revisions to the method are needed. This will ensure continued consistency, usability, and relative accuracy and will help to accommodate new wetland scientific research data.

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APPENDIX A

SUMMARY OF
WETLAND FUNCTIONAL ASSESSMENT METHODS TESTED

California Rapid Assessment Method (CRAM)

Developed:
Joshua N. Collins, Ph.D., San Francisco Estuary Project
Eric Stein, Dr. Env., Southern California Coastal Water Research Project
Martha Sutula, Ph.D., Southern California Coastal Water Research Project

Funded:
U.S. Environmental Protection Agency, State Wetland Development Grants

Date:
2004

Purpose:

> "To provide a rapid, scientifically defensible, and repeatable assessment methodology that can be used routinely in wetland monitoring and assessment programs. CRAM should be applicable to wetlands and streams throughout the state of California. The general framework of CRAM should be consistent across wetland types and regions, yet allow for customization to address special characteristics of different regions and wetland classes."

This method specifically identifies six different wetland classifications found in California. They include: riverine, depressional, seeps and springs, lacustrine, costal lagoon, and estuarine. Each of these classifications are recognized within the scoring matrices and address specific attributes that may or may not be present in all wetland types.

Functions and Values Evaluated:

Landscape Context	Connectivity % of AA with buffer Avg. Buffer Width Buffer Condition
Hydrology	Source of Water Hydroperiod Hydrologic Connectivity/Upland Connection
Abiotic Structure	Abiotic Patch Richness Topographic Complexity

Biotic Structure	Organic Matter Accumulation
	Biotic Patch Richness
	Vertical Biotic Structure
	Interspersion and Zonation
	Percent Invasive Plant Species
	Native Plant Species Richness

Each of these factors is given a rating A, B, C, or D. An A rating represents near pristine or optimal conditions where as a D rating represents something that is severely impaired or not functioning.

Stressor Index	Hydrology
	Abiotic Structure
	Biotic Structure
	Adjacent Land Use

The stressor index gives a numeric value to the four broad categories listed above. These categories are rated on a scale of 0-10 with 0 representing the absence of stressors and 10 representing the maximum amount of stressors possible.

All letter and numeric scores remain separate.

[Florida] Wetland Rapid Assessment Procedure ([F]WRAP)

Developed:
Raymond E. Miller Jr., Senior Environmental Analyst
Boyd E. Gunsalus, Staff Environmental Analyst
Natural Resource Management Division, Regulation Department, South Florida Water Management District.

Funded:
Natural Resource Management Division, Regulation Department, South Florida Water Management District.

Date:
September 1997 with updates in 1999

Purpose:

To establish a standardized rating index to evaluate wetland sites that have been enhanced, preserved, or restored throughout the South Florida Water Management District. This procedure is to aid regulators and those who work with wetlands to determine successful permit compliance (Miller and Gunsalus 1999).

Functions and Values Evaluated:

Wildlife Utilization
Wetland Overstory/Shrub Canopy
Wetland Vegetative Ground Cover
Adjacent Upland Support/Wetland Buffer
Field Indicators of Wetland Hydrology
Water Quality Input and Treatment Systems

Each of the six functions and values evaluated is scored, summed, and then divided by the total possible maximum score for each variable. Scores can range from 0 to 3 with .5 increments between. The final score will be a number between zero and one.

Rapid Assessment (RA)

Developed:
Nancy Keate, PhD

Funded:
U.S. Environmental Protection Agency, Region 8, Wetland Protection Grants Program
May 2001-2003

Date:
Revised 12- 2003, Revised 04-2004, 06-2004, 08-2004, 02-2005, 07-2005

Purpose:

To develop a rapid wetland functional assessment protocol based on reference sites that are pristine or considered to be pristine.

Functions and Values Evaluated:
Hydrologic Functional Capacity Lost (HFC)

Hydrologic modifications
Runoff from adjacent land uses

Geochemical Functional Capacity Lost (GFC)

Dissolved load from land uses adjacent to the wetland
Point source impacts on water quality

Connectivity Functional Capacity Lost (CFC)

Habitat quality adjacent to the wetland
Habitat fragmentation

Vegetation Integrity Lost (VIL)

After deriving answers for each of these losses, the evaluator then multiplies each number by the total acreage of the wetland being evaluated to get the Functional Capacity Uunits Lost. This unit is how all scores remain. Scores for the four major functions are not combined.

It is important to note that this method evaluates a wetland's functional loss, as opposed to its ability or remaining ability to function.

Utah Department of Transportation Wetland Functional Assessment Method (UDOT WFAM)

Developed:
Craig Johnson, Professor, Utah State University, Department of Landscape Architecture and Environmental Planning.

Funded:
Utah Department of Transportation 2003-2006

Date:
2003 - 2005

Purpose:
To provide UDOT with a science-based, economical, and repeatable rapid wetland functional assessment method that specifically addresses Utah wetland classifications (Johnson 2005).

Functions and Values Evaluated:
Functions
- Biological
  - Level of disturbance
  - Plant community composition
  - Federally listed or proposed Threatened or Endangered Plants or Animals or Plants or Animals rated S1 by the Utah Natural Heritage Program
  - Plants or animals rated S2, or S3 by the Utah Natural Heritage Program
  - General wildlife species
  - General fish/aquatic Species
  - Amphibians
- Hydrological
  - Flood attenuation
  - Short and long-term water storage
  - Sediment/nutrient/toxicant retention and removal
  - Sediment/shoreline stabilization

Values
- Visual quality
- Recreation/education

Evaluators use matrices to scores each of the functions. Scores range from 0 to 1. All scores are calculated, added, and then divided by the total functional points possible. Results are shown as a percentage. This percentage, along with individual functional scores, allows evaluators to place the wetland in one of five categories. Values are not scored; they only assist in better understanding the site and possible social implications.

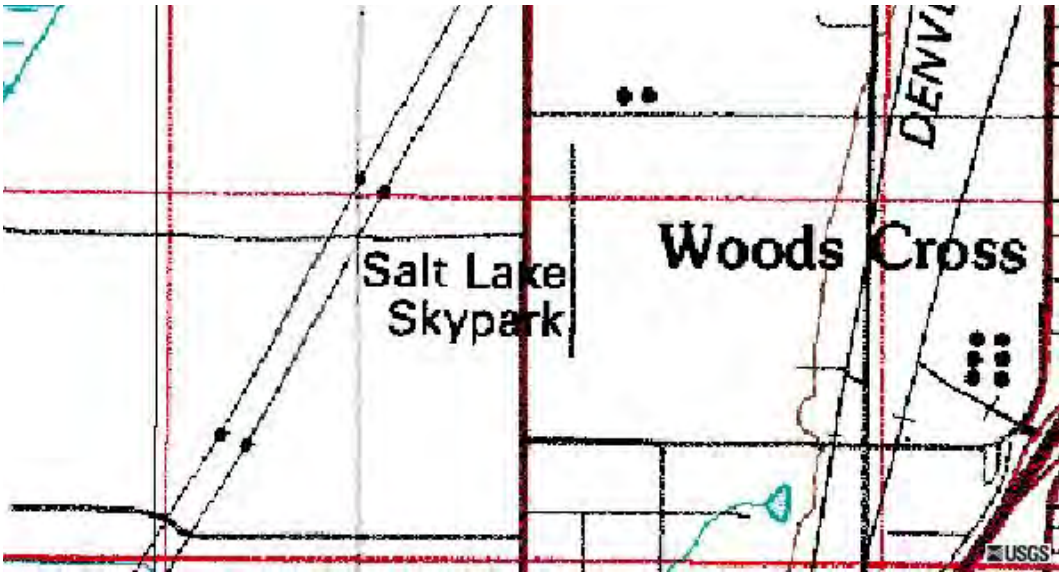
APPENDIX B

FIELD TEST SITES

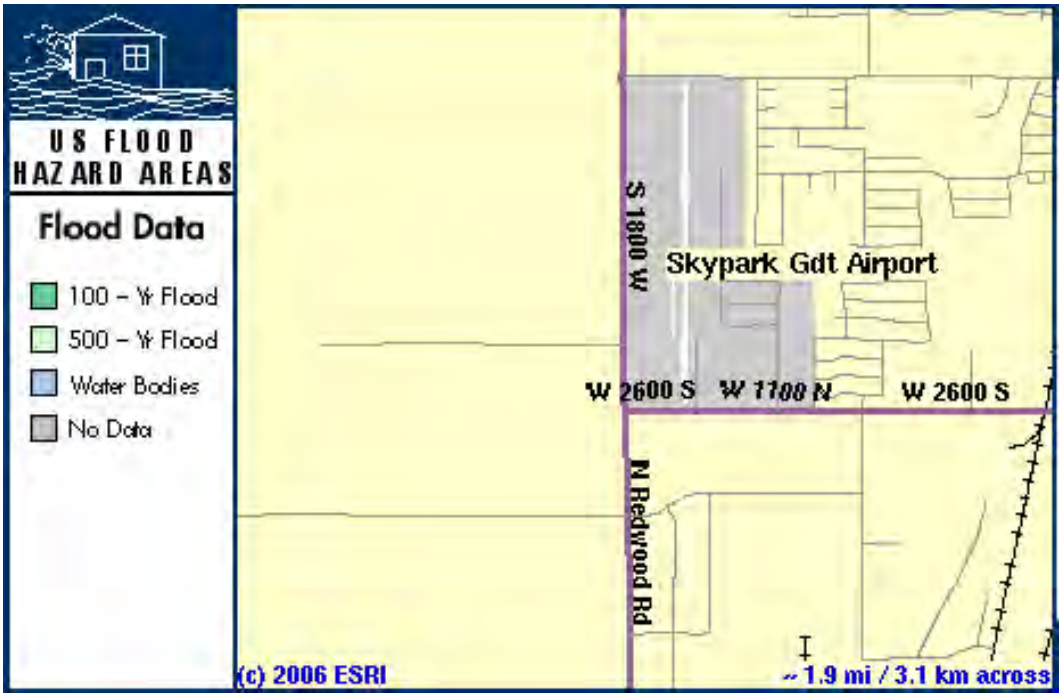
Site 1: Skypark, at 2600 South Redwood Road Woods Cross, Utah, a slope wetland.

Site Description: This parcel of land is located on the corner of 2600 South and Redwood Road in Woods Cross, Utah. Evaluators at the site investigated the property and determined that historically, the predominant source of water was shallow groundwater and a natural spring near the eastern boundary of the site. Extensive ditching has occurred along the South and West edges of the property that have appeared to significantly lower the water table. Despite this, standing water was present during all site visits.

2 km SW of Woods Cross, Utah, United States 10/4/1997.
USGS Map provided online through Microsoft TerraServer Imagery.
Available at: http://terraserver-usa.com.



2 km SW of Woods Cross, Utah, United States 7/1/1980.
USGS Map provided online through Microsoft TerraServer Imagery.
Available at: http://terraserver-usa.com.

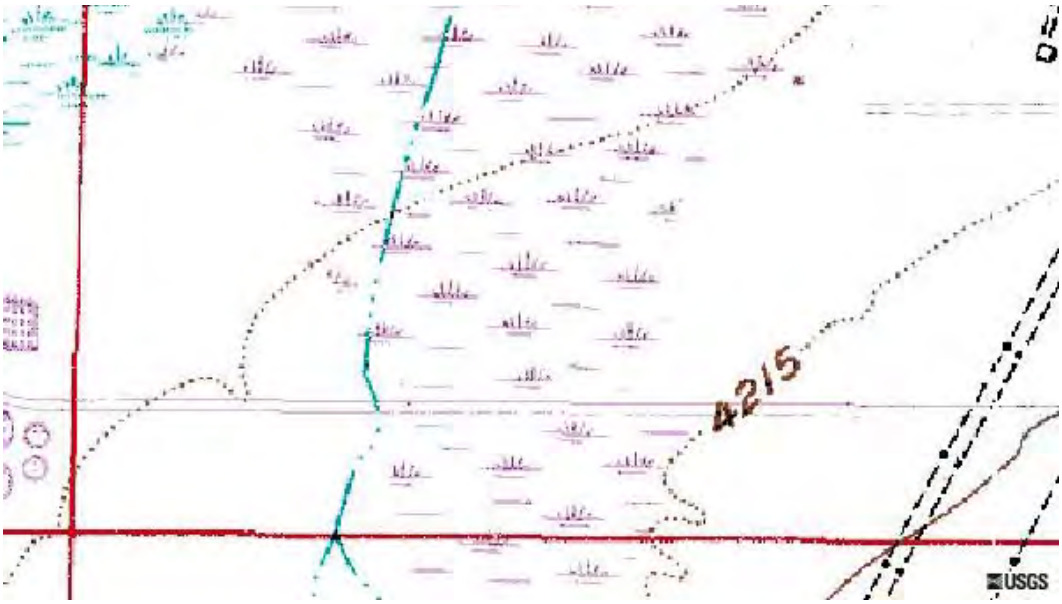


Map provided online through ESRI/FEMA Project Impact Hazard Site.
Available at: http://www.esri.com/hazards/makemap.html.

Site 2: Bountiful Pond, a slope wetland.

Site Description: This site is located west of Bountiful, Utah near the Bountiful Pond. Evaluators at the site investigated the property and determined that shallow groundwater and surface flows move in a northwesterly direction towards the Bountiful Pond and the Great Salt Lake. The road near the bottom of in the aerial photograph has greatly limited the water reaching the site. Extensive ditching has occurred along the South side of the road and the West edge of the property this also influences site hydrology. Despite this, evidence of recent standing water was present along with abundant wetland vegetation.

Bountiful, Utah, United States 10/4/1997.
USGS Map provided online through Microsoft TerraServer Imagery.
Available at: http://terraserver-usa.com.

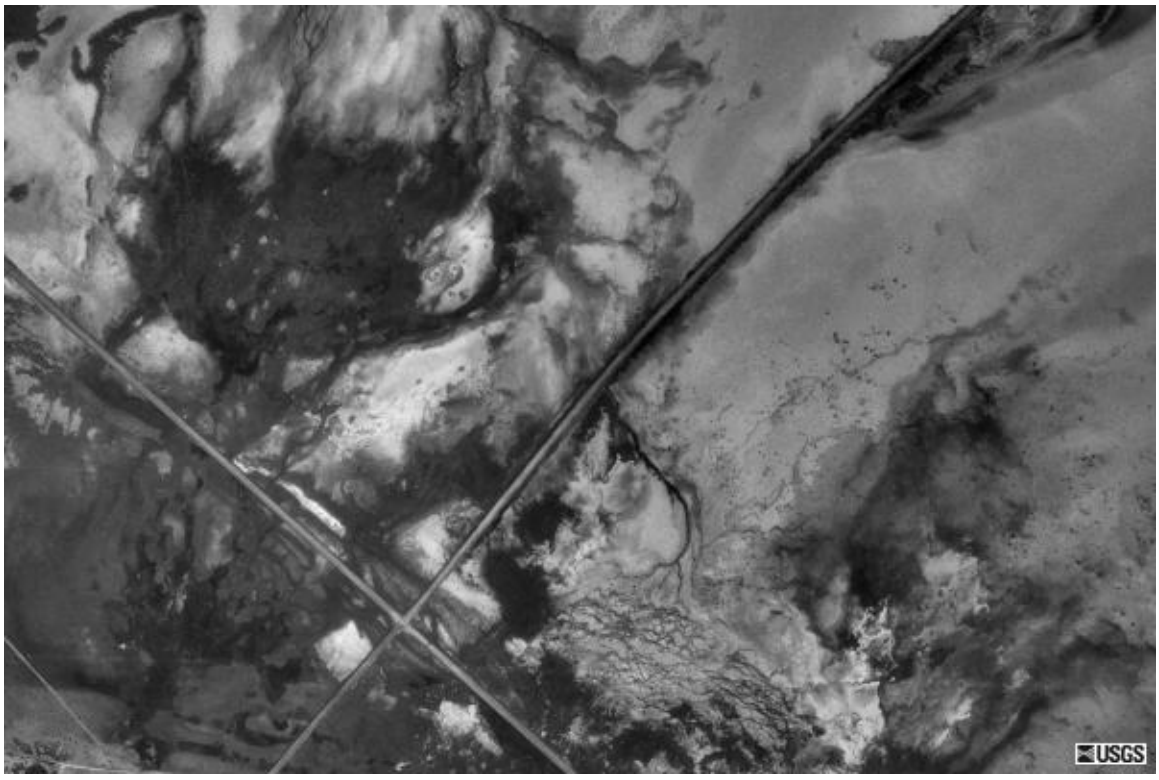


Bountiful, Utah, United States 7/1/1975.
USGS Map provided online through Microsoft TerraServer Imagery.
Available at: http://terraserver-usa.com.

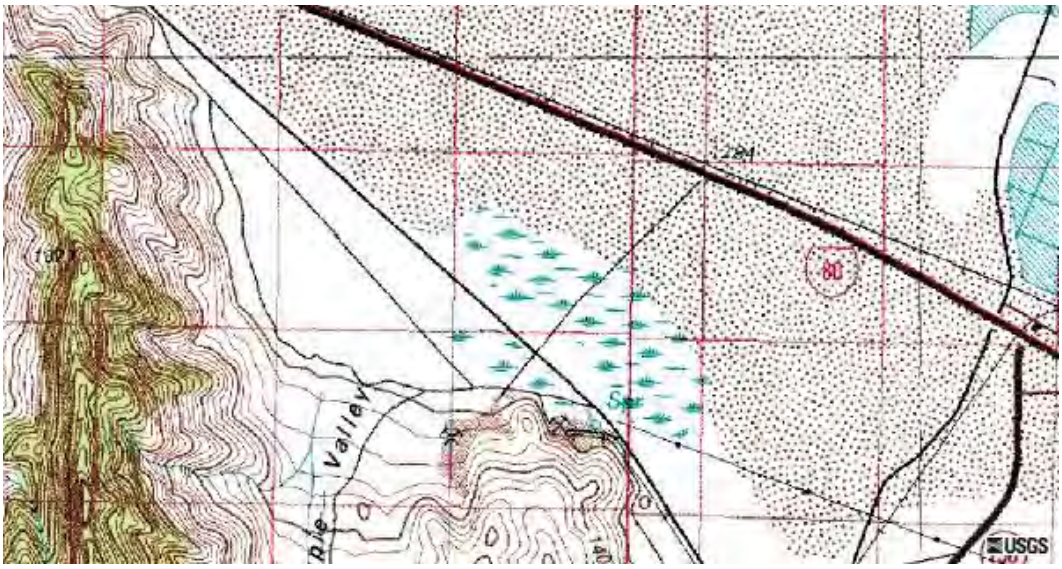
Map provided online through ESRI/FEMA Project Impact Hazard Site.
Available at: http://www.esri.com/hazards/makemap.html.

Site 3: Plover Playa in Tooele County, a mineral flat wetland.

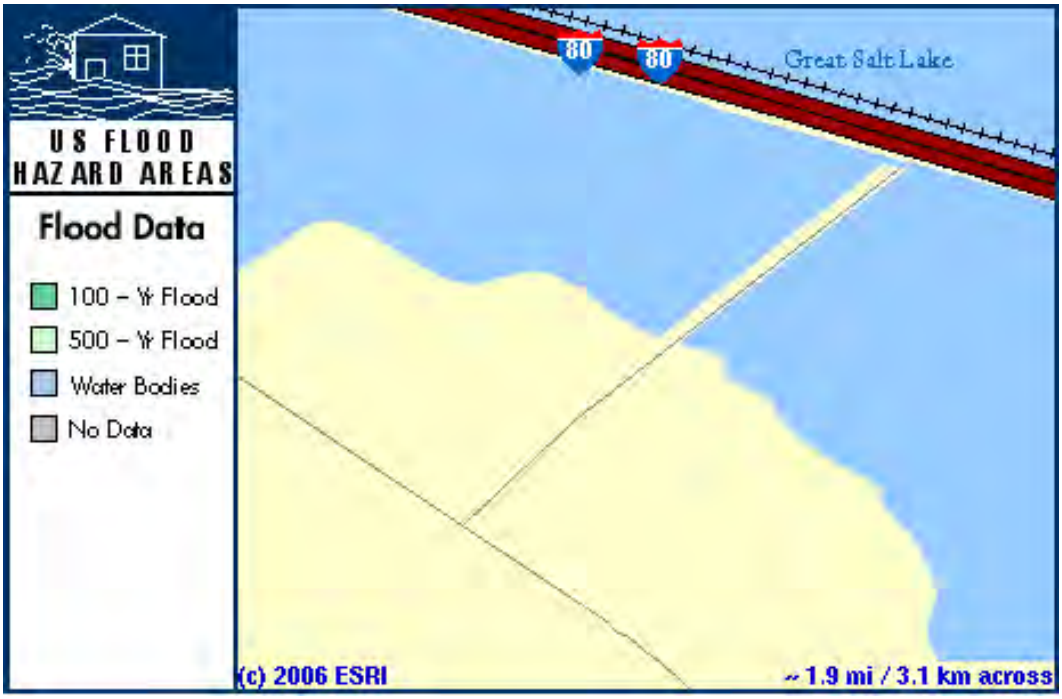
Site Description: This site is located west of Salt Lake City in Tooele County, Utah. It is a large mineral flat complex associated with the Great Salt Lake. Evaluators at the site investigated the property and determined that shallow groundwater and surface flows move in a northerly direction towards Great Salt Lake. The road bisecting the site is a gravel road that has been built on 8 to 12 feet of fill material. This has restricted the flow of water in the wetland, creating deeper flows in some areas and limiting them in others. Standing water was present at each site visit and abundant wetland vegetation tolerant to alkaline soils was also present.



58 km W of Salt Lake City, Utah, United States 8/29/1999.
USGS Map provided online through Microsoft TerraServer Imagery.
Available at: http://terraserver-usa.com.



58 km W of Salt Lake City, Utah, United States 7/1/1985.
USGS Map provided online through Microsoft TerraServer Imagery.
Available at: http://terraserver-usa.com.

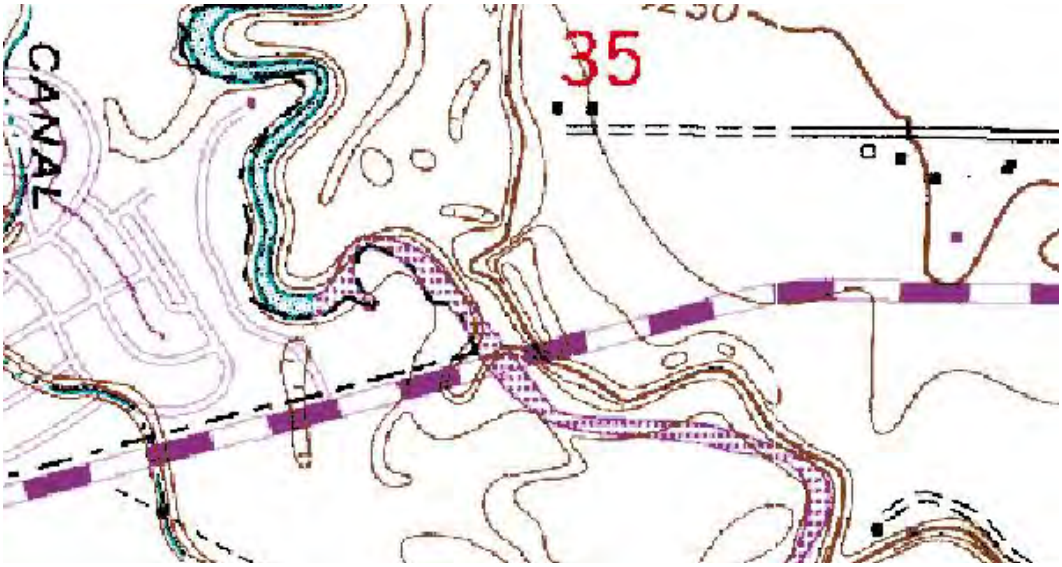


Map provided online through ESRI/FEMA Project Impact Hazard Site.
Available at: http://www.esri.com/hazards/makemap.html.

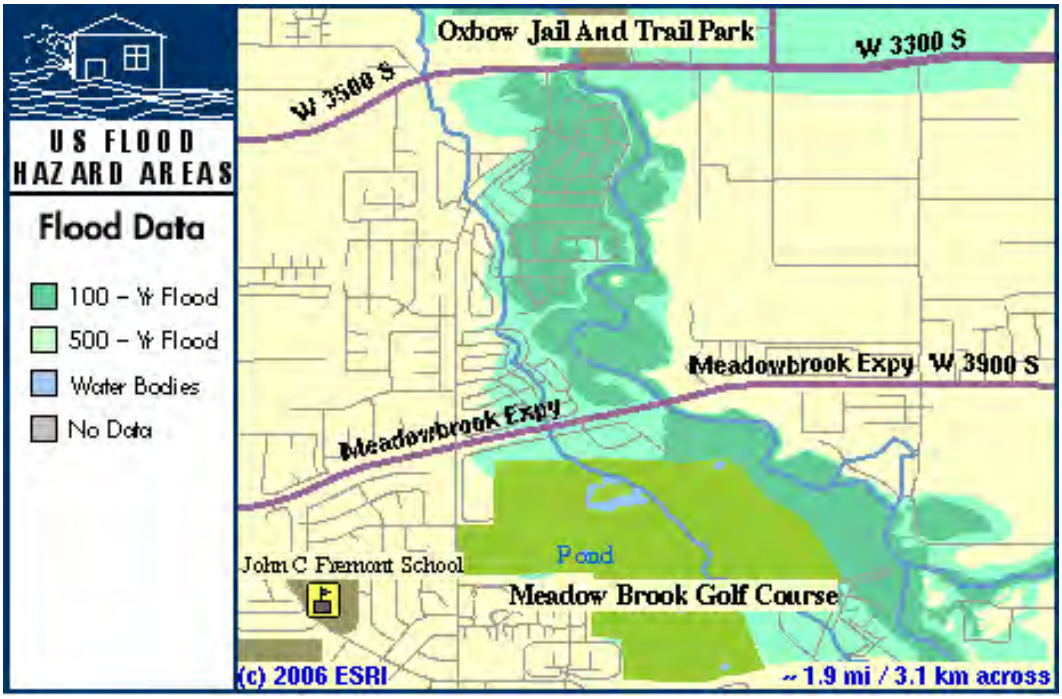
Site 4: Jordan River at 3900 South, a riverine wetland.

Site Description: This site is located Taylorsville, Utah at the Jordan River and 3900 South. Evaluators at the site investigated the property and determined that the river is deeply incised near the bridge and narrow wet edges are all that remain on some portions of the site. Old floodplains no longer exist near the bridge or access to them with over-bank flows are no longer possible due to the depth of the channel in which the river flows. A long narrow island is present in the river at this site. It was estimated that it has been unaltered by river flows for several years due to the abundant wetland vegetation, including small woody shrubs present.

Taylorsville, Utah, United States 9/18/2003.
USGS Map provided online through Microsoft TerraServer Imagery.
Available at: http://terraserver-usa.com.



Taylorsville, Utah, United States 7/1/1975.
USGS Map provided online through Microsoft TerraServer Imagery.
Available at: http://terraserver-usa.com.



Map provided online through ESRI/FEMA Project Impact Hazard Site.
Available at: http://www.esri.com/hazards/makemap.html.

APPENDIX C

FIELD TEST NOTES

May 31, 2005
UWAG Field Test Day

1. Would be helpful to number form pages, just in case they get out of order in the field.
2. Identify useful map and aerial photograph websites.
3. Number 13, wetland classification definitions need to be better defined. Specifically when dealing with the difference between a slope, depression and mineral flat. We need to come up with a universally accepted definition for a playa and determine where it belongs. Cross section illustrations may help to show some of the different classifications. How much of an elevation change is needed in order to consider an area a closed contour?
4. Number 15a, specifically identify the source for using 1200 feet as the distance for the EAA.
5. 15b, give examples of a reasonable number of transects/points for sized of wetlands. Example: Small wetland 2 transects with 20 points.
6. Appendix F, footer is wrong and numbering is off!
7. 15b, discuss and give room for evaluators to draw where plant transects were established.
8. Remove the word "critical" from numbers 15c and 15d.
9. Number 15e, add a sentence or two expanding the assessment area to include at least the EAA and in some case may need to be expanded beyond the 1200 ft. The example was of a nesting Bald Eagle and that it requires a 1 mile buffer around it.
10. May want to consider adding a question similar to 15g for migratory bird species and award points if highly sensitive species frequent the site. Partners in Flight website could be a good resource.
11. Field evaluators need to do their homework about the potential wildlife in the AA and surrounding area, than approach the regional wildlife biologist. The concern is that the regional biologist will not have time to respond to the UDOT project as a top priority.
12. Terry Johnson should keep a list of wildlife biologist contacts that each region should contact when conducting an evaluation.
13. Number 15a, it may be wise to consider the differences between temporary disturbances and permanent or long term disturbances. Example: grazing, cultivation and logging can be considered temporary disturbances while roads, buildings and other permanent features are long term disturbances. If temporary disturbances were to be eliminated, the wetland in theory would improve and or be enhanced.
14. State specifically on each question what geographic area is being evaluated, the AA or the EAA.
15. Numbers 15i and 15j in a round about way are asking the same question. Potentially these could be combined but not reducing the point value.
16. Number 15j, it may not be important as to the levels of input but as to whether or not the wetland is able to hold the water long enough for the sediments, toxicants and or nutrients to settle out.
17. Numbers 15i and 15j are really about the hydrology and what is going on with it. It appears that vegetation and topography are two good indicators of these things.

18. Number 16, visually who cares who owns it, remove 16i. Evaluators questioned the differences between urban and rural wetlands. Evaluator's judgment, even after reading the definitions, was highly subjective at best.
19. Evaluators expressed concern with the subjectivity in knowing whether or not one AA or multiple exist for a site. It is clear that you have two AA's if you have a riverine and a depression but what if you have two slope wetlands that have different hydrology sources and vegetation.
20. Method perhaps is a little heavy on wildlife. Testers want to know how a wetland would score if it's pristine site but doesn't have any wildlife.
21. Relying primarily on a regional biologist potentially could be difficult; every square inch of the State is not mapped and some data that is available isn't current.
22. Numbers 15c and 15d could be combined and weighting the outcome less would be important. Currently, the two questions are weighted at .9 each. Perhaps the two together should be weighted at 1.0, instead of the present 1.8.
23. Number 15i, not enough point spread. Your answer really doesn't matter!
24. Hydrology is a key component when evaluating wetland functions. Evaluators must be familiar with hydrology and understand how it works and relates to the big picture. More questions should be asked to require evaluators to do a more in depth analysis of site hydrology. These additional questions don't need to be assigned a value and point system but require simple mapping and field study of the site.
25. Require sketching of site hydrology and vegetation. Use aerial photography and topographic maps to aid in this step.
26. Number 15b, remove the word ratio, should be a percentage.

June 8, 2005 and June 9, 2005
UDOT Landscape Architects Field Test Days

1. Include county lines and major roads on ecoregion and watershed maps
2. Appendix B should be changed to feet, not miles.
3. Number 12, remove the words "habitat for"
4. Number 15b, change ratio to percentage.
5. Number 15c, call UDWR not, USFWS
6. Number 15j, update
7. Number 16iii, will this question ever get a "no" response?
8. Number 15a, disturbance question must be more descriptive.
9. Number 15b, When working with your plant transect, native upland plants should count against your percentage. Example: 6 natives, 4 non-natives = 60%; if one of the natives is classified as an upland species, 6 natives, 4 non natives minus the native upland plant = 50%.
10. Why 1200 feet? For riverine system this is too long or not necessary.
11. Riverine systems are handled differently within UDOT. This method was designed to address those riverine systems that are classified as jurisdictional wetland, not just the "wet edge".

September 7, 2005
Comment received from a private consulting firm that participated at Site 3: Plover Playa in Tooele County, a mineral flat wetland.

1. In the category section gray out lines that are not applicable.

September 26, 2005
Comments produced by the principal investigator of the project.

1. 1200 feet requirement below and above the AA will be changed to 600 feet. All 1200 feet requirements will be changed to 600 feet. Sedimentation and toxicants drop out of systems within the 600 feet. Look at Susan Buffler's thesis. 1200 feet was more for wildlife, however, in linear transportation projects where disturbance has likely already occurred 600 feet is adequate.
2. 15a. Change the wording under "conditions within the AA". Exclude items that would never be found and add the word trails the matrix. Remove the physical elements.
3. 15b.iii. Not all AA's will allow the evaluator to conduct the step point transect. For example, heavily wooded areas along a riverine corridor, small size of the AA, or broken up fragments of small wetland pieces, wetland vegetation is submerged in deep, mucky water. In these instances or others where it is not possible to conduct the prescribed step point transect the evaluator should use their best professional judgment and visually assess the vegetation.
4. 15b. ii. This question needs to clearly state that this is a visual assessment, just as the literature states in the beginning of this manual.
5. 15b. iii. The word "ratio" needs to be changed to percentage and an example should be included in the literature. For example: number of natives divided by points sampled should give the evaluator the correct percentage. 30 native species divided by 55 sample points = 55%.
6. 15b. iii. If multiple hits are gathered at one point. Each of those hits should count as a sample point. For example, at the first point only a herbaceous layer was found, that species is recorded and is one point. The next sample point has an herbaceous layer and a tree canopy. This point should record two hits and count as two points sampled.
7. 15b. iii. Water of a river or lake should not be included when estimating percent cover.
8. 11. AA need to exclude the river or lake. Open water in a wetland is fine, but if the open water was not delineated as jurisdictional wetland then that area should not be included in the AA. Literature in the manual needs to be updated. It needs to reflect this change as well as the AutoCAD drawing in the appendix.
9. An acceptable list of native and non native plants needs to be used by evaluators. For example, is typha native or not? Nancy's info in the appendices could help. (need to look into it)
10. 15b. iii. Terry's comment about a plant found in the transect that is not an OBL, FACW or FAC+ should not count as a native needs to be incorporated.
11. 15f. Include in matrix additional room for the minus .1 if carp present.

12. 15h. Change the wording of the first box in the matrix from "Within the floodplain of the AA, estimate % ground coverage with high surface roughness" to "Within the AA (part of the floodplain), estimate % ground coverage with high surface roughness".
13. 15i. Second box in matrix needs to be revised from "Has the wetlands' natural ability to store water been disturbed?" to "Has the wetlands' natural ability to store water been disturbed negatively?"
14. Hydrological/Biophysical Assessment. Addition explanation about the need to walk the entire site, map it, and truly understand what is happening with the hydrology needs to be included. If an evaluator doesn't understand the hydrology of the site it would be difficult to answer questions accurately in this portion of the assessment. The evaluator should map the "micro" watershed that is surrounding the wetland.
15. 13. When determining the wetland classification the evaluator must be familiar with the site (i.e.-already walked and mapped the site). It is clear that choosing the right wetland classification can be unclear. The thought is to add the salinity measurement to determine if a sight is a mineral flat or not. In other words, high salinity would become an indicator that the site is a mineral flat as opposed to a slope. The difference between a slope and a depression must be determined after the site has been studied and any other contiguous wetlands. Depressions on a site that continue beyond the project boundary really may be a part of a larger slope complex.
16. 15j. Change question in the third box down in the matrix from asking about water storage to asking about soils.
17. 15f. In second matrix 3M needs to be changed to 3L.
18. The overall assessment area category on the last page of the form needs to be edited very carefully. There some confusing and unclear statements.

January 12, 2006
Comments received from a private consulting firm that did not participate in field testing.

1. Need to focus on efficiency and ease of use.
2. Need to complete a thorough technical edit.
3. Consistency and redundancy are problems.
4. Need thorough testing and calibration.
5. Question 15b. Plant Community Composition. This variable must consider vegetative structure to effectively characterize the community. Currently the only way to get a low rating for this function is to have less than 60% cover. A site with cover this low is close to not meeting the definition of a wetland. Subsequently, many degraded wetlands with relatively poorly developed plant communities will be rated too high.

Also why is there such a concern about invasive species? Some invasive are a problem, but others are naturalized and provide good cover and forage. Examples of non-native species that do not pose a real problem and that are listed in the method are *Agrostis stonlonifera, Bromus inermis, Poa pratensis*, etc. The functional rating of a wetland should not be decreased due to the presence of plants like these.

6. Supporting technical data (14) and Values (16 and 17). There is no point in collecting/recording these data if they are not considered in the decision matrices or in the ratings.
7. Wetland classification (13) – the "Utah System" only considers the position in the landscape. The Cowardin System may be a better choice because it considers the position in the landscape and the dominant vegetation communities.
8. Technical Appendices – These need to contain the same amount and kind of information for each wetland type. The riverine appendix is very weak and inadequate for 15b. Also, what is the point of all the background data (especially for slope wetlands)? It is not reference and only adds confusion to the method.
9. Data Sheets - Why include non-applicable information when the data sheets have been created to be specific to each type? Isn't that the point of having five separate sheets?
10. Short and Long Term Surface Water Storage (15i) – Why doesn't this function apply to riverine sites. If riverine includes wetlands on floodplains (according to your classification system), then this function should be included. Although the primary water source for these wetlands may be overbank flooding, they regularly receive water from precipitation (sheet flow), groundwater discharge, and other sources.
11. Level of Disturbance (15a) – What about including or mentioning more contemporary land uses like landscaping, urban recreation areas, mining, pipeline right of ways, etc.
12. Assessment Area (11) – the EAA is confusing. This should be the standard for the AA to properly assess functions – buffers must be considered.
13. General Wildlife (15e) – How to choose a final rating.

APPENDIX D

FIELD TEST RESULTS

Site 1: Skypark, at 2600 South Redwood Road Woods Cross, Utah, a slope wetland.
Method: California Rapid Assessment Method

Functions	Letter Score	Descriptor
Landscape Context		
Connectivity	C	At least some portion of one other area of aquatic resources exists within a 500 m zone surrounding the wetland being assessed, with no intervening barriers to wildlife movement.
% of AA with buffer	C	Buffer is 25-50% of AA perimeter.
Avg. Buffer Width	D	Average buffer width of AA is <30 m (model assumes that functions of a buffer do not increase significantly beyond an avg width of 100m. A "D" is the worst score, whereas an "A" is the best with an avg buffer width of >100 m).
Buffer Condition	C	Buffer for AA is characterized by a prevalence of invasive plants and either moderate or extensive soil disruption, moderate or greater amounts of trash or refuse, and moderate intensity of human visitation or recreation.
Hydrology		
Source of Water	B	Dry-season freshwater source is primarily natural; but AA receives occasional or small amounts of inflow from anthropogenic sources, such as urban runoff, agriculture, or publicly owned treatment works
Hydroperiod	D	The filling or inundation patterns in the AA are of substantially lower magnitude or duration than would be expected under natural conditions (or compared to comparable natural wetlands), but thereafter, the AA is subject to natural draw down or drying.
Hydrologic Connectivity/Upland Connection	N/A	Only considered for riverine, estuarine, or lagoon wetlands & adjacent uplands
Abiotic Structure		
Abiotic Patch Richness	A/B	A: >15% (Score for a slope/seep wetlands), B: 44-85% (Score for a depressional wetland); Score is obtained by determining how many physical patch types exist on site. This number is then divided by the expected patch type for the wetland class.
Topographic Complexity	C	AA has a single, uniform slope or elevation. However, that slope, or elevation, has a variety of physical patch types.
Biotic Structure		
Organic Matter Accumulation	C	The AA is characterized by occasional small amounts of coarse organic debris, such as leaf litter or thatch, with only traces of fine debris, and with little evidence of organic matter recruitment.
Biotic Patch Richness	D	<53%; Score is obtained by 1) determining size of AA and therefore appropriate patch size. For Site 1, the AA>100m^2, and therefore the minimum patch size is 3m^2. Compare number of patches within Site 1 for the number expected in a seep/spring/wet meadow class. Five patches exist at Site 1 (Diatom, Groundcover herbs/forbs, medium emergent monocot beds, short emergent monocot beds, tall herbs/forbs/ferns) of 15 possible = 33%.
Vertical Structure	C+	C: >= 25-50% of the AA supports 3 height classes, or >= 50-75% supports 2 height classes; 50% of Site 1 has 3 height classes represented: tall (loosestrife), medium (scirpus), and short (herb layer).

Interspersion/Zonation	B	Wetland has a moderate degree of plan-view interspersion; Score is obtained by 1)Assessing from a plan view perspective the degree of interspersion (the number of plant zones and how they are dispersed across the landscape).
Percent Invasive Plant Species	D	>25%; Score is obtained by assessing the similarity b/w the dominant species composition of the plant community and what is expected based on regional botanical surveys and historical resources. Specifically, we determined that Site 1 had 6 co-dominant species and 4 invasive co-dominants for the short herbs stratum. 4/6 = 67%. Within the tall herb stratum, we found 3 co-dominant species, two of which were invasive species. 2/3 = 67%. Averaged across all strata, the co-dominants express 67% invasive species.
Native Plant Species Richness	C	3-4 (this number represents the sum of native co-dominants across all strata present).
Stressor Index		
Hydrology	3	Non-point discharge (horses), artesian well (dewatering effect), and groundwater extraction
Abiotic Structure	3	Fill of sediment or soils (large fill area), Vegetation management (horses), trash or refuse (bricks at north end).
Biotic Structure	1	Mowing and excessive grazing within AA
Adjacent Land Use	4	Industrial/commercial, military training/air traffic, transportation corridor, rangeland

Site 2: Bountiful Pond, a slope wetland.
Method: California Rapid Assessment Method

Functions	Letter Score	Descriptor
Landscape Context		
Connectivity	B	At least some portion of two areas of aquatic resources exists within a 500-m zone surrounding the wetland being assessed, with no intervening barriers to wildlife movement.
% of AA with buffer	A	Buffer is >75-100% of AA perimeter
Avg. Buffer Width	B	Average buffer width of AA is >60-99 m (model assumes that functions of a buffer do not increase significantly beyond an avg width of 100m). A "D" is the worst score, whereas an "A" is the best with an avg buffer width of >=100 m.
Buffer Condition	B	Buffer for AA is characterized by moderate cover of native vegetation, moderate cover of invasive plants, intact or moderately disrupted soils, moderate or lesser amounts of trash or refuse, and minor intensity of human visitation or recreation.
Hydrology		
Source of Water	A	Dry-season freshwater source for AA is precipitation, groundwater, and/or natural runoff, or an adjacent freshwater body, with no indications of artificial water sources
Hydroperiod	D	The filling or inundation patterns in the AA are of substantially lower magnitude or duration than would be expected under natural conditions (or compared to comparable natural wetlands), but thereafter, the AA is subject to natural drawdown or drying.
Hydrologic Connectivity/Upland Connection	NA	Only considered for riverine, estuarine, or lagoon wetlands & adjacent uplands
Abiotic Structure		
Abiotic Patch Richness	A/C	A: >15% (Score for a slope/seep wetlands), C: 33-44% (Score for a depressional wetland); Score is obtained by determining how many physical patch types exist on site. This number is then divided by the expected patch type for the wetland class.
Topographic Complexity	D	AA has a single, uniform slope or elevation, with few physical patch types.
Biotic Structure		
Organic Matter Accumulation	D	The AA contains essentially no significant amounts of coarse plant debris, and only scant amounts of fine debris.
Biotic Patch Richness	D	<53%; Score is obtained by 1) determining size of AA and therefore appropriate patch size. For Site 2, the AA>100m^2, and therefore the minimum patch size is 3m^2. Compare number of patches within Site 2 for the number expected in a seep/spring/wetmdw. class. One patch type exists at Site 2 (short emergent monocot beds) of 15 possible = 7%.
Vertical Structure	D	D: <25% of the AA supports 3 height classes, or < 50% supports 2 height classes; The entire AA at site 2 supports one height class.

Interspersion/Zonation	C	Wetland has a low degree of plan-view interspersion; Score is obtained by 1) Assessing from a plan view perspective the degree of interspersion (the number of plant zones and how they are dispersed across the landscape).
Percent Invasive Plant Species	C	16-25%; Score is obtained by assessing the similarity b/w the dominant species composition of the plant community and what is expected based on regional botanical surveys and historical resources. Specifically, we determined that Site 2 had 4 co-dominant species and 1 invasive co-dominant for the short herbs stratum. 1/4 = 25%. Averaged across all strata, the co-dominants express 25% invasive species.
Native Plant Species Richness	D	<3 (this number represents the sum of native co-dominants across all strata present).
Stressor Index		
Hydrology	3	Non-point source (farm drainage), dike/levee (road), drainage ditch
Abiotic Structure	0	None
Biotic Structure	0	None
Adjacent Land Use	3	Transportation corridor, rangeland, passive recreation (hiking to the north at Bountiful pond)

Site 1: Skypark, at 2600 South Redwood Road Woods Cross, Utah, a slope wetland.
Method: [Florida] Wetland Rapid Assessment Procedure

Functions	Score	Descriptor
Wildlife Utilization	1 ÷ 3 = 0.33	Existing wetland exhibits minimal evidence of wildlife utilization. Observed one lone mallard drake, killdeer pair, kestrel, goose scat
Wetland Overstory/Shrub Canopy	NA	Only vegetation layer is herbaceous
Wetland Vegetative Ground Cover	1 ÷ 3 = 0.33	Minimal desirable vegetative ground cover is present
Adjacent Upland Support/Wetland Buffer	0 ÷ 3 = 0.00	No buffer exists for any part of the site
Field Indicators of Wetland Hydrology	2 ÷ 3 = 0.67	Hydrologic regime adequate to maintain a viable wetland system. External features may affect wetland hydrology
Water Quality Input and Treatment Systems	1.5 ÷ 3 = 0.50	
Total:	1.83 ÷ 5 = 0.366	

Site 2: Bountiful Pond, a slope wetland.
Method: [Florida] Wetland Rapid Assessment Procedure

Functions	Score	Descriptor
Wildlife Utilization	2 ÷ 3 = 0.67	Existing wetland exhibits moderate evidence of wildlife utilization
Wetland Overstory/Shrub Canopy	NA	No canopy cover or shrub layer
Wetland Vegetative Ground Cover	2 ÷ 3 = 0.67	Moderate amount of desirable vegetative ground cover is present
Adjacent Upland Support/Wetland Buffer	1.75 ÷ 3 = 0.58	75% of site scored a 2 and 25% of site scored a 1
Field Indicators of Wetland Hydrology	1 ÷ 3 = 0.33	Hydrologic regime inadequate to maintain a viable wetland system. External features may affect wetland hydrology
Water Quality Input and Treatment Systems	1.125 ÷ 3 = 0.375	
Total:	2.62 ÷ 5 = 0.524	

Site 1: Skypark, at 2600 South Redwood Road Woods Cross, Utah, a slope wetland.
Method: Rapid Assessment

Functions	Functional Capacity Lost	Wetland Acreage	Functional Capacity Units Lost
Hydrologic Functional Capacity Lost (HFC)	0.23	2.5	0.23 x 2.5 = 0.575
Geochemical Functional Capacity Lost (GFC)	0.17	2.5	0.17 x 2.5 = 0.425
Connectivity Functional Capacity Lost (CFC)	0.44	2.5	0.44 x 2.5 = 1.1
Vegetation Integrity Lost (VIL)	0.69	2.5	0.69 x 2.5 = 1.725
Total Functional Capacity Units Lost			3.825

Site 2: Bountiful Pond, a slope wetland.
Method: Rapid Assessment

Functions	Functional Capacity Lost	Wetland Acreage	Functional Capacity Units Lost
Hydrologic Functional Capacity Lost (HFC)	0.51	0.5	0.51 x 0.5 = 0.255
Geochemical Functional Capacity Lost (GFC)	0.054	0.5	0.054 x 0.5 = 0.027
Connectivity Functional Capacity Lost (CFC)	0.39	0.5	0.39 x 0.5 = 0.195
Vegetation Integrity Lost (VIL)	0.5	0.5	0.5 x 0.5 = 0.25
Total Functional Capacity Units Lost			0.727

Site 1: Skypark, at 2600 South Redwood Road Woods Cross, Utah, a slope wetland.
Method: Utah Department of Transportation-Wetland Functional Assessment Method
Group A: One UDOT environmental manager and one UDOT landscape architect.

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition	M	0.6	1	0.6 x 2.5 acres = 1.5
15c. Listed/Proposed T&E Species Habitat	L	0.3	.9	0.3 x 2.5 = 0.75
15d. UT Natural Heritage Program Species Habitat	L	0.1	.9	0.1 x 2.5 = 0.25
15e. General Wildlife Habitat	L	0.2	1	0.2 x 2.5 = 0.5
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat Rating		NA	0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage	H	0.8	1	0.8 x 2.5 = 2.0
15j. Sediment/Nutrient/Toxicant Removal	M	0.5	1	0.5 x 2.5 = 1.25
15k. Sediment/Shoreline Stabilization			1	
Totals:		2.5	5.8	6.25 Functional Units

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

43%	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

_X_ Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Site 1: Skypark, at 2600 South Redwood Road Woods Cross, Utah, a slope wetland.
Method: Utah Department of Transportation-Wetland Functional Assessment Method
Group B: Three UDOT landscape architects.

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition	M	0.6	1	0.6 x 2.5 acres = 1.5
15c. Listed/Proposed T&E Species Habitat	L	0.3	.9	0.3 x 2.5 = 0.75
15d. UT Natural Heritage Program Species Habitat	L	0.1	.9	0.1 x 2.5 = 0.25
15e. General Wildlife Habitat	L	0.2	1	0.2 x 2.5 = 0.5
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat Rating		NA	0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage	H	0.8	1	0.8 x 2.5 = 2.0
15j. Sediment/Nutrient/Toxicant Removal	H	0.9	1	0.9 x 2.5 = 2.25
15k. Sediment/Shoreline Stabilization			1	
Totals:		2.9	5.8	7.25 Functional Units

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

50%	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

_X_ Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Site 1: Skypark, at 2600 South Redwood Road Woods Cross, Utah, a slope wetland.
Method: Utah Department of Transportation-Wetland Functional Assessment Method
Group C: One government wetland specialist, one government wildlife biologist, and one private wetland consultant. All are members of the UWAG group.

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition	M	0.6	1	0.6 x 2.5 acres = 1.5
15c. Listed/Proposed T&E Species Habitat	L	0.0	.9	0.0 x 2.5 = 0.0
15d. UT Natural Heritage Program Species Habitat	L	0.1	.9	0.1 x 2.5 = 0.25
15e. General Wildlife Habitat	L	0.2	1	0.2 x 2.5 = 0.5
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat Rating		NA	0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage	H	0.8	1	0.8 x 2.5 = 2.0
15j. Sediment/Nutrient/Toxicant Removal	H	0.9	1	0.9 x 2.5 = 2.25
15k. Sediment/Shoreline Stabilization			1	
Totals:		2.6	5.8	6.5 Functional Units

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

45%	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

_X_ Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Site 1: Skypark, at 2600 South Redwood Road Woods Cross, Utah, a slope wetland.
Method: Utah Department of Transportation-Wetland Functional Assessment Method
Group D: One government wetland specialist, one government hydrologist, and one government wildlife biologist. All are members of the UWAG group.

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition	M	0.4	1	0.4 x 2.5 acres = 1
15c. Listed/Proposed T&E Species Habitat	L	0.0	.9	0.0 x 2.5 = 0.0
15d. UT Natural Heritage Program Species Habitat	L	0.1	.9	0.1 x 2.5 = 0.25
15e. General Wildlife Habitat	L	0.3	1	0.3 x 2.5 = 0.75
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat Rating		NA	0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage	H	0.8	1	0.8 x 2.5 = 2.0
15j. Sediment/Nutrient/Toxicant Removal	H	0.9	1	0.9 x 2.5 = 2.25
15k. Sediment/Shoreline Stabilization			1	
Totals:		2.5	5.8	6.25 Functional Units

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

43%	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

_X_ Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Site 1: Skypark, at 2600 South Redwood Road Woods Cross, Utah, a slope wetland.
Method: Utah Department of Transportation-Wetland Functional Assessment Method
Group E: One UDOT landscape architect manager and one landscape architect student.

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition	M	0.6	1	0.6 x 2.5 acres = 1.5
15c. Listed/Proposed T&E Species Habitat	L	0.3	.9	0.3 x 2.5 = 0.75
15d. UT Natural Heritage Program Species Habitat	L	0.1	.9	0.1 x 2.5 = 0.25
15e. General Wildlife Habitat	L	0.3	1	0.3 x 2.5 = 0.75
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat Rating		NA	0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage	H	0.8	1	0.8 x 2.5 = 2.0
15j. Sediment/Nutrient/Toxicant Removal	M	0.5	1	0.5 x 2.5 = 1.25
15k. Sediment/Shoreline Stabilization			1	
Totals:		2.6	5.8	6.5 Functional Units

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

45%	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

_X_ Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Site 2: Bountiful Pond, a slope wetland.
Method: Utah Department of Transportation-Wetland Functional Assessment Method
Group A: One UDOT environmental manager and one UDOT landscape architect.

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition	M	0.6	1	0.6 x 0.5 acres = 0.3
15c. Listed/Proposed T&E Species Habitat	M	0.5	.9	0.5 x 0.5 = 0.25
15d. UT Natural Heritage Program Species Habitat	L	0.2	.9	0.2 x 0.5 = 0.1
15e. General Wildlife Habitat	M	0.7	1	0.7 x 0.5 = 0.35
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat Rating		NA	0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage	H	0.8	1	0.8 x 0.5 = 0.4
15j. Sediment/Nutrient/Toxicant Removal	H	0.9	1	0.9 x 0.5 = 0.45
15k. Sediment/Shoreline Stabilization			1	
Totals:		3.7	5.8	1.85 Functional Units

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

64%	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

_X_ Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Site 2: Bountiful Pond, a slope wetland.
Method: Utah Department of Transportation-Wetland Functional Assessment Method
Group B: Three UDOT landscape architects.

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition	M	0.6	1	0.6 x 0.5 acres = 0.3
15c. Listed/Proposed T&E Species Habitat	L	0.3	.9	0.3 x 0.5 = 0.15
15d. UT Natural Heritage Program Species Habitat	L	0.1	.9	0.1 x 0.5 = 0.05
15e. General Wildlife Habitat	M	0.7	1	0.7 x 0.5 = 0.35
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat Rating		NA	0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage	H	1.0	1	1 x 0.5 = 0.5
15j. Sediment/Nutrient/Toxicant Removal	H	1.0	1	1 x 0.5 = 0.5
15k. Sediment/Shoreline Stabilization			1	
Totals:		3.7	5.8	1.85 Functional Units

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

64%	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

_X_ Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Site 2: Bountiful Pond, a slope wetland.
Method: Utah Department of Transportation-Wetland Functional Assessment Method
Group C: One government wetland specialist, one government wildlife biologist, and one private wetland consultant. All are members of the UWAG group.

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition	M	0.6	1	0.6 x 0.5 acres = 0.3
15c. Listed/Proposed T&E Species Habitat	L	0.3	.9	0.3 x 0.5 = 0.15
15d. UT Natural Heritage Program Species Habitat	L	0.1	.9	0.1 x 0.5 = 0.05
15e. General Wildlife Habitat	M	0.6	1	0.6 x 0.5 = 0.3
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat Rating		NA	0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage	M	0.7	1	0.7 x 0.5 = 0.35
15j. Sediment/Nutrient/Toxicant Removal	H	0.9	1	0.9 x 0.5 = 0.45
15k. Sediment/Shoreline Stabilization			1	
Totals:		3.2	5.8	1.6 Functional Units

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

55%	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

_X_ Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Site 2: Bountiful Pond, a slope wetland.
Method: Utah Department of Transportation-Wetland Functional Assessment Method
Group D: One government wetland specialist, one government hydrologist, and one government wildlife biologist. All are members of the UWAG group.

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition	M	0.6	1	0.6 x 0.5 acres = 0.3
15c. Listed/Proposed T&E Species Habitat	M	0.5	.9	0.5 x 0.5 = 0.25
15d. UT Natural Heritage Program Species Habitat	M	0.6	.9	0.6 x 0.5 = 0.3
15e. General Wildlife Habitat	H	1.0	1	1 x 0.5 = 0.5
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat Rating		NA	0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage	H	0.9	1	0.9 x 0.5 = 0.45
15j. Sediment/Nutrient/Toxicant Removal	H	0.9	1	0.9 x 0.5 = 0.45
15k. Sediment/Shoreline Stabilization			1	
Totals:		4.5	5.8	2.25 Functional Units

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

78%	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
_X_ Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
_X_ Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

__ Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Site 2: Bountiful Pond, a slope wetland.
Method: Utah Department of Transportation-Wetland Functional Assessment Method
Group E: One UDOT landscape architect manager and one landscape architect student.

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition	M	0.6	1	0.6 x 0.5 acres = 0.3
15c. Listed/Proposed T&E Species Habitat	M	0.5	.9	0.5 x 0.5 = 0.25
15d. UT Natural Heritage Program Species Habitat	L	0.2	.9	0.2 x 0.5 = 0.1
15e. General Wildlife Habitat	M	0.7	1	0.7 x 0.5 = 0.35
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat Rating		NA	0	
			1	
15i. Short and Long Term Surface Water Storage	H	0.9	1	0.9 x 0.5 = 0.45
15j. Sediment/Nutrient/Toxicant Removal	H	1.0	1	1 x 0.5 = 0.5
15k. Sediment/Shoreline Stabilization			1	
Totals:		3.9	5.8	1.95 Functional Units

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

67%	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
_X_ Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

__ Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Site 3: Plover Playa in Tooele County, a mineral flat wetland.
Method: Utah Department of Transportation-Wetland Functional Assessment Method
Group A: Two UDOT landscape architects.

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition	H	1.0	1	1 x 2.5 acres = 2.5
15c. Listed/Proposed T&E Species Habitat	L	0.3	.9	0.3 x 2.5 = 0.75
15d. UT Natural Heritage Program Species Habitat	L	0.1	.9	0.1 x 2.5 = 0.25
15e. General Wildlife Habitat	H	1.0	1	1 x 2.5 = 2.5
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat Rating		NA	0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage	H	1.0	1	1 x 2.5 = 2.5
15j. Sediment/Nutrient/Toxicant Removal	H	0.8	1	0.8 x 2.5 = 2
			1	
Totals:		4.2	5.8	10.5 Functional Units

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

72%	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___ Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
_X_ Score 1 function point for Plant Community Composition; **or**
__ Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

__ Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Site 3: Plover Playa in Tooele County, a mineral flat wetland.
Method: Utah Department of Transportation-Wetland Functional Assessment Method
Group B: One UDOT landscape architect and one landscape architect student.

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition	H	1.0	1	1 x 2.5 acres = 2.5
15c. Listed/Proposed T&E Species Habitat	L	0.3	.9	0.3 x 2.5 = 0.75
15d. UT Natural Heritage Program Species Habitat	L	0.1	.9	0.1 x 2.5 = 0.25
15e. General Wildlife Habitat	H	1.0	1	1 x 2.5 = 2.5
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat Rating		NA	0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage	H	0.8	1	0.8 x 2.5 = 2
15j. Sediment/Nutrient/Toxicant Removal	H	0.8	1	0.8 x 2.5 = 2
15k. Sediment/Shoreline Stabilization			1	
Totals:		4.0	5.8	10 Functional Units

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

69%	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___ Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
_X_ Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

__Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Site 3: Plover Playa in Tooele County, a mineral flat wetland.
Method: Utah Department of Transportation-Wetland Functional Assessment Method
Group C: Two hydrologists and a civil engineer from a private consulting firm.

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition	H	1.0	1	1 x 2.5 acres = 2.5
15c. Listed/Proposed T&E Species Habitat	L	0.3	.9	0.3 x 2.5 = 0.75
15d. UT Natural Heritage Program Species Habitat	L	0.1	.9	0.1 x 2.5 = 0.25
15e. General Wildlife Habitat	H	1.0	1	1 x 2.5 = 2.5
15f. General Fish/Aquatic Habitat			1	
15g. General Amphibian Habitat Rating		NA	0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage	H	0.8	1	0.8 x 2.5 = 2
15j. Sediment/Nutrient/Toxicant Removal	H	0.9	1	0.9 x 2.5 = 2.25
15k. Sediment/Shoreline Stabilization			1	
Totals:		4.1	5.8	10.25 Functional Units

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

71%	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___ Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
_X_ Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

__Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Site 4: Jordan River at 3900 South, a riverine wetland.
Method: Utah Department of Transportation-Wetland Functional Assessment Method
Group A: Three UDOT landscape architects, one UDOT landscape architect manager, and one landscape architect student.

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition	L	0.1	1	0.1 x 0.25 acres = 0.025
15c. Listed/Proposed T&E Species Habitat	L	0.0	.9	0.0 x 0.25 = 0.0
15d. UT Natural Heritage Program Species Habitat	L	0.1	.9	0.1 x 0.25 = 0.025
15e. General Wildlife Habitat	L	0.2	1	0.2 x 0.25 = 0.05
15f. General Fish/Aquatic Habitat	M	0.3	1	0.3 x 0.25 = 0.075
15g. General Amphibian Habitat Rating		NA	0	
15h. Flood Attenuation	M	0.6	1	0.6 x 0.25 = 0.15
15j. Sediment/Nutrient/Toxicant Removal	L	0.3	1	0.3 x 0.25 = 0.075
15k. Sediment/Shoreline Stabilization	M	0.6	1	0.6 x 0.25 = 0.15
Totals:		2.2	7.8	1.95 Functional Units

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

28%	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___ Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
__ Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

__Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
_X_ Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

APPENDIX E

FIELD TEST FORM AND REVISED FORM

UDOT Wetland Assessment Form (Slope)

1. Project Name:

2. Project Number:

3. USCOE Permit Number: **Project Pin Number:**

4. Evaluation Date (MM/DD/YYYY):

5. Evaluating Agency:

6. Evaluator(s):

7. Purpose of Evaluation (check one): ____Wetlands potentially affected by UDOT project
____ Mitigation wetlands, pre-construction
____ Mitigation wetlands, post-construction
____ Other (explain):

8. Wetland/Site Number(s):

9. Wetland Location(s):
Ecoregion (see map Appendix A):_____
Watershed (see map Appendix A):_____
County (see map Appendix A): _____
Legal: T_____N or S; R_____E or W; S_____;T_____N or S; R_____E or W; S_____
Approximate Stationing or Mileposts:_____
_____
GPS Reference Number:_____
Other Location information:

10. Wetland Size (total acres, measured by GPS if applicable):

11. Assessment Area (AA) (total acres, measured by GPS if applicable, see appendix):

12. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals or State Listed S1 Species
It is required that the evaluator contact USFWS with regards to the presence or absence of threatened or endangered (T or E) species and UDWR concerning the presence or absence of a state listed S1, S2 or S3 species. The documented habitat of a federally listed or proposed threatened or endangered plant or animal species or a state listed S1 species results in an automatic Red Flag categorization of the assessed site. Coordination with USFWS and UDWR is required. (However, the evaluation proceeds as normal so that the COE receives an assessment of function and value consistent with the UDOT assessment method.)
Is the AA documented to contain primary habitat for T or E or S-1 species? _____Yes _____No
If yes, list the species:
(This field assesses habitat for species receiving protection under provision of the Endangered Species Act and Utah critically imperiled species.)

13. Selecting a Wetland Classification
Refer to the glossary to determine the correct wetland class. Refer to Appendix E for reference photos and lists of the most common native species in each classification. Turn to appropriate colored pages to continue functional assessment as noted below.
Riverine: Blue
Slope: Pink
Depressional: Yellow
Mineral Flat: Green
Lacustrine Fringe: Purple
Roadside Ditch Wetland: If AA qualifies as a non-jurisdictional 'roadside ditch wetland', AA is classified as Category IV. Further assessment is not necessary, although all documentation must be completed.

***Toned questions or functional categories on the assessment form do not apply to this wetland class, do not answer. They are excluded from the individual function rating as well as the final overall functional assessment rating.**

Slope

Slope wetlands – Occur at points of surface changes, breaks in slope or stratigraphic changes / groundwater is primary water source / water flow is primarily unidirectional- down gradient / water may discharge to stream, lake, depression.

14. Identify subclass

The evaluator uses the information below together with information in Appendix D to identify the AA subclass. This information is not used directly to rate the AA.

Identify the soil type (circle): organic or mineral

Refer to glossary for definitions of organic and mineral soils.

What is the depth water table?

Circle appropriate answer.

Water table < 20 in.

Water table ≥ 20 in.

Presence of heavy metals or toxicants?

Yes No

Determine the pH range _____

Soil and water pH range

Organic soils	Mineral soils
≤ 4.9	≤ 6.0
5.0 - 6.5	6.1-7.3
> 6.5	≥ 7.4 - 8.4
≥ 8.5	

Determine the salinity_____

Water salinity

< 5 dS/m

very saline

5-10 dS/m

10-16 dS/m

16-35 dS/m

≥ 35 dS/m

Subclass is:

_____ Seasonal and persistent freashwater

_____ Seasonal and persistent saline and

Reference Appendix D for definitions of water class and salinity.

Depth to water table, pH range, salinity and presence of heavy metals are determined using accepted wetland science protocols.

For montane wetlands, salinity is not listed as all are nonsaline.

Biological Assessment

Sources of assessment criteria for each field are adopted from MDT, *Montana Wetland Assessment Method* and are listed under methods on page 5. Additional criteria sources are listed with each assessment field.

15a. Level of Disturbance

This field assesses the level of disturbance in the AA and EAA. Source: Soule (1991), Forman and Godron (1986) and Fahrig (1997).

Use matrix below to determine level of disturbance (H = high, M = moderate, or L = low). Circle the appropriate answer.

	Predominant conditions found in EAA (1,200 feet from perimeter of AA)		
Conditions within AA	Land managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads, buildings, ditches or canals.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density, and or numerous ditches or canals.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings.	L	L	M
AA not cultivated, but moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads, buildings, ditches or canals.	M	M	H
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density, and or numerous ditches or canals.	H	H	H

Comments: Note types of disturbance, intensity, season, etc.

15b. Plant Community Composition

This field assesses the plant community within the AA. Source: Keate (2004) and Padgette et al. (1989). Refer to Appendix E for photographs, plan views, cross sectional diagrams, the range of expected coverage and wetland specific vegetation lists. Refer to Appendix F for transect protocol (step point).

i. Do you find all layers of vegetation that are expected for this wetland type? Circle: Y N

ii. What is the percent ground cover (within the AA) dominated by native vegetation? High ≥ 80%, Moderate 79-60%, Low < 60%

iii. What is the ratio of native plants to non-native plants observed using the transect protocol? (High ≥ 80%, Moderate 79-60%, Low < 60%)

iv. Rating for riverine and lacustrine wetlands.

Layers (i)	Y									N								
Cover (ii)	H			M			L			H			M			L		
Native Species (iii)	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
	1H	.9H	.8H	.7M		.5M	.4M	.3L	.2L	.9H		.7M	.6M	.5M	.4M	.3L		.1L

iv. Rating for depressional, mineral flat, and slope wetlands.

Cover (ii)	H			M			L		
Native Species (iii)	H	M	L	H	M	L	H	M	L
Rating	1H	.8H	.6M	.8H	.6M	.4M	.6M	.4M	.2L

Comments:

15c. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals

This field assesses documented or suspected use of the AA by Federally listed or proposed threatened or endangered plants or animals. Source: Consultation with USFWS biologist.

Refer to the U.S. Fish and Wildlife Services website at www.fws.gov or visit the Utah Data Conservation Center website at http://dwrcdc.nr.utah.gov/ucdc/. Circle one category below based on definitions contained in the instructions and after consultation with USFWS biologist.

i. AA is Documented (D) or Suspected (S) to contain:

*Documented primary or critical habitat for T or E or State listed S-1 species has been addressed in #12

Primary habitat (list species)	* S	_____
Secondary habitat (list species)	D S	_____
Incidental habitat (list species)	D S	_____
No usable habitat	D S	_____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Highest Habitat Level	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.5 M	.3 L	0 L

Sources for documented use (e.g. observations, records, etc):

15d. Habitat for plant or animals rated S2 or S3 by the Utah Natural Heritage Program

This field assesses documented or suspected use of the AA by S2 or S3 species listed by the Utah Natural Heritage Program (UNHP). Source: Consultation with UDWR regional biologist.

Refer to the UNHP website or the Utah Sensitive Species List at http://dwrcdc.nr.utah.gov/ucdc/.

Do not include species listed in 15c from above. Circle one category below based on definitions contained in the instructions and after consultation with UDWR biologist.

i. AA is Documented (D) or Suspected (S) to contain:

Primary habitat (list species and S rating)	D S	_____
Secondary habitat (list species and S rating)	D S	_____
Incidental habitat (list species and S rating)	D S	_____
No usable habitat	D S	_____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low).

Highest Habitat Level	Primary/D	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.6 M	.2 L	.1 L	0 L

Sources for documented use (e.g. observations, records, etc.):

15e. General Wildlife Habitat Rating

This field assesses general wildlife habitat conditions in the AA. Source: Hammer (1992), Mitch and Gosselink (1993) and Weller and Spatcher (1965).

i. Wildlife habitat features

Working from top to bottom, circle appropriate AA attributes in matrix to arrive at a rating (H = high, M = moderate, or L = low).

Plant Community (15b)	H			M			L		
Disturbance Level (15a)	L	M	H	L	M	H	L	M	H
Rating	H	H	M	H	M	L	M	L	L

Wildlife habitat features rating.	1H	.6M	.2L

ii. Modified Wildlife Habitat Rating

The wildlife habitat features rating may be modified based on documented wildlife use and levels of use of the AA. Consult with the UDWR regional wildlife biologist to determine the level of wildlife use in the AA using the procedures detailed below.

UDWR biologist consulted:

Name(s)_____Date(s)_____

First circle the appropriate answer to the following question: Does the UDWR have sufficient knowledge of the AA to determine a level of general wildlife use. Yes No

If the answer is No do not modify your answer to 15e(i) above. If you answer is Yes and after further consultation with a UDWR biologist and using the level of use descriptive categories on page 14. Select the descriptive category (H, M or L) that best describes the level of wildlife use in the AA. Circe the appropriate answer. H M L

If the level of use circled is:

H – add .2 to the wildlife habitat features rating 15e(i)

M – add .1 to the wildlife habitat features rating

L – do not modify the wildlife habitat features rating

iii. Rating

Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Modified wildlife habitat features rating	1H			.6M			.2L		
Rating	1.2H	1.1H	1H	.8H	.7M	.6M	.4M	.3L	.2L

Comments:

15f. General Fish/Aquatic Habitat Rating

This field assesses general fish and aquatic habitat in the AA. Source: Sigler and Miller (1963), Gore (1985), Williams et al (1997) and National Research Council (1992).

Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, etc., circle NA here and proceed to the next function. If fish use occurs in the AA but is not desired from a resource management perspective [such as fish use within an irrigation canal], then Habitat Quality [i below] should be marked as "Low", applied accordingly in ii below, and noted in the comments.)

i. Habitat Quality

Refer to the glossary for further definitions of these terms. Circle appropriate AA attributes in matrix to arrive at the quality rating (H = high, M = moderate, or L = low).

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
Cover: % of waterbody in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10–25%		>25%	10–25%	<10%		10–25%	<10%
contains riparian or wetland scrub-shrub or forested communities	H	H		H	H	M	M		M
Shading: 50 to 75% of streambank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H		M	M	M	M	M	L	L
Shading: < 50% of streambank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality

Circle the appropriate response to the following question. If answer is Y, then reduce rating in i above by one level (H = M, M = L, L = L)

Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the waterbody included on the UDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support?Y N

Modified habitat quality rating = (circle) H M L

iii. **Rating**

Refer to the Utah Division of Wildlife Resource website for fish species. Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Types of fish known or suspected within AA	Modified Habitat Quality (ii)		
	H		L
Native fish	1 H	.8 M	.5 M
Introduced fish	.9 H	.6 M	.4 M
No fish	.3 L	.2 L	.1 L

Comments: reduce the score by .1 if AA has carp present.

15g. General Amphibian Habitat Rating

This field assesses general amphibian habitat within the AA. Source: Consultation with UDWR regional biologist.

UDWR biologist(s) consulted:

Name(s)_____Date(s)_____

Circle the appropriate answer to the following question after consulting with UDWR regional biologist.

The UDWR has documented the presence of amphibians in the AA or, habitat and water quality characteristics are such that they would support amphibians.

Rating: Yes No

If the answer is Yes, add **.2** under the functional points/rating column in the Functional Assessment Rating Section at the end of this form.

Hydrological/Biophysical Assessment

15h. Flood Attenuation

This field assesses the capability of the AA to slow in channel or overbank flow during high water/flood events. This applies to riverine wetlands only. Source: Kleinschmidt Associates (1993), Munson (1974) and Strom et al (2004).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Within the floodplain of the AA, estimate % ground coverage with high surface roughness*	≥65%	64%-50%	49%-35%	>35%
Rating	1H	.8H	.6M	.4M

*See glossary for definition of surface roughness rating criteria.

ii. There are residences, businesses, or other features, which may be significantly damaged by floods located within 0.5 miles downstream of the AA. Yes No

Comments:

15i. Short and Long Term Surface Water Storage

This field assesses the potential of the AA to capture and hold surface water originating from inundation, precipitation, upland surface (sheet flow) or subsurface (groundwater flow). Source: Munson (1974), Strom et al (2004), Hammer (1986) and Mitch and Gosselink (1993).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Duration of surface water is implied in the definition of wetland class or of the subclass and thus reflects the natural function. Circle the appropriate answer.

Wetlands are inundated	≥ 5 out of 10 years		< 5 out of 10 years	
Has the wetland's natural ability to store water been disturbed?	N	Y	N	Y
Rating	1H	.8H	.9H	.7M

In order to properly assess this function, examination of the area down gradient from the AA may aid in determining whether or not dams, water control structures, overflow aprons, ditches, canals, drain tiles or other forms of outlet or modification exist.

Comments:

15j. Sediment/Nutrient/Toxicant Retention and Removal

This field assesses the ability of the AA to retain and capture sediments, nutrients and toxicants. Source: Kleinschmidt Associates (1999), Hammer (1986) and Hammer and Kadlec (1983).

This function applies to wetlands which could receive excess sediments, nutrients or toxicants through influx of surface or groundwater or direct input. If no wetlands in the AA are subject to such input, circle NA here and proceed with evaluation.

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. **Minor** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on UDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. **Major** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
Within the AA, estimate % ground coverage with high to moderate surface roughness*	≥ 50%		<50%		≥ 50%		<50%	
Has the wetland's natural ability to store water been disturbed?	N	Y	N	Y	N	Y	N	Y
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L

*See glossary for definition of surface roughness.

Comments:

15k. Sediment/Shoreline Stabilization

This field assesses the ability of the AA to dissipate flow or wave energy in order to reduce erosion. This applies to riverine and lacustrine wetlands only. Source: Kleinschmidt Associates (1999), Keate (2004), Padgette et al (1989) and Mitch and Gosselink (1993).

Applies only if AA occurs on or within the banks or a river, stream, or other natural (vegetated swale) or man-made drainage, or on the shoreline of a standing water body, which is subject to wave action. It does not apply, circle NA here and proceed to next function)

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function.

Within the AA, estimate % ground coverage with high surface roughness*	Duration of surface water adjacent to rooted vegetation	
	Permanent	
≥ 65%	1H	
64% - 50%	.8H	.5M
	.6M	.3L
< 35%	.4M	.1L

Comments:

Social Value Assessment

The following are not functions but values, which are important to society. Plus answers would suggest important societal assets, which should guide any future mitigation planning.

16. Visual Quality*

Refer to the glossary to distinguish between "wildland wetland" and "urban/exurban wetland".
If AA is considered "wildland wetland" answer the following three questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Has wetland experienced moderate to low level of disturbance (refer to glossary)? _____
iii. Is there an absence of human structures or other human induced disturbances (refer to glossary)? ____

If AA is considered to be an "urban/exurban wetland", answer the following six questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is there potentially a large number of viewers? _____
iii. Is the viewing distance in the fore or middle grounds for most viewers (refer to glossary)? _____
iv. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
v. Is there an absence of human structures or other human induced disturbances (refer to glossary)? _____
vi. Is the wetland a part of a larger open space, green space, park, buffer or corridor? _____

17. Recreational/Educational Quality*

Answer the following seven questions for both "wildland wetlands" and "urban/exurban wetlands". Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is the wetland presently used for recreation/education? _____
iii. Is the wetland ¼ mile or less from and elementary school? _____
iv. Is the wetland five miles or less from a high school? _____
v. Is there vehicular, trail, boat or canoe access to the site? _____
vi. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
vii. Is the wetland visible from a county, state or federal highway, heavily used recreation trail, residential development or other
situations where large numbers of people would have visual access to the wetland? _____

*Note: In some cases wetlands many contain plant or wildlife species or perform functions that would be diminished by human activity. In these cases recreational and educational activities would be prohibited.

Summary Comments for entire Wetland AA Evaluated

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition			1	
15c. Listed/Proposed T&E Species Habitat			.9	
15d. UT Natural Heritage Program Species Habitat			.9	
15e. General Wildlife Habitat			1	
15f. General Fish/Aquatic Habitat				
15g. General Amphibian Habitat Rating			0	
15h. Flood Attenuation				
15i. Short and Long Term Surface Water Storage			1	
15j. Sediment/Nutrient/Toxicant Removal			1	
15k. Sediment/Shoreline Stabilization			1	
Totals:				

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

_X_ Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

UDOT Wetland Assessment Form (Slope)

1. Project Name:

2. Project Number:

3. USCOE Permit Number: **Project Pin Number:**

4. Evaluation Date (MM/DD/YYYY):

5. Evaluating Agency:

6. Evaluator(s):

7. Purpose of Evaluation (check one): ____Wetlands potentially affected by UDOT project
____ Mitigation wetlands, pre-construction
____ Mitigation wetlands, post-construction
____ Other (explain):

8. Wetland/Site Number(s):

9. Wetland Location(s):
Ecoregion (see map Appendix A):_____
Watershed (see map Appendix A):_____
County (see map Appendix A): _____
Legal: T_____N or S; R_____E or W; S_____;T_____N or S; R_____E or W; S_____
Approximate Stationing or Mileposts:_____
_____
GPS Reference Number:_____
Other Location information:

10. Wetland Size (total acres, measured by GPS if applicable):

11. Assessment Area (AA) (total acres, measured by GPS if applicable, see appendix):

12. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals or State Listed S1 Species
It is required that the evaluator contact USFWS with regards to the presence or absence of threatened or endangered (T or E) species and UDWR concerning the presence or absence of a state listed S1, S2 or S3 species. The documented habitat of a federally listed or proposed threatened or endangered plant or animal species or a state listed S1 species results in an automatic Red Flag categorization of the assessed site. Coordination with USFWS and UDWR is required. (However, the evaluation proceeds as normal so that the COE receives an assessment of function and value consistent with the UDOT assessment method.)
Is the AA documented to contain primary habitat for T or E or S-1 species? _____Yes _____No
If yes, list the species:
(This field assesses habitat for species receiving protection under provision of the Endangered Species Act and Utah critically imperiled species.)

13. Selecting a Wetland Classification
Refer to the glossary to determine the correct wetland class. Refer to Appendix E for reference photos and lists of the most common native species in each classification. Turn to appropriate colored pages to continue functional assessment as noted below.
Riverine: Blue
Slope: Pink
Depressional: Yellow
Mineral Flat: Green
Lacustrine Fringe: Purple
Roadside Ditch Wetland: If AA qualifies as a non-jurisdictional 'roadside ditch wetland', AA is classified as Category IV. Further assessment is not necessary, although all documentation must be completed.

***Toned questions or functional categories on the assessment form do not apply to this wetland class, do not answer. They are excluded from the individual function rating as well as the final overall functional assessment rating.**

Slope

Slope wetlands: Occur at points of surface changes, breaks in slope or stratigraphic changes. Surface water runoff and groundwater outflow (i.e. – spring or seep) are the primary water sources. Water flow is unidirectional (down slope/gradient). Water may discharge to a stream, lake or depression. Wetland complexes can be comprised of a slope wetland with several depressions or low-points interspersed throughout. Relying on topographic maps, aerial photographs, and field evaluation will help determine which classification is dominant and or most appropriate.

14. Identify subclass

The evaluator uses the information below together with information in Appendix D to identify the AA subclass. This information is not used directly to rate the AA.

Identify the soil type (circle): organic or mineral

Refer to glossary for definitions of organic and mineral soils.

What is the depth water table?

Circle appropriate answer.

Water table < 20 in.

Water table ≥ 20 in.

Presence of heavy metals or toxicants?

Yes No

Determine the pH range _____

Soil and water pH range

Organic soils	Mineral soils
≤ 4.9	≤ 6.0
5.0 - 6.5	6.1-7.3
> 6.5	≥ 7.4 - 8.4
≥ 8.5	

Determine the salinity_____

Water salinity

< 5 dS/m

very saline

5-10 dS/m

10-16 dS/m

16-35 dS/m

≥ 35 dS/m

Subclass is:

_____ Seasonal and persistent freashwater

_____ Seasonal and persistent saline and

Reference Appendix D for definitions of water class and salinity.

Depth to water table, pH range, salinity and presence of heavy metals are determined using accepted wetland science protocols.

For montane wetlands, salinity is not listed as all are nonsaline.

Biological Assessment

Sources of assessment criteria for each field are adopted from MDT, *Montana Wetland Assessment Method* and are listed under methods on page 5. Additional criteria sources are listed with each assessment field.

15a. Level of Disturbance

This field assesses the level of disturbance in the AA and EAA. Source: Soule (1991), Forman and Godron (1986), Fahrig (1997), Buffler (2005), and Spackman and Hughes (1995).

Use matrix below to determine level of disturbance (H = high, M = moderate, or L = low). Circle the appropriate answer.

Conditions within AA	Predominant conditions found in EAA (600 feet from perimeter of AA)		
	Land managed in predominantly natural state; is not grazed, hayed, landscaped, or otherwise converted; does not contain roads or buildings.	Land not cultivated, but moderately grazed or hayed; or has been subject to minor clearing, fill placement or hydrological alteration; contains few roads, buildings, ditches or canals.	Land cultivated or heavily grazed or landscaped; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density, and or numerous ditches or canals.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, landscaped, or otherwise converted; does not contain human induced trails.	L	L	M
AA not cultivated, but moderately grazed or hayed; or has been subject to relatively minor clearing or hydrological alteration; contains few human induced trails, ditches or canals.	M	M	H
AA cultivated or heavily grazed or landscaped; subject to relatively substantial grading, clearing, or hydrological alteration; and numerous human induced trails, ditches or canals.	H	H	H

Comments: Note types of disturbance, intensity, season, etc.

15b. Plant Community Composition

This field assesses the plant community within the AA. Source: Keate (2004) and Padgette et al. (1989). Refer to Appendix F for photographs, plan views, cross sectional diagrams, the range of expected coverage and wetland specific vegetation lists. Refer to Appendix G for transect protocol (step point). Draw a simple boundary of the AA and illustrate all plant transect locations and approximate distances on page 11 of this form. See glossary for definition of native wetland plants.

i. Do you find all layers of vegetation that are expected for this wetland type? Circle: Y N

ii. What is the percent ground cover (within the AA) dominated by native wetland vegetation?

High ≥ 80%, Moderate 79-60%, Low < 60%

iii. What is the percent of native wetland plants to non-native or non-wetland plants observed using the transect protocol?

High ≥ 80%, Moderate 79-60%, Low < 60%

iv. Rating for riverine and lacustrine wetlands.

Layers (i)	Y									N								
Cover (ii)	H			M			L			H			M			L		
Native Wetland Species (iii)	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.9H	.8H	.7M	.6M	.5M	.4M	.3L	.2L	.1L

iv. Rating for depressional, mineral flat, and slope wetlands.

Cover (ii)	H			M			L		
Native Wetland Species (iii)	H	M	L	H	M	L	H	M	L
Rating	1H	.8H	.6M	.8H	.6M	.4M	.6M	.4M	.2L

Comments:

15c. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals

This field assesses documented or suspected use of the AA by Federally listed or proposed threatened or endangered plants or animals. Source: Consultation with USFWS biologist.

Refer to the U.S. Fish and Wildlife Services website at www.fws.gov or visit the Utah Data Conservation Center website at http://dwrcdc.nr.utah.gov/ucdc/ . Circle one category below based on definitions contained in the instructions and after consultation with USFWS biologist.

i. AA is Documented (D) or Suspected (S) to contain:

*Documented primary habitat for T or E or State listed S-1 species has been addressed in #12

Primary habitat (list species)	* S	_____
Secondary habitat (list species)	D S	_____
Incidental habitat (list species)	D S	_____
No usable habitat	D S	_____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Highest Habitat Level	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.5 M	.3 L	0 L

Sources for documented use (e.g. observations, records, etc):

15d. Habitat for plant or animals rated S2 or S3 by the Utah Natural Heritage Program

This field assesses documented or suspected use of the AA by S2 or S3 species listed by the Utah Natural Heritage Program (UNHP). Source: Consultation with UDWR regional biologist.

Refer to the UNHP website or the Utah Sensitive Species List at http://dwrcdc.nr.utah.gov/ucdc/ .

Do not include species listed in 15c from above. Circle one category below based on definitions contained in the instructions and after consultation with UDWR biologist.

i. AA is Documented (D) or Suspected (S) to contain:

Primary habitat (list species and S rating)	D S	_____
Secondary habitat (list species and S rating)	D S	_____
Incidental habitat (list species and S rating)	D S	_____
No usable habitat	D S	_____

ii. Rating

Evaluator uses the conclusions from i above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low).

Highest Habitat Level	Primary/D	Primary/S	Secondary/D	Secondary/S	Incidental/D	Incidental/S	None
Rating	.9 H	.8 H	.7 M	.6 M	.2 L	.1 L	0 L

Sources for documented use (e.g. observations, records, etc.):

15e. General Wildlife Habitat

This field assesses general wildlife habitat conditions in the AA. Source: Hammer (1992), Mitch and Gosselink (1993) and Weller and Spatcher (1965).

i. Wildlife habitat features

Working from top to bottom, circle appropriate AA attributes in matrix to arrive at a rating (H = high, M = moderate, or L = low).

Disturbance Level (15a)	L			M			H		
Plant Community (15b)	H	M	L	H	M	L	H	M	L
Rating	H	H	M	H	M	L	M	L	L

Wildlife habitat features rating.	1H	.6M	.2L

ii. Modified Wildlife Habitat Rating

The wildlife habitat features rating may be modified based on documented wildlife use and levels of use of the AA. Consult with the UDWR regional wildlife biologist to determine the level of wildlife use in the AA using the procedures detailed below.

UDWR biologist consulted:

Name(s)_____Date(s)_____

First circle the appropriate answer to the following question: Does the UDWR have sufficient knowledge of the AA to determine a level of general wildlife use. Yes No

If the answer is No do not modify your answer to 15e(i) above. If you answer is Yes and after further consultation with a UDWR biologist and using the level of use descriptive categories on page 14. Select the descriptive category (H, M or L) that best describes the level of wildlife use in the AA. Circe the appropriate answer. H M L

If the level of use circled is:

H – add .2 to the wildlife habitat features rating 15e(i)

M – add .1 to the wildlife habitat features rating

L – do not modify the wildlife habitat features rating

iii. Rating

Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Modified wildlife habitat features rating	1H			.6M			.2L		
Rating	1.2H	1.1H	1H	.8H	.7M	.6M	.4M	.3L	.2L

Comments:

15f. General Fish/Aquatic Habitat

This field assesses general fish and aquatic habitat in the AA. Source: Sigler and Miller (1963), Gore (1985), Williams et al (1997) and National Research Council (1992).

Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not or was not historically used by fish due to lack of habitat, excessive gradient, etc., circle NA here and proceed to the next function. If fish use occurs in the AA but is not desired from a resource management perspective [such as fish use within an irrigation canal], then Habitat Quality [i below] should be marked as "Low", applied accordingly in ii below, and noted in the comments.)

i. Habitat Quality

Refer to the glossary for further definitions of these terms. Circle appropriate AA attributes in matrix to arrive at the quality rating

(H = high, M = moderate, or L = low).

Duration of surface water in AA	Permanent / Perennial			Seasonal / Intermittent			Temporary / Ephemeral		
Cover: % of water body in AA containing cover objects such as submerged logs, large rocks & boulders, overhanging banks, floating-leaved vegetation, etc.	>25%	10–25%	<10%	>25%	10–25%	<10%		10–25%	<10 %
Shading: >75% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	H	H	H	M		M	M
Shading: 50 to 75% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	H	M	M	M	M	M	L	L
Shading: < 50% of stream bank or shoreline within AA contains riparian or wetland scrub-shrub or forested communities	H	M	M	M	L	L	L	L	L

ii. Modified Habitat Quality

Circle the appropriate response. If answer is Y, then reduce rating in i above by one level (H = M, M = L, L = L)

Is fish use of the AA precluded or significantly reduced by a culvert, dike, or other man-made structure or activity or is the water body included on the UDEQ list of water bodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support?Y

N

Modified habitat quality rating = (circle) H M L

iii. **Rating**

Refer to the Utah Division of Wildlife Resource website for fish species. Use the conclusions from i and ii above and the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Types of fish known or suspected within AA	Modified Habitat Quality (ii)		
	H	M	L
Native fish	1 H	.8H	.6 M
	.5 M	.4 M	.3 L
No fish	.3 L	.2 L	.1 L
Note: reduce the score by .1 if the AA has carp present.			

.9H	.7M	.5M	.4M	.3L	.2L	.1L	0L

15g. General Amphibian Habitat

This field assesses general amphibian habitat within the AA. Source: Consultation with UDWR regional biologist.

UDWR biologist(s) consulted:

Name(s)_____Date(s)_____

Circle the appropriate answer to the following question after consulting with UDWR regional biologist.

The UDWR has documented the presence of amphibians in the AA or, habitat and water quality characteristics are such that they would support amphibians.

Rating: Yes No

If the answer is Yes, add **.2** under the functional points/rating column in the Functional Assessment Rating Section at the end of this form.

Hydrological/Biophysical Assessment

Draw a simple boundary of the AA on page 12 of this form and illustrate the hydrological conditions found within the AA. Include water source locations, directions of flow (if applicable), approximate depths, and any significant site features that influence site hydrology.

15h. Flood Attenuation

This field assesses the capability of the AA to slow in channel or over bank flow during high water/flood events. This applies to riverine wetlands only. Source: Kleinschmidt Associates (1993), Munson (1974) and Strom et al (2004).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Within the AA, estimate % ground coverage with high surface roughness*	≥65%	64%-50%	49%-35%	>35%
Rating	1H	.8H	.6M	.4M

*See glossary for definition of surface roughness rating criteria.

ii. There are residences, businesses, or other features, which may be significantly damaged by floods located within 0.5 miles downstream of the AA. Yes No

Comments:

15i. Short and Long Term Surface Water Storage

This field assesses the potential of the AA to capture and hold surface water originating from inundation, precipitation, upland surface (sheet flow) or subsurface (groundwater flow). Source: Munson (1974), Strom et al (2004), Hammer (1986) and Mitch and Gosselink (1993).

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Duration of surface water is implied in the definition of wetland class or of the subclass and thus reflects the natural function. Circle the appropriate answer.

Wetlands are inundated	≥ 5 out of 10 years		< 5 out of 10 years	
Has the wetland's natural ability to store water been disturbed negatively?	N	Y	N	Y
Rating	1H	.8H	.6M	.4M

In order to properly assess this function, examination of the area down gradient from the AA may aid in determining whether or not dams, water control structures, overflow aprons, ditches, canals, drain tiles or other forms of outlet or modification exist.

Comments:

15j. Sediment/Nutrient/Toxicant Retention and Removal

This field assesses the ability of the AA to retain and capture sediments, nutrients and toxicants. Source: Kleinschmidt Associates (1999), Hammer (1986) and Hammer and Kadlec (1983).

This function applies to wetlands which could receive excess sediments, nutrients or toxicants through influx of surface or groundwater or direct input. If no wetlands in the AA are subject to such input, circle NA here and proceed with evaluation.

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function. Circle the appropriate answer.

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver low to moderate levels of sediments, nutrients, or compounds such that other functions are not substantially impaired. **Minor** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				AA is in close proximity to or receives input from or is on UDEQ list of water bodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. **Major** sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
Within the AA, estimate % ground coverage with high to moderate surface roughness*	≥ 50%		<50%		≥ 50%		<50%	
Has the wetland's natural ability to store water been disturbed negatively?	N	Y	N	Y	N	Y	N	Y
Rating	1H	.9H	.8H	.7M	.6M	.5M	.4M	.3L

*See glossary for definition of surface roughness.

Comments:

15k. Sediment/Shoreline Stabilization

This field assesses the ability of the AA to dissipate flow or wave energy in order to reduce erosion. This applies to riverine and lacustrine wetlands only. Source: Kleinschmidt Associates (1999), Keate (2004), Padgette et al (1989) and Mitch and Gosselink (1993).

Applies only if AA occurs on or within the banks or a river, stream, or other natural (vegetated swale) or man-made drainage, or on the shoreline of a standing water body, which is subject to wave action. It does not apply, circle NA here and proceed to next function)

i. Rating

Working from top to bottom, use the matrix below to arrive at the functional points and rating (H = high, M = moderate, or L = low) for this function.

Within the AA, estimate % ground coverage with high surface roughness*	Duration of surface water adjacent to rooted vegetation	
	Permanent	Seasonal
≥ 65%	1H	.7M
64% - 50%	.8H	.5M
49% - 35%	.6M	
< 35%	.4M	.1L

Comments:

Social Value Assessment

The following are not functions but values, which are important to society. Plus answers would suggest important societal assets, which should guide any future mitigation planning.

16. Visual Quality*

Refer to the glossary to distinguish between "wildland wetland" and "urban/exurban wetland".
If AA is considered "wildland wetland" answer the following three questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Has wetland experienced moderate to low level of disturbance (refer to glossary)? _____
iii. Is there an absence of human structures or other human induced disturbances (refer to glossary)? _____

If AA is considered to be an "urban/exurban wetland", answer the following six questions based on information gathered from suggested sources. Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is there potentially a large number of viewers? _____
iii. Is the viewing distance in the fore or middle grounds for most viewers (refer to glossary)? _____
iv. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
v. Is there an absence of human structures or other human induced disturbances (refer to glossary)? _____
vi. Is the wetland a part of a larger open space, green space, park, buffer or corridor? _____

17. Recreational/Educational Quality*

Answer the following seven questions for both "wildland wetlands" and "urban/exurban wetlands". Each 'yes' answer receives a plus (+) rating in the space provided.

i. Is the wetland in public ownership (city, county, state or federal)? _____
ii. Is the wetland presently used for recreation/education? _____
iii. Is the wetland ¼ mile or less from and elementary school? _____
iv. Is the wetland five miles or less from a high school? _____
v. Is there vehicular, trail, boat or canoe access to the site? _____
vi. Has the wetland experienced a moderate to low level of disturbance (refer to glossary)? _____
vii. Is the wetland visible from a county, state or federal highway, heavily used recreation trail, residential development or other situations where large numbers of people would have visual access to the wetland? _____

*Note: In some cases wetlands many contain plant or wildlife species or perform functions that would be diminished by human activity. In these cases recreational and educational activities would be prohibited.

Summary Comments for entire Wetland AA Evaluated

Functional Assessment Rating

Function Variables	General Evaluation	Actual Functional Points/Rating	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)
15b. Plant Community Composition			1	
15c. Listed/Proposed T&E Species Habitat			.9	
15d. UT Natural Heritage Program Species Habitat			.9	
15e. General Wildlife Habitat			1	
15f. General Fish/Aquatic Habitat				
15g. General Amphibian Habitat			0	
15h. Flood Attenuation			1	
15i. Short and Long Term Surface Water Storage			1	
15j. Sediment/Nutrient/Toxicant Removal			1	
15k. Sediment/Shoreline Stabilization			1	
Totals:				

If functional variables other than those toned are not applicable (NA) to the AA of concern, enter NA in the possible functional points box and subtract the possible functional points for that variable when calculating percent of total functional points.

	% total functional points

Note: % total functional points = actual functional points ÷ possible functional points.

Overall Assessment Area Category

Circle appropriate category based on the criteria outlined below. **I II III IV**

Red Flag Category
___ Documented habitat for a federally listed or proposed threatened or endangered plant or animal species was found. (Yes response to question 12)
___ Documented habitat for a species rated S1 by the Utah Natural Heritage Program. (Yes response to question 12)
Wetlands in this category are a special case and require consultation with the COE, USFWS, and UDWR throughout the entire application process.

Category I Wetland: (Must satisfy one of the following criteria; if it does not meet criteria, go to Category II)
___ Score of .9 functional point for Species Rated primary documented S2 by the Utah Natural Heritage Program **or** .8 for primary suspected S2 species, level of disturbance is also rated low; **or**
___Score of 1 functional point for Flood Attenuation (riverine only) and answer to Question 15i. ii is "yes"; **or**
___Score 1 function point for Plant Community Composition; **or**
___Total actual functional points > 80% (round to nearest whole #) of total possible functional points.

Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; if not satisfied, go to Category IV)
___Score of .9 functional point for Species Rated primary documented S3 by the Utah Natural Heritage Program, **or** .8 functional point for Species Rated primary suspected S3 species; level of disturbance is rated low **or**
___Score of ≥.9 functional point for General Wildlife Habitat; **or**
___Score of ≥.9 functional point for General Fish/Aquatic Habitat (riverine and lacustrine only); **or**
___Score of >.7 ≤.8 functional point for Plant Community Composition
___Total Actual Functional Points > 65% (round to nearest whole #) of total possible functional points.

Category III Wetland: (Criteria for Categories I, II or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if it does not satisfy criteria, place wetland in Category III)
___Total actual functional points < 30% (round to nearest whole #) of total possible functional points
___Roadside Ditch Wetland Classification

Supplemental Diagram A

15b. Plant Community Composition Diagram

Draw a simple boundary of the AA and illustrate all plant transect locations and approximate distances. Please note that 100 sample points per acre should be collected within the AA. (Example: if AA equals .25 acres, then 25 sample points should be taken.) Never use less then 10 sample points within any AA, even when AA is less then .10 acres in size. Placement of transect(s) should accurately represent the AA. Be sure to place transect(s) through different water regimes, vegetative structure, and topographic changes that may exist within the AA.

Supplemental Diagram B

Hydrological/Biophysical Assessment Diagram

Draw a simple boundary of the AA and illustrate the hydrological conditions found within the AA. Include water source locations, directions of flow (if applicable), approximate depths, and any significant site features that influence site hydrology.

APPENDIX E

Rocky Mountain / High Plateaus Depressional and Slope Wetland Profiles

Introduction

The wetland profiles described in this booklet are based on HGM subclasses. The state is divided into three major Ecoregions – Great Basin (13), Rocky Mountain (19), and Colorado Plateau (20).

[The term "Rocky Mountain / High Plateaus" refers to all three Ecoregions that this appendix applies to – Wasatch and Uinta Mountains (19), Colorado Plateaus (20), and Southern Rockies (21).]

The subclasses in Rocky Mountain ecoregion are driven by the water regime and calcium concentration of water (determined through principal components factor analysis of reference standard sites in the entire class) and wetland class.

Water regime classes for depressions are as follows:

0 Ephemeral – surface water is present in some years for brief periods (<3 months)
1 Seasonal – surface water is present in most years for 3-6 months
2 Semi permanent – surface water is common to persistent in most years for 6-12 months
3 Permanent – surface water is continuously present in all years.

Water regime classes for slopes are as follows:

1 Seasonal slope - Average depth to water table > 20 inches
2 Persistent slope - Average depth to water table $\leq$ 20 inches

The classes of calcium concentration are as follows:

1 poor < 10 mg/l
2 rich > 10 mg/l

As a surrogate for calcium concentrations use water EC as follows:

1 poor $\leq$ 0 .15 dS
2 rich > 0.15 dS

Poor wetlands are generally not receiving any groundwater.

Hydrogeomorphic Depression and Slope Wetland Class Descriptions

Depressional wetlands are topographic depressions with closed contours. Water sources are precipitation, runoff and/or groundwater. Water flow vectors are toward the center of the depression. The dominant hydrodynamics are vertical. They may or may not have inlets and outlets.

Slope wetlands occur at points of surface changes, breaks in slope or stratigraphic changes. Groundwater and runoff are the primary water sources. Water flow is unidirectional (down slope/ gradient). Water may discharge to a stream, lake or depression.

Rocky Mountain Ecoregion

The Rocky Mountain Ecoregion in Utah includes the north-south trending Wasatch Range and High Plateaus and the Uinta Mountains, which are the longest east-west trending range in North America. In the Wasatch Mountains all peaks are below 12,000 ft. In the High Plateaus higher peaks are found but the tallest, Delano Peak reaches only 12,173 ft. Extensive meadows bordered by aspen are common. In highest peak in the Uinta Mountains is King Peak at 13,498 ft. Much of the backbone of the range is over 11,000 ft. Shallow tarn lakes and grassy meadows are common.

In the winter, snow enters the region as Pacific storms, primarily from the northwest. Summer precipitation, which nearly equals the winter amounts in some locations, results from thunderstorms. The average annual temperature

ranges from 35 to 45 F and varies with altitude and latitude. There is a zonation of vegetation, also controlled by altitude, latitude and exposure. The uppermost zone is alpine tundra noted by the absence of trees. Below is the subalpine zone usually dominated by Engelmann spruce and subalpine fir. Below this is the montane zone, which is characterized by ponderosa pine and Douglas fir. After fires in the subalpine and upper montane zones, forests are often replaced by aspen or lodgepole pine. Below the montane zone is the foothill / woodland zone. Many of these slopes have shrubs dominating which include mountain mahogany and several kinds of scrub oak. Unforested parks are common in the region and are often dominated by grasses. Some are covered by sagebrush and other shrubs, such as antelope bitterbrush.

Soils in the region correspond with the vegetation, ranging from mollisols and alfisols in the montane zone to aridisols in the foothill zone. Many steep slopes and glaciated sites are inceptisols.

Rocky Mountain Depressional Wetlands
Depressional wetland location and vegetation scores

Table 1- Depressional wetland location and vegetation scores

wetland site water class 1	East	North	reference score	VIBI	species richness	elevation
boulder mtn2	12,453,434	4,223,708	0.90	0.60	9.00	11,027
lilypad	12,607,252	4,510,503	1.00	1.00	14.00	9,662
lily lake2	12,505,242	4,503,271	0.93	1.00	19.00	9,955
lily lake1	12,505,242	4,503,271	0.93	1.00	19.00	9,955
summit park	12,604,864	4,515,924	0.95	1.00	16.00	9,823
cook pothole upper	12,452,860	4,226,131	0.90	0.80	14.00	10,570
sims pothole3	12,607,743	4,508,418	1.00	1.00	10.00	9,673
lily lake1a	12,505,242	4,503,271	0.93	1.00	19.00	9,955
sims pothole4	12,607,754	4,508,472	1.00	1.00	20.00	9,813
sims pothole1	12,606,846	4,509,428	0.93	1.00	11.00	9,880
sims pothole2	12,606,846	4,509,428	0.93	1.00	9.00	9,880
boulder mtn1	12,459,403	4,217,775	0.90	0.60	10.00	10,880
big park2	12,606,250	4,513,974	0.95	1.00	26.00	9,711
big park1	12,424,787	4,641,273	0.95	1.00	26.00	9,711
cook pothole lower	12,452,832	4,225,986	0.90	0.80	12.00	10,580
geyser pass	12,654,701	4,260,928	0.98	1.00	14.00	10,530
lake park1	12,624,009	4,515,699	0.95	1.00	11.00	9,178
midway pond	12,457,414	4,493,351	1.00	1.00	15.00	8,335
lake park2	12,624,009	4,515,699	0.95	1.00	15.00	9,178
um pothole3	12,446,632	4,284,659	0.93	1.00	8.00	9,881
mill city2	12,510,926	4,521,760	0.97	1.00	13.00	9,234
gibson lower	12,447,899	4,654,068	0.93	1.00	8.00	8,465
aquarius pothole	12,449,001	4,222,275	0.90	0.70	18.00	9,211

Table 1, continued

wetland site water class 2	East	North	reference score	VIBI	species richness	elevation
um pothole1	12,447,847	4,281,872	0.95	1.00	15.00	9,467
mill city1	12,511,528	4,521,825	0.97	1.00	17.00	9,236
um pothole2	12,447,727	4,282,347	0.90	1.00	15.00	9,515
um pothole4	12,447,702	4,281,251	0.95	1.00	12.00	9,413
dry lake2	12,419,382	4,602,043	0.95	1.00	15.00	5,645
dry lake	12,419,382	4,602,043	0.95	1.00	15.00	5,645
marsh2	12,550,916	4,533,159	1.00	1.00	14.00	9,400
scad valley	12,479,358	4,371,347	0.90	0.80	9.00	8,720
gibson upper	12,447,283	4,654,476	0.90	1.00	20.00	8,565
goldhollow beaver	12,511,326	4,520,580	0.93	0.70	22.00	9,116
marsh3	12,550,916	4,533,159	1.00	1.00	14.00	9,400
whitney rd pond	12,510,588	4,522,600	0.93	1.00	20.00	9,180
marsh1	12,550,916	4,533,159	1.00	1.00	14.00	9,400
miller flat	12,478,515	4,374,745	0.90	1.00	5.00	8,800
roadhollow pond	12,509,796	4,521,936	1.00	1.00	21.00	9,237
xmas ponds lower	12,516,387	4,519,697	0.95	1.00	24.00	8,603
goldhollow pond	12,511,011	4,520,246	1.00	1.00	16.00	9,177
xmas ponds lower2	12,516,387	4,519,697	0.95	1.00	24.00	8,603
soldier hollow ponds2	12,455,868	4,479,492	0.83	0.50	31.00	5,480
soldier hollow ponds	12,455,868	4,479,492	0.83	0.40	30.00	5,480
soldier hollow ponds3	12,455,868	4,479,492	0.83	0.50	30.00	5,480

Table 2 - Descriptive Statistics Rocky Mountain reference standard depressions

Descriptive Statistics of reference standard depressions by water chemistry class					
water chemistry subclass		Minimum	Maximum	Mean	Std. Deviation
1.00	species richness	10.00	26.00	16.3636	5.42720
	native species	1.00	1.00	1.0000	0.00000
	indicator	0.92	1.00	0.9845	0.02806
	total cover	0.63	0.89	0.7700	0.08614
	TDS water	6.00	78.00	26.6667	26.17250
	TSS water	2.00	170.00	41.0556	51.32522
	EC water	0.01	0.13	0.0345	0.04204
	pH water	5.70	7.20	6.6091	0.53377
	calcium water	2.40	10.70	5.0545	2.17732
	total nitrogen water	0.04	0.16	0.0578	0.04055
	phosphorus water	0.01	0.01	0.0100	0.00000
	lead water	0.03	0.03	0.0300	0.00000
	cadmium water	0.02	0.02	0.0200	0.00000
	pH soil	4.90	6.60	5.2091	0.54673
	EC soil	0.20	1.40	0.4091	0.35058
	total organic carbon	8.00	77.50	31.0045	18.72611
	soil	0.45	1.92	1.2489	0.60843
	cadmium soil	0.06	0.27	0.1344	0.06766
	lead soil	0.05	14.80	6.4433	5.49594

Descriptive Statistics of reference standard depressions by water chemistry class					
water chemistry subclass		Minimum	Maximum	Mean	Std. Deviation
2.00	species richness	12.00	24.00	16.7500	4.02549
	native species	1.00	1.00	1.0000	0.00000
	indicator	0.88	1.00	0.9767	0.03601
	total cover	0.61	0.82	0.7200	0.06481
	TDS water	120.00	2,040.00	642.0909	675.65590
	TSS water	6.70	353.00	156.7833	136.41467
	EC water	0.20	3.40	1.0458	1.06979
	pH water	6.40	7.80	7.1075	0.47024
	calcium water	14.20	52.10	35.5417	13.20933
	total nitrogen water	0.03	0.81	0.1883	0.30740
	phosphorus water	0.01	0.94	0.2100	0.36381
	lead water	0.03	0.03	0.0300	0.00000
	cadmium water	0.02	0.02	0.0200	0.00000
	pH soil	5.60	7.30	6.4083	0.49028
	EC soil	0.30	3.00	0.8500	0.75739
	total organic carbon	1.71	43.30	17.1425	14.65297
	soil	0.15	2.23	1.0130	0.87918
	cadmium soil	0.02	0.24	0.1020	0.06391
	lead soil	0.69	13.10	5.9360	4.01405

Table 3 Dominant vegetation for reference depressions by water class

Wetland site	Species 1	Cover 1	Species 2	Cover 2	Species 3	Cover 3	Species 4	Cover 4	Species 5	Cover 5
Water class 2										
lily pad	carlas	0.17	carros	0.11	carlim	0.11	carcan	0.05	calcan	0.04
summit park	caraqu	0.43	carros	0.13	callep	0.06	calcan	0.03	carcan	0.02
sims pothole3	carves	0.66	calcan	0.05	eriper	0.01	carcan	0.01	jundru	0.01
sims pothole4	carcan	0.16	caraqu	0.13	carros	0.08	glybor	0.05	carves	0.05
big park2	carlim	0.22	carcan	0.10	callep	0.10	caraqu	0.04	carmur	0.03
big park1	carros	0.21	carlim	0.21	caraqu	0.19	carcan	0.08	callep	0.03
geyser pass	carros	0.53	caraqu	0.30	carebe	0.02	descae	0.02		
lake park1	carros	0.55	carcan	0.04	calneg	0.01	galbif	0.01	caraqu	0.01
midway pond	elepal	0.33	carves	0.25	spamin	0.12	glybor	0.04	sagcun	0.02
lake park2	moss	0.27	caraqu	0.19	carlas	0.19	callep	0.10	elepal	0.05
mill city2	carves	0.40	spamin	0.19	ransce	0.08	eleaci	0.08	carros	0.07
Water class 2										
um pothole1	elepal	0.26	carves	0.19	aloaeq	0.06	siusua	0.06	carpac	0.03
mill city1	carros	0.23	aloaeq	0.22	salwol	0.12		0.05	elepal	0.02
um pothole4	elepal	0.29	eleaci	0.14	aloaeg	0.09	siusua	0.07	ranaqu	0.03
dry lake2	elepal	0.33	sciacu	0.12	alipla	0.10	ranaqu	0.03	sagcun	0.01
dry lake	elepal	0.40	sciacu	0.10	ranaqu	0.10	alipla	0.03	sagcun	0.01
marsh2	caraqu	0.40	carros	0.18	calneg	0.06	carval	0.06	elepal	0.01
marsh3	caraqu	0.32	carros	0.30	carsim	0.08	moss	0.04	carpau	0.01
marsh1	caraqu	0.44	carros	0.17	moss	0.16	elepal	0.02	sweper	0.01
roadhollow pd	carros	0.21	carmic	0.17	elepal	0.12	geumac	0.10	salgey	0.10
Wetland site	Species 1	Cover 1	Species 2	Cover 2	Species 3	Cover 3	Species 4	Cover 4	Species 5	Cover 5
xmas ponds low	caraqu	0.60	carros	0.25	carneb	0.05				
goldhollow pd	carros	0.37	elepal	0.08	aloaeq	0.06	geumac	0.03	salwol	0.02
xmas ponds low2	caraqu	0.60	carros	0.25	carneb	0.05				

Rocky Mountain Depressional wetland species for reference standard sites

Sedges/Rushes
Carex aquatilis / water sedge
Carex aurea / golden sedge
Carex canenscens / pale sedge
Carex eleocharis / narrowleaf sedge
Carex ebena / ebony sedge
Carex illota / sheep sedge
Carex lanuginosa/ woolly sedge
Carex lasiocarpa / slender sedge
Carex limosa/ mud sedge
Carex microptera / small wing sedge
Carex muricata / boreal sedge
Carex nebrascensis/ Nebraska sedge
Carex pachystachya / Chamisso's sedge
Carex paupercula / poor sedge
Carex rostrata or C. utriculata / beaked sedge
Carex saxatilis / russet sedge
Carex simulata / short-beaked or lookalike sedge
Carex vescaria / blister sedge
Juncus arcticus / wiregrass
Juncus drummondii / Drummond's rush
Juncus longistylis / longstyle spikerush
Juncus nevadensis / Nevada spikerush
Eleocharis palustris / common spikerush
Eleocharis rostellata / Torrey's spikerush
Eleocharis acicularis / slender spikerush
Scirpus acutus / hardstem bulrush

Graminoids
Agrostis scabra / ticklegrass
Alopecurus aequalis / shortawn foxtail
Bromus ciliatus / fringed brome
Calamagrostis Canadensis / bluejoint reedgrass
Calamagrostis neglecta or C. inexpansa / slimstem or northern reedgrass
Danthonia intermedia /timber oatgrass
Deschampsia caespitosa / tufted hairgrass
Glyceria borealis / northern mannagrass
Glyceria stricta / fowl mannagrass
Hierochloe odorata / sweetgrass or vanilla grass
Phleum alpinus / alpine timothy
Poa leptocoma or P. reflexa / bog bluegrass or nodding bluegrass
Trisetum wolfii / Wolf's trisetum

Shrubs
Salix wolfii / planifolia/ geyeriana / boothii – Wolf's, planeleaf, Geyer's, Booth's willow
Potentilla fruticosa / palustris - shrubby cinquefoil / marsh cinquefoil
Vaccinium uliginosum v. occidentale - western huckleberry

Forbs
Aquilegia spp. / columbine
Aconitum columbianum / monkshood
Aster integrifolius / thickstem aster
Antennaria corymbosa / Plains pussytoes
Achillea millefolium / milfoil yarrow
Anemone patens / Pasque flower, wild crocus
Alisma plantago-aquatica / water plantain
Caltha leptosepala / marsh marigold
Dowingia laeta / downingia
Equisteum arvense / meadow horsetail
Epilobium halleanum / Hall's willowherb
Epilobium hornemannii / Hornemann's willowherb
Erigeron speciosus / Oregon daisy
Erigeron peregrinus / strange daisy
Fragaria vesca / stravling strawberry
Geum macrophyllum / large-leaved avens
Galium bifolium / twinleaf bedstraw
Gentiana affinis / algida / calycosa / prostrate – Rocky Mountain, Arctic, explorer, moss gentian
Helenium hoopesii / orange sneezeweed
Mentha arvensis / field mint
Marsilea vestita / pepperwort, water clover
Mimulus guttatus / common monkey flower
Nuphar polysepalum / yellow pondlily, spatterdock
Polygonum amphibium / water smartweed
Polemonium caeruleum / blue or western Jacob's ladder
Polygonum viviparum / alpine bistort
Pedicularis groenlandica / elephanthead
Polygonum bistortoides / American bistort
Potamogeton gramineus/nodosus/natans / grass, longleaf, floating pondweed
Pedicularis racemosa / leafy loosewort
Porterella carnuloosa / fleshy porterella
Rorippa carvipes / common yellowcress
Ranunculus sceleratus/ aquatilis / blister buttercup, water crowsfoot
Sium suave / hemlock water parsnip
Swertia perennis / felwort
Sedum rhodanthum / pink stonecrop
Sagittaria cunenata / arrowleaf
Sparganium spp. / bur-reed
Stellaria calycantha, longifolia, obtuse, umbellate / calyx, long-leaved, blunt, umbellate starwort
Senecio spp - grounsel
Utricularis vulgaris – common bladderwort
Vicia Americana – American vetch
Veronica wormskjoldii, peregrine, americana – speedwell

Lilypad Lake, south slope Uintas, Ashley NF

Scad Valley pond, Wasatch Plateau, Manti-LaSal NF

Dry Lake, Sardine Canyon Wasatch Cache NF

Whitney Road pond, Northwest slope Uinta Mountains

Mill City road pond, northwest slope Uinta Mountains

Sims pothole3, southeast slope Uinta Mountains

UM pothole3, Fishlake Plateau

Miller Flat pothole – Wasatch Plateau

Boulder Mountain pothole, Aquarius Plateau – not a reference standard site

Gold Hill pond, North slope Uintas Wasatch-Cache NF

Lily Lake, South slope Uintas, Wasatch-Cache NF

Lower Gibson Lake, Northern Wasatch-Cache NF

Marsh pond, north slope Uintas, Wasatch-Cache NF

Rocky Mountain Slope Wetlands

Table 4 - Slope wetland locations and vegetation scores for reference standard sites

NAME	EASTING	NORTHING	Elevation ft	VIBI
Reader Creek 1	12,581,945	4,513,034	10,500	1.00
Reader Creek 3	12,581,097	4,513,300	10,560	1.00
China Meadows	12,550,352	4,531,066	9400	0.96
Reader Creek 4	12,581,297	4,513,316	10,600	1.00
Christmas Meadows 2	12,516,494	4,519,605	8,775	0.92
Smith's Fork	12,550,707	4,532,269	9,340	0.96
Christmas Meadows 1	12,516,494	4,519,605	8,770	0.93
East Marsh Meadows	12,550,916	4,533,159	9,375	0.96

NAME	Species1	COVER1	Species2	COVER2	Species3	COVER3	Species4	COVER4	Species5	COVER5
Reader Creek 1	caraqu	0.40	carlim	0.20	salpla	0.11	elepau	0.04	eripol	0.03
Reader Creek 3	caraqu	0.47	salpla	0.32	moss	0.34	carlim	0.03	descae	0.02
China Meadows	caraqu	0.45	carros	0.20	salpla	0.11	eleros	0.05	callep	0.02
Reader Creek 4	caraqu	0.16	carlim	0.15	salpla	0.14	calcan	0.08	descae	0.03
Christmas Meadows 2	callep	0.30	caraqu	0.24	descae	0.14	carbux	0.09	salwol	0.08
Smith's Fork	carros	0.48	carsax	0.14	salwol	0.10	descae	0.08	carlen	0.03
Christmas Meadows 1	caraqu	0.41	salwol	0.21	carros	0.17	fraves	0.04	carneb	0.03
East Marsh Meadows	caraqu	0.32	carros	0.30	carsim	0.08	salwol	0.04	moss	0.04

Table 5 - Descriptive Statistics for reference standard slope wetlands by water class

water class		Minimum	Maximum	Mean	Std. Deviation
1.00	Shrub cover	0.00	0.23	0.0767	0.08426
	Shrub height	0.00	30.00	17.5556	11.83333
	Herb cover	0.60	0.94	0.8200	0.12359
	Herb height	11.00	31.00	17.8889	6.45067
	Moss cover	0.02	0.11	0.0611	0.03855
	Total cover	0.82	1.10	0.9567	0.07416
	Obligate	0.60	1.00	0.8444	0.16667
	pH soil	4.80	6.20	5.1778	0.49441
	total organic carbon soil	2.00	73.00	25.0000	20.91650
	EC soil	0.20	0.70	0.3333	0.17500
	Zinc soil	0.46	10.90	2.3563	3.49025
	pH water	5.80	6.90	6.3556	0.37454
	EC water	0.01	0.09	0.0400	0.02828
	depth to water table	2.00	14.40	5.6222	3.99086
2.00	Shrub cover	0.04	0.26	0.1333	0.11372
	Shrub height	19.00	30.00	23.0000	6.08276
	Herb cover	0.62	0.85	0.7233	0.11676
	Herb height	14.00	23.00	18.3333	4.50925
	Moss cover	0.01	0.16	0.0700	0.07937
	Total cover	0.82	1.00	0.9267	0.09452
	Obligate	0.80	1.00	0.8667	0.11547
	pH soil	6.20	6.70	6.4667	0.25166
	total organic carbon soil	6.00	40.00	20.0000	17.77639
	EC soil	0.60	0.80	0.7333	0.11547
	Zinc soil	1.60	5.70	3.8667	2.08407
	pH water	6.70	7.80	7.2333	0.55076
	EC water	0.22	0.45	0.3267	0.11590
	depth to water table	0.50	11.30	7.5333	6.09617

Rocky Mountain Slope Wetland species

Sedges/Rushes
Carex aquatilis / water sedge
Carex aurea / golden sedge
Carex buxbaumii / Buxbaum's sedge
Carex canenscens / pale sedge
Carex eleocharis / narrowleaf sedge
Carex ebena / ebony sedge
Carex illota / sheep sedge
Carex lanuginosa / woolly sedge
Carex lasiocarpa / slender sedge
Carex lenticularis /lens sedge
Carex limosa / mud sedge
Carex microptera / small wing sedge
Carex muricata / boreal sedge
Carex nebrascensis / Nebraska sedge
Carex pachystachya / Chamisso's sedge
Carex paupercula / poor sedge
Carex rostrata or C. utricularia / beaked sedge
Carex saxatilis / russet sedge
Carex simulata / short beaked or lookalike sedge
Carex vescaria / blister sedge
Eleocharis palustris / common spikerush
Eleocharis pauciflora / few flowered spikerush
Eleocharis rostellata / Torrey's spikerush
Eleocharis acicularis / slender spikerush
Eriophorum polystachion / cottongrass
Juncus arcticus / wiregrass
Juncus bufonius / toad rush
Juncus drummondii / Drummond's rush
Juncus ensifolius / swordleaf rush
Jincus filiformis / filiform rush
Juncus halli / Hall's rush
Juncus longistylis / longstyle rush
Juncus nevadensis / Nevada rush
Luzula campestris / hairy wood rush
Luzula spicata / spike woodrush
Scirpus acutus / hardstem bulrush

Graminoids
Agrostis scabra / ticklegrass
Calamagrostis canadensis / bluejoint reedgrass
Calamagrostis neglecta or inexpansa / slim stem or northern reedgrass
Danthonia intermedia / timber oatgrass
Deschampsia caespitosa / tufted hairgrass
Hierochloe odorata / sweetgrass or vanilla grass
Hordeum brachyantherum / meadow barley
Phleum alpinus / alpine timothy
Trisetum wolfii / Wolf's trisetum

Shrubs
Betula glandulosa / glandular or bog birch
Potentilla fruticosa / palustris /- shrubby cinquefoil / marsh cinquefoil
Salix wolfii / planifolia/ geyeriana / boothii/ drummondii – Wolf's/planeleaf/ Geyer's / Booth's willow
Vaccinium myrtillus / scoparium – dwarf bilberry / grouseberry

Forbs
Antennaria corymbosa, umbrinella / Plains pussytoes, mountain pussytoes
Achillea millefolium – milfoil yarrow
Anemone patens – Pasque flower, wild crocus
Caltha leptosepala – marsh marigold
Equisteum arvense – meadow horsetail
Erigeron speciosus – strange daisy
Fragaria vesca – stravling strawberry
Geum aleppicum – erect avens
Geum macrophyllum – large-leaved avens
Galium bifolium – twinleaf bedstraw
Gentiana algida / calycosa / prostrate – Artic, explorer, moss gentian
Geranium richardsonii – Richardson's geranium
Habenaria dilata, sparsiflora, saccata – white, Watson's, slender bog orchid
Ligusticum tenuifolium – small or slenderleaf ligusticum
Mentha arvensis – field mint
Mertensia arizonica, ciliate – tall, mountain bulebells
Polygonum amphibium – water smartweed
Polygonum viviparum – alpine bistort
Pedicularis groenlandica – elephanthead
Polygonum bistortoides – American bistort
Potamogeton gramineus/nodosus/natans / grass, longleaf, floating pondweed
Potentilla gracilis, ovina, diversifolia – slender, sheep, wedgeleaf cinquefoil
Rorippa curvipes – yellow pondlily, spatterdock
Sparganium minimum – small bur-reed
Sedum rhodanthum – pink stonecrop
Senecio spp - groundsel
Sisyrinchium idahoense – Idaho blue-eyed grass
Swertia perennis - felwort
Thalictrum fendleri – Fendler's meadowrue
Veratrum californicum – false hellebore, skunk cabbage
Veronica wormskjoldii, peregrine, americana – speedwell

China Meadows, northwest slope Uintas, Wasatch-Cache NF

East Fork of Smith's Fork, northwest slope Uintas, Wasatch-Cache NF

Marsh pond slope, northwest slope Uintas, Wasatch-Cache NF

Upper Christmas Meadows, northwest slope Uintas, Wasatch-Cache NF

Lower Christmas Meadows, northwest slope Uintas, Wasatch-Cache NF

Reader Creek, patterned fen, southeast slope Uintas, Ashley NF

Gilbert Meadows, northwest slope Uintas, Wasatch-Cache NF

Reader Creek, southwest slope Uintas, Ashley NF