# UTAH'S WETLAND PROGRAM PLAN- 2018-2023

## VERSION 1.0, DECEMBER 2017

Prepared for EPA Region 8 Wetlands Program, by:

**Utah Geological Survey, Utah Department of Natural Resources**
**Utah Division of Water Quality, Utah Department of Environmental Quality**
**Salt Lake City, UT**

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**Cover:**

**Clockwise from upper left: Fen along a headwaters tributary to East Fork Blacks Fork in the Uinta-Wasatch-Cache National Forest's High Uinta Wilderness in northern Utah, alkali bulrush (*Bolboschoenus maritimus*) stand in a privately managed duck hunting club along the northeastern edge of Great Salt Lake, riparian area and wetland viewing platform at the Swaner Eco-Center in Summit County, and pickleweed (*Salicornia rubra*) in the fall on a mudflat near Farmington Bay, Great Salt Lake.**

# Introduction

The Utah Wetland Program Plan is designed to guide the direction of state activities related to the federal Core Elements of a State or Tribal Wetland Program developed by the Environmental Protection Agency (EPA). EPA's Core Elements Framework was designed to help States and Tribes develop comprehensive wetland programs based on a common set of program objectives. The four "Core Elements" of an effective wetland program include: Monitoring and Assessment; Regulation (including §401 certification); Voluntary Restoration and Protection; and Water Quality Standards for Wetlands. Outreach and partnership development activities are integrated into all wetland programs. The Utah Geological Survey (UGS) and Utah's Division of Water Quality (UDWQ) created this Wetland Program Plan (WPP) to define state wetland program objectives and develop projects that support agency objectives. The purpose of this WPP is to guide UGS's and UDWQ's wetland program development activities over the next six years (2018 - 2023) and serve as a tool for communication and collaboration with other state and federal agencies and non-governmental groups involved in wetland research, conservation, and protection. This plan will be used by UGS and UDWQ to secure financial resources, update and engage stakeholders, and organize partnerships to complete a wide range of statewide program development tasks.

UGS and UDWQ have been lead agencies in conducting wetlands work in the state of Utah. UGS's mission is to provide "timely scientific information about Utah's geologic environment, resources and hazards," including groundwater and wetland resources. To support this mission, UGS has focused on wetland mapping and classification and conducting wetland rapid assessment surveys with the goal of providing data on Utah's wetland resources to decision-makers to inform management, restoration, conservation, and mitigation decisions. UDWQ's mission is to "protect, maintain and enhance the quality of Utah's surface and underground waters for appropriate beneficial uses; and protect the public health through eliminating and preventing water related health hazards which can occur as a result of improper disposal of human, animal or industrial wastes while giving reasonable consideration to the economic impact." To support this mission and UDWQ's regulatory duties, the Wetland Program is currently focused on developing appropriate wetland specific beneficial uses and criteria, particularly for wetlands associated with Great Salt Lake that comprise the majority of wetlands in the state of Utah.

*The **overall goal** of Utah's WPP is to increase the amount and availability of scientific data on Utah's wetlands by continuing to build and deploy scientifically-based tools to assess wetland health and to afford greater protection by determining wetland specific beneficial uses and criteria to protect those uses*. The actions covered by this WPP to advance this goal are divided into four sections:

1. **Mapping and Landscape Planning**: Develop data, tools and methods that allow wetland data to be better incorporated into landscape-scale planning, including mapping to support planning and monitoring efforts.
2. **Monitoring and Assessment**: Develop and deploy methods to evaluate the condition, function, and beneficial use attainment of Utah's wetlands.
3. **Water Quality Standards:** Define science-based beneficial uses for Utah's wetlands with appropriate criteria that are protective of the use.

4. **Outreach, Coordination, and Data Dissemination:** Increase public awareness of wetlands and use of wetland data through data accessibility, outreach, and collaboration

Each section contains a list of actions that UGS and UDWQ plan to complete over the next six years if adequate funding for each action is secured. The format for each action is the following: first there is a brief summary of the work that has been done previously related to the action, if applicable, and the work that will be done. Next, the relevant components of the EPA's Core Elements Framework that apply to the action are listed, with the Core Element in bold followed by the individual objectives and key actions from the framework. For example, the Monitoring and Assessment Core Element's fourth action under the first objective would be listed as **Monitoring and Assessment,** 1d Select core indicators. Last, a list of activities that will be conducted in support of the action are listed, with the year that the activity will be completed listed in parenthesis following the activity.

## 1. Mapping and Landscape Planning

Develop data, tools and methods that allow wetland data to be better incorporated into landscape scale planning, including mapping to support planning and monitoring efforts

**Overview**

Timely and accurate information about the distribution, abundance, and type of aquatic resources in the state is vital for effective restoration, conservation, and land use planning and for providing a sample frame to support monitoring and assessment activities. UGS is focused on updating wetland mapping in the state, improving methods for mapping and describing wetlands, and creating useful landscape tools and summaries to provide context to mapped data.

### Action 1.1. Update wetland mapping in the state in priority areas

UGS

The National Wetlands Inventory (NWI) provides spatial data for wetlands in Utah, but most of the state was mapped in the 1980s using older techniques and data standards, and land use changes from the past thirty years are not reflected in the current data. UGS is the lead agency for updating wetland mapping in the state, with mapping projects at or near completion in the upper Bear River watershed, around Great Salt Lake, and in Salt Lake and Juab counties. UGS will continue to remap regions in the state to provide a more accurate and comprehensive map of wetland resources. Priority areas for new mapping will be determined by a combination of factors, including priorities identified by stakeholders and the accuracy of existing data.

*EPA Core Elements*

**Monitoring and Assessment**: 1b Define monitoring strategies, 1c Develop monitoring design
**Voluntary Restoration and Protection:** 1b Consider watershed planning, wildlife habitat, etc. when selecting restoration/protection sites

*Activities*

1. Remap a portion of the Uinta Basin (2018)
2. Engage stakeholders to determine regional interest and need for updated wetland mapping; select priority areas for mapping projects (ongoing)
3. Remap priority areas (ongoing)
4. Ensure that all mapping data end up in appropriate, publicly available repositories with appropriate documentation, including the federal NWI database and the Utah Automated Geographic Resource Center (ongoing)

## Action 1.2. Improve methods for mapping wetlands through enhanced attribution and incorporation of additional aquatic features

**UGS**

The NWI data do not meet the needs of all stakeholders, both because some features, such as riparian areas and springs, are not always mapped and because the NWI attribution can be confusing or incomplete. UGS developed a functional reclassification to crosswalk NWI's Cowardin classes to more intuitive wetland types (e.g., meadow, marsh, or playa) in 2017 and began pilot work to integrate riparian mapping with wetland mapping that same year. The next step in improving NWI data is adding landscape position, landform, water flow path, and waterbody (LLWW) descriptors to wetlands and cross-walking those descriptors to wetland functions. LLWW descriptors enhance NWI polygons through attribution of key hydrogeomorphic features of wetlands, including landscape position, landform, and water flow path. UGS plans to work with other partners mapping in the West to develop consistent methods for applying LLWW descriptors to mapped NWI polygons in a manner appropriate to the western United States. UGS also plans to conduct pilot work to organize and validate data on the location of springs to obtain a more complete spatial layer of aquatic resources. Spring systems are often too small to be captured with routine NWI mapping, but are important sources of water in the West.

*EPA Core Elements*

**Monitoring and Assessment**: 1c Develop monitoring design
**Voluntary Restoration and Protection:** 1b Consider watershed planning, wildlife habitat, etc. when selecting restoration/protection sites
**Water Quality Standards:** 2b Establish designated uses (map where uses apply)

*Activities*

1. Develop new methods of mapping when novel wetland types are encountered (ongoing)
2. Complete pilot project testing concurrent riparian-wetland mapping (2018)
3. Incorporate riparian mapping in all new wetland mapping projects if pilot project demonstrates feasibility (2019-2023)
4. Work collaboratively with partners in nearby states to develop LLWW modifiers and functional crosswalk that is appropriate for wetlands in the West (2019-2020)
5. Apply LLWW modifiers to Utah's wetlands using an automated approach whenever possible and during new mapping projects when necessary (2021-2023)
6. Develop template for managing data on spring locations (2021-2022)
7. Conduct pilot project to determine feasibility of managing spring data concurrently with wetland mapping (2023)
8. Work with UDWQ to ensure wetland classifications are relevant for beneficial use designations (ongoing)

## Action 1.3. Create tools to integrate and summarize data across large scales to assist with landscape planning

**UGS**

UGS will develop new spatial layers and summarize existing layers to provide resources for landscape planning, including wildlife range maps, landscape profiles, and functional summaries. Wildlife range maps of sensitive wetland-dependent species can be used in conjunction with wetland spatial data to evaluate habitat availability and in a regulatory context to determine how to minimize habitat loss for key species. Landscape profiles summarize wetland spatial data about the extent, type, conservation status, and potential landscape stress of wetlands within planning units, such as watersheds, counties, or ecoregions. This summarized information will be useful for landscape planning such as determining restoration and conservation opportunities and evaluating out-of-kind mitigation proposals. Functional summaries will be developed from LLWW modifiers once a complete study area is mapped with the LLWW modifiers.

*EPA Core Elements*

**Monitoring and Assessment**: 3b Develop geographically-based wetland protection
**Regulation** 3d Incorporate watershed approach
**Voluntary Restoration and Protection:** 1b Consider watershed planning, wildlife habitat, etc. when selecting restoration/protection sites, 2a Establish partnership to leverage protection

*Activities*

1. Develop spatial layer showing range of sensitive amphibian species (2018) and other wetland-dependent wildlife species (TBD)
2. Develop landscape profile for major watersheds in Utah by summarizing information such as wetland extent, class, potential landscape stress, and ownership (2020)
3. Develop landscape profile for assessment project areas by summarizing information such as wetland extent, class, potential landscape stress, and ownership (Bear River Watershed 2018; Central Basin and Range 2020; Wasatch and Uinta Mountains 2022)
4. Conduct pilot project developing functional summaries using LLWW modifiers (2022)

## 2. Monitoring and Assessment

Develop and deploy methods to evaluate the condition, function, and beneficial use attainment of Utah's wetlands.

### Overview

Monitoring and assessment data are important for providing basic information on wetland resources, such as type, condition, functional contribution, and common threats, and for meeting regulatory needs. Utah's monitoring and assessment strategy is twofold. Baseline information and initial characterization of high-quality or 'reference' condition will be collected using a rapid assessment protocol with probabilistic surveys supplemented with some targeted monitoring. More intensive monitoring strategies will be developed and deployed to address specific regulatory goals, including developing appropriate beneficial uses for different wetland types and assessing whether wetlands are meeting those uses. Baseline data collection will be led by UGS and will generally occur across all wetland types, and the regulatory assessment will be led by UDWQ and will target specific classes of wetlands. Both UGS and UDWQ will organize assessments around the three main Level III Omernik ecoregions in Utah: the Central Basin and Range, the Wasatch and Uinta Mountains, and the Colorado Plateau. The sampling strategy under this WPP is for UGS to first conduct a rapid wetland assessment within an ecoregion and then synthesize that data in collaboration with UDWQ to provide information on relevant wetland types, ecological descriptions, and potential reference sites to inform development of beneficial use classes for the region that are protective of that ecosystem type. UDWQ will next develop appropriate methods for more intensive monitoring of those particular wetland classes and conduct targeted monitoring to determine whether methods and standards are sufficient and whether wetlands are meeting beneficial uses. Over the next six years, UGS will improve on their rapid assessment method, synthesize data within ecoregions, explore regionally specific wetland condition metrics, and use water level data to answer questions about the future of Utah's wetlands. UDWQ will continue improvement of methods developed to monitor impounded and fringe wetlands around Great Salt Lake. Following the mapping and rapid assessment surveys, UDWQ will develop assessment methods for playa wetlands around Great Salt Lake, assess important condition and water quality questions using high frequency data, and begin assessing beneficial uses of Wasatch and Uinta Mountains wetlands.

### Action 2.1. Improve existing rapid assessment protocol to ensure validity and utility for stakeholder needs

**UGS**

UGS has developed a rapid wetland condition assessment protocol, the Utah Rapid Assessment Procedure (URAP), to facilitate the collection of basic wetland field data and modified the protocol in 2016 to add functional components evaluating wildlife habitat and potential for water quality improvement. UGS has validated the protocol by comparing rapid assessment condition scores with plant community composition and stressor summaries. In 2017, UGS conducted a series of field tests to determine the reliability of results when data

collected by different observers, with different methods (for vegetation data), and at different times of year. UGS plans on developing the method further by adding additional functional components, validating some of the functional components, and working with stakeholders to ensure the protocol meets stakeholder needs.

*EPA Core Elements*

**Monitoring and Assessment**: 1a Identify outcomes, 1d Select core indicators, 2a Ensure scientific, 3a Evaluate monitoring program

*Activities*

1. Make minor adjustments to protocol as needed after probabilistic Bear River watershed survey (Action 2.2) (2018)
2. Add flood attenuation and water storage function checklists to protocol (2019)
3. Validate wildlife checklist and wildlife plant values by surveying at locations with wildlife data (2021-2022)
4. Engage stakeholders to determine needs that are unmet by existing rapid assessment tool (ongoing)
5. Modify metrics as needed for newly developed wetland classes or unique situations encountered and, as new components are added, make sure there is a simple version composed of core indicators that can be used rapidly and by multiple partners (ongoing)
6. Conduct trainings on assessment method as needed based on stakeholder interest (ongoing)

### Action 2.2. Obtain data on the type, condition, and threats to wetlands in Utah

**UGS**

UGS initially began conducting watershed-based wetland surveys, but has since determined that ecoregional surveys are more effective for capturing wetland type, condition, functions and threats and for characterizing high-quality wetlands. Assessments within ecoregions allow for collection of more data from a narrower range of wetland types, making it more feasible to establish reference condition and develop ecological system descriptions. UGS will finish conducting one more watershed-based wetland assessment and then begin conducting ecoregional assessments. Probabilistic surveys within each ecoregion will be focused on areas outside of the watersheds that have already been surveyed, but analysis will synthesize data within the ecoregion across the different survey efforts. Targeted sampling will be used to obtain data on most and least disturbed wetlands to aid in the development of ecological descriptions of wetland types and reference site descriptions.

*EPA Core Elements*

**Monitoring and Assessment**: 1c Determine classification, 1d Select core indicators, 2a Monitor resources, 2b Monitor wetlands, 2c Establish reference condition, 2e Analyze

monitoring data, 3b Evaluate consequences of actions, 3c Improve site-specific management
**Regulation**: 2f Require effective mitigation, 3a Monitor implementation, 3c Ensure replacement of aquatic resources
**Voluntary Restoration and Protection**: 1c Provide guidance on success measures
**Water Quality Standards:** 2a Gather/analyze monitoring data

*Activities*

1. Conduct probabilistic survey in the Bear River Watershed (2018)
2. Conduct probabilistic survey in the Central Basin and Range ecoregion (excluding previously surveyed watersheds) (2019-2020)
3. Determine preliminary wetland classes in the Central Basin and Range and survey targeted high and low quality sites in each class, as needed (2020)
4. Synthesize monitoring results and develop ecological descriptions for common wetland types in the Central Basin and Range, combining all relevant survey data (2020)
5. Conduct probabilistic survey in the Uinta and Wasatch Mountains ecoregion (excluding previously surveyed watersheds) (2021-2022)
6. Determine preliminary wetland classes in the Uinta and Wasatch Mountains and survey targeted high and low quality sites in each class, as needed (2022)
7. Synthesize monitoring results and develop ecological descriptions for common wetland types in the Uinta and Wasatch Mountains, combining all relevant survey data (2022)
8. Conduct probabilistic survey in the Colorado Plateau ecoregion (2023)
9. Encourage additional data collection of core indicators from partners to leverage data to characterize watersheds (ongoing)

### Action 2.3. Classify plants according to ecological characteristics to better describe wetland condition and function

**UGS & UDWQ**

Plant composition data are valuable for evaluating wetlands. Plant species respond to both recent and ongoing disturbances, even those that are not readily apparent during field surveys (e.g., water quality disturbances, late season grazing), and plant communities can be evaluated at most wetlands at a single point in time, rather than requiring repeat visits. Coefficients of Conservatism values (C-values) are often used to analyze plant composition data; these values range from 0 to 10 and indicate the degree that a species is associated with disturbed versus pristine habitat conditions. UGS is currently adopting C-values from neighboring states, but analysis would benefit from Utah-specific C-values, particularly in the Central Basin and Range, where no one has developed C-values. In addition to assigning C-values to species, UGS and UDWQ would also like to determine the feasibility of assigning common wetland plants ratings based on their sensitivity to specific disturbances (e.g., turbidity, cattle grazing) as well as their value for functions such as bank stability or wildlife habitat use. These values would be assigned based on the results of literature reviews. Once adequate data are collected on the distribution (from field monitoring activities) and

ecological role of common plant species, UGS will assemble information into a plant guide for common wetland species in Utah.

*EPA Core Elements*

**Monitoring and Assessment:** 1d Select core indicators, 2c Establish reference condition
**Voluntary Restoration and Protection**: 1c Provide guidance on success measures
**Water Quality Standards:** 2a Gather/analyze monitoring data

*Activities*

1. Develop C-values for common Central Basin and Range plant species (2019-2020)
2. Conduct literature review to rate commonly encountered wetland plants in the Central Basin and Range based on functional traits such as: value for wildlife food, bank stability indicator, susceptibility to grazing, tolerance to water quality stressors such as turbidity and high nutrient levels, response to fluctuating water levels (2019-2020)
3. Incorporate new C-values and other plant ratings into data analysis and evaluate effectiveness (2020)
4. Expand effort to assign common plants functional values to include common Uinta and Wasatch Mountains species (2021-2022)
5. Expand effort to assign common plants functional values to include common Colorado Plateau species (2023)
6. Determine level of interest and feasibility for assembling a plant guide for Utah's wetland species, decide on format (ecoregional or statewide, common species or all species), and begin assembling guide (2023)

### Action 2.4. Utilize hydrologic data to evaluate new aspects of wetland condition

**UGS**

UGS has a network of wetland piezometers installed in Snake Valley in western Utah to monitor water levels in areas with sensitive species that may be threatened by groundwater withdrawal. UGS currently has funding to develop models of wetland water levels based on climate data and water levels from nearby groundwater wells. Quantifying climate's impact on water levels will make it easier to detect other factors that may alter water levels, such as groundwater pumping or change in vegetation regime, and to predict future water levels at wetland sites. Results from the Snake Valley analysis will be used to assess the feasibility of expanding the piezometer network to other regions in the state to better define natural hydrology and to monitor for long-term trends.

*EPA Core Elements*

**Monitoring and Assessment:** 1d Select core indicators, 2b Monitor wetlands, 2c Establish reference condition, 2e Analyze monitoring data
**Voluntary Restoration and Protection**: 1c Provide guidance on success measures

**Water Quality Standards:** 2a Gather/analyze monitoring data

*Activities*

1. Develop models to predict wetland water levels based on climate data, using existing piezometer monitoring network in Snake Valley (2018)
2. Classify wetland piezometers in Snake Valley based on water regime and examine methods to evaluate whether wetlands are shifting outside bounds of historical conditions (2019-2020)
3. Identify existing (non-UGS) wetlands piezometer data and incorporate into central database (2021-2022)
4. Determine feasibility and outline goals of expanding piezometer network (2022)
5. Select preliminary reference network sites and install piezometers (2023)
6. Collect assessment data at reference piezometer sites on an annual basis (2023)

## Action 2.5. Continue developing methods for monitoring impounded and fringe wetlands around Great Salt Lake

**UDWQ**

UDWQ has developed methods and conducted surveys of two types of Great Salt Lake wetlands: impounded and fringe wetlands. An impounded wetland multi-metric index (MMI) has been used in three surveys, testing the ability to accurately measure condition in an initial targeted sample of wetlands that are highly valued as wildlife habitat, a probabilistic sample of wetlands across the range of Great Salt Lake conditions, and carefully selected best available condition reference wetland sites. A method to assess fringe wetlands was tested with an initial probabilistic survey around Great Salt Lake. These surveys have provided critical information on the relative condition of those wetlands, the characteristics of high-quality reference wetlands, and the most common wetland stresses. However, assessment method development is an iterative process and both methods should be refined and the network of monitored sites expanded. The water quality goals for Great Salt Lake wetlands are based on the ability to support wetland-dependent wildlife, yet linking condition to actual wildlife use remains a challenge. As UDWQ refines their assessment methods, they will work with state and federal wildlife agencies to explore the possibility of linking existing condition data or future surveys to wildlife surveys conducted by the Utah Division of Wildlife Resources and the U.S. Fish and Wildlife Service. Finally, when methods have been established for all major Great Salt Lake wetland classes, UDWQ will move into routine monitoring of wetlands in order to report on the status of that aquatic resource.

*EPA Core Elements*

**Monitoring and Assessment:** 1c Develop monitoring design, 1d Select core set of indicators, 2c Establish reference condition, 2e Analyze monitoring data
**Water Quality Standards:** 2a Gather/analyze monitoring data

*Activities*

1. Consult with state and federal wildlife agencies on methods for linking condition data to wetland-dependent wildlife use (2018)
2. Develop a third draft of the impounded wetland MMI based on validation reports and current wetland condition literature (2018)
3. Conduct a probabilistic survey of impounded wetlands using the third version of the impounded wetland MMI; interim impounded wetland reporting (2018)
4. Develop a second draft of the fringe wetland assessment method through consultation with UGS and other stakeholders (2019)
5. Conduct a targeted survey of 50 fringe wetlands, focused on the highest and lowest condition sites; interim fringe wetland reporting (2019)
6. Validate fringe wetland assessment methods through analysis of previous and current fringe wetland assessment results (2020)
7. Analyze and report on the status of Great Salt Lake wetlands based on the results of impounded, fringe, and playa/mudflat assessments (2022)
8. Develop a framework for routine monitoring of Great Salt Lake wetlands (2023)
9. Test a Great Salt Lake wetland monitoring protocol for use across multiple ecosystem types and by a variety of users (2023)

### Action 2.6. Assess the condition of Great Salt Lake playa and mudflat wetlands

**UDWQ**

UDWQ has developed preliminary Level III assessment methods and conducted assessments for two of three key Great Salt Lake wetland classes, impounded and fringe wetlands. In order to understand the condition and stressors of playa and mudflat wetlands, UDWQ plans to develop methods for monitoring playas and mudflat wetlands. Playa wetlands are unique to arid and semi-arid regions; they are very flat depressional wetlands supplied primarily by precipitation and defined by the accumulation of salts at the soil surface and low vegetation cover (<30% of total area). Mudflat wetlands are closely related, but accumulate less pronounced salt crusts and are the result of land being exposed by receding surface waters along shallow waterbody shorelines. Assessment is challenging as the area covered by these wetlands, especially mudflats, changes from year to year, making the acquisition of a correct sample frame challenging. Playas and mudflats are also hard to assess due to the episodic nature of precipitation and associated bursts of productivity, making it difficult to find the correct index period for accurate assessment. However, playa and mudflat wetlands support extraordinary migratory shorebird populations and are a critical part of Great Salt Lake's health. UDWQ will use the NWI crosswalk data created by UGS as well as any available rapid assessment information to sample using a two-part approach: a targeted survey followed by probabilistic sampling.

*EPA Core Elements*

**Monitoring and Assessment:** 1c Develop monitoring design, 1d Select core set of indicators, 2c Establish reference condition, 2e Analyze monitoring data
**Water Quality Standards:** 2a Gather/analyze monitoring data

*Activities*

2. Determine the appropriate sample frame, wetland classification, and study area (Great Salt Lake or Great Basin) required to accurately assess the playa/mudflat wetland type (2020)
3. Conduct literature review and develop preliminary condition assessment method for playa/mudflat wetlands (2020)
4. Develop and review a Sampling and Analysis Plan and Standard Operating Protocols for playa/mudflat assessment, including data management system (2020)
5. Conduct targeted survey of likely reference and lowest condition playa/mudflat wetlands (2021)
6. Analyze targeted survey results, define playa/mudflat reference condition, and update method accordingly (2021)
7. Conduct a probabilistic survey of 50 playa/mudflat wetlands (2022)
8. Analyze and report results of playa/mudflat assessments, including implications for Great Salt Lake wetland water quality standards (2022)
9. Finalize multi-metric index for playa/mudflat wetlands (2023)

### Action 2.7. Build a high-frequency monitoring network to track water quality processes

**UDWQ**

Water quality issues that affect wetlands are tightly linked to hydrology and, since wetland hydrology is dynamic, water quality also fluctuates across time and space. This makes detecting water quality impairment and understanding the causes and consequences of poor condition difficult. Conditions that violate conventional water quality standards, like high temperature and pH or low oxygen, may be part of natural wetland processes, not human-induced changes. Conversely, impairments to water quality may be linked to water management decisions, making them potentially preventable with appropriate guidance. High frequency monitoring involving automated probes collecting data on water level, nutrients, and other parameters of interest deployed across a range of conditions will allow UDWQ to develop defensible numeric water quality criteria and monitoring periods. Data collected at higher frequency will also assist in tracking critical times of year for important water quality challenges including summer algae blooms, dips in dissolved oxygen availability, and pulses of nutrients that may be critical to nutrient cycling processes. Linking water quality data with water availability also provides a potential mechanism for preventing poor condition. Studies will begin in the Farmington Bay portion of Great Salt Lake because UDWQ is currently conducting research there, annual blooms of harmful and nuisance algae are common, and the area is popular for waterfowl hunting and wildlife viewing. Wetland monitoring will also support high frequency monitoring occurring upstream of Farmington Bay on the Jordan River.

*EPA Core Elements*

**Monitoring and Assessment:** 1c Develop monitoring design, 2d Ensure validity of monitoring activities
**Regulation:** 3e Perform outreach
**Voluntary Restoration and Protection:** 1b Consider multiple objectives

*Activities*

1. Evaluate data from 2017-2018 gradient study to determine potential parameters that capture variability in water quality over time and space (i.e., dissolved oxygen, nitrogen, or phosphorus) (2018)
2. Conduct a literature review and consult with stakeholders to determine critical questions to be addressed by high frequency monitoring and the appropriate number of monitoring stations (2019)
3. Develop QA/QC workflow for high frequency data (2019)
4. Deploy automated probes across a network of wetland sites, upload data, and calibrate sensors as necessary (2019)
5. Upload and analyze data (2020)
6. Present data both in report form as well as housing data in an online server (2021)
7. Redeploy sensors in existing or new locations based on monitoring results or water quality data needs (ongoing)

### Action 2.8. Assess the condition of Rocky Mountain wetlands — UDWQ

Over the last decade the bulk of UDWQ's wetland work has been conducted on wetlands associated with Great Salt Lake because that is where approximately 75% of Utah's wetlands are located and because of immediate threats to the water quality of these wetlands. The first activities of this WPP are focused on finalizing Water Quality Standards for those wetlands, after which UDWQ hopes to expand the universe of wetlands they study and protect to all wetlands of the state. Following the ecoregional approach taken by UGS and building off their earlier research, UDWQ will begin the process of assessing and developing Water Quality Standards for wetlands in the Uinta and Wasatch Mountain ecoregion of the Rocky Mountains. Wetlands in montane regions occur in smaller numbers and sizes than the wetlands of Great Salt Lake, have biota adapted to the colder conditions found at higher elevations, and support a different suite of ecological functions. Uinta and Wasatch Mountain wetlands are associated with the headwaters of streams that supply water to the population centers of Utah, which is an important function to protect. UGS has or will complete surveys of the Bear, Weber, and Jordan River watershed portions of this ecoregion, which once analyzed will provide insight into the dominant wetland types, relative condition, and dominant sources of stress. UDWQ will use that analysis to conduct targeted surveys of dominant wetland types, followed by probabilistic surveys.

*EPA Core Elements*

**Monitoring and Assessment:** 1b Define monitoring strategies, 2c Establish reference condition

**Water Quality Standards:** 2a Gather/analyze monitoring data

*Activities*

1. Collaborate with UGS to synthesize results from studies in the Bear, Weber, and Jordan watershed portions of the ecoregion to determine important classes of wetlands (see Action 2.2) (2021)
2. Develop an appropriate classification system and sample frame for assessment (2021)
3. Conduct a targeted survey of Uinta and Wasatch Mountain region wetlands, targeting the highest and lowest condition sites (based on UGS summaries) (2022)
4. Analyze data and update methods (2022)
5. Conduct a probabilistic survey of 50 wetlands in the Uinta and Wasatch Mountain region wetlands (2023)
6. Analyze and report the results of targeted and probabilistic surveys (2023) and assess the appropriateness or need to adopt uses and criteria to protect montane wetlands (2023).
7. Synthesize the results of UGS studies in the southern portion of the Uinta and Wasatch Mountain ecoregion and identify potential changes to the existing assessment methods in preparation for assessment of wetlands in the Green and Sevier watersheds (TBD).

## 3. Outreach, Coordination, and Data Dissemination

Increase wetland awareness and use of wetland data through data accessibility, outreach, and collaboration

### Overview

Outreach and coordination with other stakeholders, including local, state, and federal agencies, non-profit groups, consulting firms, and the general public, is crucial for increasing efficiencies amongst programs, making sure information is available to decision-makers, increasing public support for wetlands, and determining unmet needs. UGS currently disseminates wetlands information online (https://geology.utah.gov/resources/wetlands) with a summary of the work being conducted by UGS, links to project reports, and a wetland mapper showing up-to-date wetland mapping data. UGS also coordinates a loose working group of over 130 professionals with an interest in wetlands, hosting meetings about once per year and sending newsletters to the group approximately twice a year with a summary of the latest work being done by UGS. One of UDWQ's responsibilities is to coordinate with federal agencies in charge of regulatory issues and consult with state agencies and private organizations on the requirements of water quality permits, certifications, and monitoring. In order to effectively coordinate with other wetland stakeholders on regulatory issues, the wetland program needs up-to-date information on the important wetland resources in the state and the condition and threats to those resources. UDWQ will work to improve coordination within our agency, with the wetland working group, and with our stakeholders to share the results of our work in a timely and accessible way. UDWQ and UGS will continue to update their websites, improve compilation and online sharing of wetland data, and participate in and host meetings as needed to improve outreach and coordination.

### Action 3.1. Refine wetland mapping portal to include additional functionality and links to summaries of important wetland information

**UGS**

UGS currently has a wetland mapping portal that shows the most up-to-date wetland spatial data, project boundaries for UGS field assessments with links to relevant reports, and boundaries of some wetland management areas. UGS plans to add additional data to the mapper, including wildlife range maps and wetland landscape profile summaries, and to create additional functionality, such as the ability to download data directly from the mapper.

*EPA Core Elements*

**Monitoring and Assessment**: 2d Track monitoring data, 3b Develop geographically-based wetland protection
**Regulation** 3d Incorporate watershed approach, 3e Perform outreach

**Voluntary Restoration and Protection:** 1b Consider watershed planning, wildlife habitat, etc. when selecting restoration/protection sites

*Activities*

1. Update wetland mapper with newly mapped data as needed (ongoing)
2. Add functionality to mapper to allow for data downloads (2020)
3. Develop mapper to include links to landscape profile summaries by watershed, county, and ecoregion (2020)
4. Evaluate methods to display LLWW attributes in the wetland mapper (2022)
5. Add additional data layers and links to mapper as needed, such as boundaries of wetland beneficial use classes, range maps for sensitive wetland-dependent wildlife species, and summaries of results from watershed and ecoregional probabilistic surveys (ongoing)

### Action 3.2. Integrate wetland data into a single data structure, to the extent practicable, and develop methods for sharing data while respecting existing privacy constraints

**UGS & UDWQ**

Good data management is crucial for ensuring the integrity of survey data and making the data easier to analyze and share with partners. UGS's survey data are housed in a relational Access database with lookup tables and appropriate controls to ensure only valid responses are entered in each field. UGS currently has funding to develop a public portal for displaying plant community data. The public portal will show some site-specific data, but much of the data will need to be summarized or queryable within broader regions to protect the privacy of landowners. Additional data may be displayed on the portal, such as soil profiles and water quality parameters once the initial framework is built. UGS is also interested in integrating additional wetland data into a single database, such as data from EPA's National Wetland Condition Surveys and data from UDWQ. This data integration will likely require modifying the existing data structure and moving data to a more robust SQL server. UDWQ will also explore the feasibility of including wetland water quality and biological data on EPA's national level Water Quality Portal.

*EPA Core Elements*

**Monitoring and Assessment**: 1b Define monitoring strategies, 2d Track monitoring data, 2e Analyze monitoring data
**Voluntary Restoration and Protection**: 4b Monitor restoration
**Water Quality Standards:** 2a Gather/analyze monitoring data

*Activities*

1. Develop public portal for plant community data (2020)
2. Add additional data to the public data portal, including soil profiles and water quality data (2021-2022)
3. Extract and QA/QC relevant components of UDWQ data to add to UGS public data portal (2022)

4. Determine feasibility of adding partner agency data into UGS's database and make appropriate changes to the database as needed (2023)
5. Bring UDWQ's wetland data, including water quality and biological data, into a single relational database following the structure established by UGS (2023)
6. Explore options for exporting UDWQ water quality and biological data to the Water Quality Portal (2023)
7. Improve dissemination of wetland and riparian plant community data through contribution to regional and national databases, when appropriate (ongoing)

## Action 3.3. Increase outreach to Utah's wetland stakeholders

**UGS & UDWQ**

As Utah's Wetland Program has developed, it has become increasingly important to effectively disseminate the results of that work to stakeholders through presentations, working groups, and online resources. UGS will continue to coordinate the wetland working groups it has built and use information discussed in those meetings to develop effective outreach materials, including newsletters, and stay up-to-date on current issues regarding Utah's wetlands. In order to address the full range of issues relevant to wetlands, UDWQ will take a more active role in co-leading aspects of the wetland working group and identifying more focused subgroups to address water quality issues affecting wetland stakeholders. UDWQ will continue participating in water quality working group meetings as well as actively participating in the Inter-agency Review Team to support compensatory mitigation needs and the §404 permitting process. Both UGS and UDWQ will continually improve their online materials and update the WPP.

*EPA Core Elements*

**Monitoring and Assessment**: 1a Identify outcomes, 1b Define monitoring strategies, 3a Evaluate monitoring program
**Regulation:** 3e Perform public education and outreach
**Voluntary Restoration and Protection:** 1a Establish consistent goals, 1b Consider multiple objectives, 1c Provide guidance on success measures, 2a Establish partnerships

*Activities*

1. Develop outreach material summarizing key aspects of survey results that are targeted to different stakeholder groups, such as the general public, restoration practitioners, and regulatory authorities (ongoing)
2. Maintain and update agency wetland webpages as needed, including posting reports and information about wetland program projects (ongoing)
3. Conduct annual working group meetings to provide forum for discussion, identification of stakeholder needs, and plans to address those needs (ongoing)
4. Send wetlands newsletter to working group approximately twice per year with the latest news from the wetland program (ongoing)
5. Develop working group subgroups focused on water quality issues and wetlands (TBD)

6. Attend professional meeting and local non-wetland working group meetings to disseminate information about Utah's wetland program and stay up-to-date on relevant collaborative opportunities (ongoing)
7. Develop a new Wetland Program Plan and update the existing Plan as needed (2023, ongoing)
8. Contribute to the Inter-agency Review Team to review mitigation proposals in Utah (ongoing)

### Action 3.4. Maintain and develop collaborative relationships

**UGS & UDWQ**

Wetland protection and research requires active collaboration with many other organizations. Policies that guide wetland regulation require consultation with U.S. Army Corps of Engineers and EPA, often in collaboration with the Utah Department of Transportation and other state agencies. Management of wetlands, meanwhile, is conducted largely by wildlife groups, including the U.S. Fish and Wildlife Service and the Utah Division of Wildlife Resources. Around Great Salt Lake, private organizations like the Nature Conservancy, Audubon Society, and a plethora of private hunting clubs are responsible for the protection of large wetland areas and the services we value from them. Universities in Utah conduct critical research in Utah's wetlands that provide timely and robust information on the processes driving the condition of our natural resources and are often cooperators on the grants that fund wetland projects (notably Utah State University and the University of Utah). Gathering information on relevant issues and potential high and low quality wetlands from land managers is crucial before undertaking mapping and monitoring efforts in new regions of the state. Meeting the goals of our plan – increasing access to data on Utah's wetlands and regulating them appropriately – is dependent on establishing relationships with other wetland stakeholders, managers, and regulators.

*EPA Core Elements*

**Monitoring and Assessment:** 3b Evaluate the environmental consequences of actions (401 certifications)
**Voluntary Restoration and Protection:** 1b Consider wildlife habitat, 2a Establish partnerships

*Activities*

1. Within UDWQ, work with watershed planning and monitoring sections to encourage sharing of data and field resources (ongoing)
2. Consult with UDWQ's §401 Water Quality Certification Program on projects with proposed impacts to wetlands (ongoing)
3. Test the applicability of the Utah Rapid Assessment Protocol for addressing the data needs of §401 Water Quality Certifications (TBD)
4. Maintain contact with university researchers to coordinate research activities and stay apprised of research developments (ongoing)

5. Encourage improvement and offer assistance for an update of the Utah Wetland Functional Assessment Method used for large transportation projects (2019)
6. Work with Utah Division of Wildlife Resources to find ways to link UDWQ's beneficial use assessments (based on waterfowl and shorebird use) to measures of bird habitat and use (2020)
7. Consult with regional non-governmental organizations to maximize the effectiveness of local research and planning efforts, especially those affecting Great Salt Lake (ongoing)
8. Present regular updates of UDWQ work on updating development of Utah's wetland Water Quality Standards to the regulated community that may be outside the traditional group of wetland stakeholders (ongoing)

3. Outreach, Coordination, and Data Dissemination

# 4. Water Quality Standards

Define science-based beneficial uses for Utah's wetlands with appropriate criteria and assessment methods

**Overview**

Water Quality Standards include the goals (beneficial uses) for waterbodies (e.g., being swimmable or providing for aquatic habitat) and narrative or numeric criteria for determining whether waters are meeting those goals. Creating Water Quality Standards for wetlands is challenging and has not progressed as quickly as it has for lakes and streams, largely because of the dynamic nature of wetlands: it can be difficult to tell whether water quality conditions are the result of constantly changing natural processes or pollution. Accurate data on wetland classification, condition, and stressors are needed to develop Standards that are legally and scientifically defensible. Current Utah Water Quality Standards have a beneficial designated use class for wetlands around Great Salt Lake, Class 5E Transitional Waters Along the Shoreline of Great Salt Lake (UAC R317-2-6), designed to protect water quality for recreation and water dependent wildlife. All Waters of the State, including wetlands, are protected by the Narrative Standard; however, state rules do not currently include the definitions and criteria necessary to assess the regulatory status of wetlands in terms of water quality or to ensure the continued protection of wetlands or downstream water bodies. Since 2012, UDWQ has conducted extensive assessments of two classes of wetlands around Great Salt Lake to support developing Water Quality Standards for those waters. Going forward, UDWQ plans to use the Conservation Action Planning (CAP) process to bring data from our surveys and other peer-reviewed research to wetland stakeholders in order to collaboratively define appropriate beneficial uses for Great Salt Lake wetlands and the criteria needed to protect those uses. The planning meetings will result in proposed Water Quality Standards for Great Salt Lake wetlands, which will ultimately be brought into Utah's water quality rules, after which UDWQ will focus on standards development required to protect wetlands outside the Great Salt Lake ecosystem.

## Action 4.1. Conduct collaborative Conservation Action Planning Meetings to define the beneficial uses and Narrative Standard changes necessary to protect Great Salt Lake wetlands

**UDWQ**

Effective Water Quality Standards build upon scientifically defensible data as well as stakeholder engagement to be truly protective of wetland water quality. UDWQ will use facilitated stakeholder meetings following The Nature Conservancy's Conservation Action Planning framework, a landscape planning process that has been used successfully in other parts of Utah, to define beneficial uses of Great Salt Lake wetlands and the threats to those wetlands. Prior to the meetings, UDWQ will gather and synthesize available research on wetlands and water quality and benchmark Utah's current Water Quality Standards against those for wetlands in other states. Meetings will occur first for Willard Spur, a unique shallow embayment of Great Salt Lake, followed by several meetings for Great Salt Lake

wetlands as a whole. The results of research and meetings will then be used to propose updates to Utah's water quality statute.

*EPA Core Elements*

**Monitoring and Assessment:** 2e Analyze monitoring data to inform decision-making
**Water Quality Standards:** 2a Gather data that is the basis of WQS
**Voluntary Restoration and Protection:** 2a Establish partnerships

*Activities*

1. Gather and synthesize UDWQ and other peer-reviewed research relevant to wetland beneficial uses, water quality-related processes, and wetland stressors (2018)
2. Benchmark Utah's Water Quality Standards against states with Standards for wetlands (2018)
3. Participate in Conservation Action Planning meetings for Willard Spur wetland (2018)
4. Conduct four Conservation Action Planning meetings to develop beneficial uses and water quality criteria for Great Salt Lake wetlands using a contracted facilitator (2018)
5. Summarize results of research, meetings, and benchmarking into proposed changes to Utah's water quality rules (2019)

### Action 4.2. Propose changes to Utah's water quality rules that will protect Great Salt Lake wetlands

**UDWQ**

Following Conservation Action Planning meetings, UDWQ will propose changes to be made to Utah's water quality rules that will ensure the protection of Great Salt Lake wetlands. The EPA has identified five pieces of Standards that should be updated for effective wetland Water Quality Standards: a wetland definition, designated beneficial uses, narrative and numeric water quality criteria, and antidegradation policies. All proposed changes will be based upon agreement between wetland stakeholders and will be brought before Utah's Water Quality Board to take effect.

*EPA Core Elements*

**Regulation:** 2a Adopt rules to implement federal water quality statutes
**Water Quality Standards:** 1b Include wetland definition in WQS, 2b Adopt wetland-specific designated uses, 2c Adopt narrative criteria for wetlands, 2d Establish numeric criteria representing wetland-specific values, 2e Better define antidegradation policies

*Activities*

1. Propose a definition of wetlands to be included in Utah's water rules (Utah Administrative Code R317) (2019)
2. Update the definition of the Great Salt Lake 5E Transitional Waters designated beneficial use to ensure protection of all functions and wetland types discussed in Conservation Action Planning meetings (2019)

3. Propose wetland specific narrative criteria to include water quality stressors potentially affecting Great Salt Lake wetlands (2019)
4. Modify existing numeric water quality criteria or create appropriate numeric water quality criteria for warm-water fisheries beneficial use if that use is supported by wetlands (2020)
5. Update Utah's Antidegradation policy if it is determined that Utah's current policy is not appropriate for wetland waterbodies (2020)
6. Revise existing Water Quality Standards for wetlands within the boundaries of federal refuges and state waterfowl management areas as appropriate (ongoing)
7. Explore biological criteria for Great Salt Lake wetlands that should be included in Utah's water quality rules (2021)

### Action 4.3. Explore Water Quality Standard options for protecting wetlands outside Great Salt Lake

**UDWQ**

More than 75% of Utah's wetland area lies adjacent to Great Salt Lake, which is why UGS and UDWQ's mapping, monitoring and assessment, and collaborations have been so focused on this region. Additionally, wetland stakeholders have been most concerned about water quality impairments to impounded wetlands around Great Salt Lake. However, wetlands in Utah's valleys, mountains, and deserts provide critical functions that may not be sufficiently protected by Water Quality Standards that are specific only to Great Salt Lake wetlands. UDWQ will explore means for protecting all of Utah's wetlands through Water Quality Standards starting with a synthesis of data from current and upcoming WPP activities looking at the extent, classification, functions, and stressors to the rest of Utah's wetlands.

*EPA Core Elements*

**Monitoring and Assessment:** 1a Identify long-term environmental outcomes, 2e Analyze monitoring data to evaluate condition or function
**Water Quality Standards:** 2b Adopt wetland-specific designated uses, 2c Adopt narrative criteria for wetlands, 2d Establish numeric criteria representing wetland-specific values

*Activities:*

1. Synthesize UGS mapping data on the extent and classification of wetlands as new regions are re-mapped (2021, ongoing)
2. Use LLWW data, UGS monitoring and assessment activities, UDWQ monitoring data, and peer-reviewed literature to determine the functions and beneficial uses supported by Utah's wetlands (2022)
3. Review assessment data from UGS and UDWQ surveys to determine both condition and major stressors that narrative water quality standards could protect against (2023)

# Proposed Wetland Program Plan Schedule

Shading indicates the agency responsible for each activity. Green = UGS, Blue = UDWQ, Purple = joint UGS/UDWQ activities

| | Actions | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|
| 1. Mapping and Landscape Planning | 1.1. Update wetland mapping in the state in priority areas | Uinta Basin remapping | Ongoing mapping of newly identified priority areas | | | | |
| | 1.2. Improve wetland mapping methods | Concurrent riparian-wetland mapping pilot | Develop LLWW modifiers & crosswalk | | Develop spring location template, apply LLWW modifiers | | Concurrent spring data & mapping pilot project |
| | 1.3. Create landscape tools & profile summaries | Amphibian range spatial layer, Bear River landscape profile | | Central Basin & Range landscape profile | | Wasatch & Uinta Mtns landscape profile, LLWW summary pilot | |
| 2. Monitoring and Assessment | 2.1. Improve existing rapid assessment protocol | Adjust protocol following Bear River watershed survey | Add flood attenuation & water storage checklists | | Validate wildlife checklist & wildlife plant values | | |
| | 2.2. Survey to characterize attributes of reference wetlands | Probabilistic Bear River survey | | Probabilistic and Targeted Central Basin & Range survey | | Probabilistic and Targeted Uinta & Wasatch Mtns survey | Probabilistic Colorado Plateau survey |
| | 2.3. Classify plants to better describe wetland condition & function | | New C-values for common Central Basin & Range species | Incorporate new C-values in data analysis | Functional values for Uinta & Wasatch Mtns species | | Functional values for Colorado Plateau species |
| | 2.4. Evaluate wetland condition with piezometer data | Develop predictive water level & climate models | Classify Snake Valley water regime, change detection | | Bring non-UGS piezometer data into central database | Explore expansion of piezometer network | Select reference network sites, install piezometers |
| | 2.5 Improve methods for monitoring Great Salt Lake impounded and fringe wetlands | Update impounded wetland method, probabilistic survey, wildlife consultations | Update fringe assessment method, targeted survey | Fringe method validation | | Report on the status of all Great Salt Lake wetland classes | Develop a framework for routine Great Salt Lake wetland monitoring, method testing |
| | 2.6. Design & deploy a survey to assess the condition of playa & mudflat wetlands | | | Obtain sample frame, develop assessment method | Targeted playa/mudflat wetland survey | Probabilistic playa/mudflat wetland survey | Final multi-metric index |

# Proposed Wetland Program Plan Schedule

Shading indicates the agency responsible for each activity. Green = UGS, Blue = UDWQ, Purple = joint UGS/UDWQ activities

| | Actions | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|
| 2. Monitoring & Assessment | 2.7. Deploy high-frequency wetland monitoring network | Analyze Great Salt Lake data for best water quality parameters | Deploy probes, develop QA/QC protocol | Upload & analyze data | Online database for high frequency data, redeploy probes | | |
| | 2.8. Survey wetland condition in the northern Wasatch & Uinta Mountains | | | | Develop classification scheme & sample frame | Targeted Uinta & Wasatch Mountains survey | Probabilistic Uinta & Wasatch Mtns survey |
| 3. Outreach, Coordination and Data Dissemination | 3.1. Refine wetland mapping portal with additional functionality & links | | | Add download function, links to summaries | | Evaluate methods to display LLWW attributes | |
| | 3.2. Integrate wetland data into a single structure & develop data sharing | | | Develop public portal for plant community data | Add additional soil and water quality data to the public portal | Extract & QA/QC data for use in UGS data portal | Manage data in single structure, options to add partner data |
| | 3.3. Increase outreach to Utah's wetland stakeholders | Ongoing outreach, meeting attendance & trainings | | | | | Develop new WPP, update Plan as needed |
| | 3.4. Maintain & develop collaborative relationships | | | Link beneficial use & habitat monitoring efforts | | | |
| 4. Water Quality Standards | 4.1. Collaboration to define wetland beneficial uses & narrative standard | Facilitated Conservation Action Planning meetings | Summarize results & proposed water quality rules | | | | |
| | 4.2. Propose changes to Utah's water quality statute that will protect wetlands | | Define wetlands, 5E beneficial use, narrative standard | Modify numeric water quality criteria & antidegradation | Explore biological criteria for Great Salt Lake wetlands | | |
| | 4.3. Explore water quality standards for wetlands outside Great Salt Lake | | | | Synthesize UGS mapping data on wetland extent & classification | Synthesize data to determine functions & beneficial uses | Use condition data to update narrative standard |