

Utah



Utah PFW program Focus Areas. USFWS map.

Introduction and Overview

Utah is the 13th largest state in the nation with approximately 20% of the land base being privately owned. This private landownership represents considerable habitat potential with approximately 16,980 square miles or 10,867,200 acres being privately owned.

Utah is the second driest state in the nation with 13” of average annual precipitation. This dry climate makes lakes, streams, and springs extremely important areas for both human and Federal Trust Species. The importance of the Great Salt Lake and wetland complexes associated with it becomes apparent when data from the Great Salt Lake Waterbird Survey (1997–2001) is considered. Significant portions of various North American populations use the Great Salt Lake area during

their life cycle. Specific examples of species use in relation to nationwide population include 25% of the

white-faced ibis population, 27% of American avocet population, 25% of black-necked stilt population,



Greater sage-grouse foraging within a PFW program riparian enhancement project, Utah. Photo by Karl Fleming, USFWS.



White-faced ibis utilizing a PFW program-restored wetland, Utah. Photo by Karl Fleming, USFWS.

and 7% of the nation's green-winged teal population (Paul and Manning 2008). This use is even more dramatic considering these survey areas documenting these numbers only totals 404,905 acres, or an area slightly greater than 17.5 townships.

Sagebrush steppe habitat associated with low precipitation zones is a valuable habitat type for numerous Service trust species. One species that is dependent upon sage brush is the greater sage-grouse. Utah supports 8% of the total range wide population. Private lands have an important role in the preservation of greater sage-grouse in Utah because 1/3 of the habitat, and 55% of the leks are on private property.

Some of the threats to key habitats include invasive species, developmental pressure, past and current land use practices.

Focus areas were developed using the following criteria

- Species Diversity and Trust Responsibility
- Intact Landscapes
- Threats
- Public Land – Private Land relationships and patterns
- Partnership Opportunities

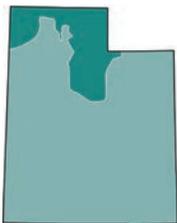
Focal species were identified for the state of Utah and classified as Level I, II, or III. All focal species occurred within the state and could be considered a priority because they were a migratory bird, a federally listed species, or a species identified as a priority in another plan developed by one of our partners. To be considered a Level I species specific criteria needed to be met. The criteria for a Level I were; spatial data available, long term population data (5+ years), understanding of threats, understanding of required conservation measures, and have

the political, social or logistical ability to deliver on-the-ground implementation during the next 5 years. Level II species have the political, social or logistical ability to deliver on-the-ground implementation during the next 5 years but lacks spatial data, long term population data (5+ years), understanding of threats, or an understanding of required conservation measures. Level III species have spatial data, long term population data (5+ years), understanding of threats, and an understanding of required conservation measures but lack the political, social or logistical ability to deliver on-the-ground implementation during the next 5 years. All projects implemented in the next five years will either benefit a Level I species or any threatened, endangered or candidate conservation species.



Utah PFW program staff develop rest-rotation grazing plans throughout sagebrush habitat to enhance rangeland conditions for wildlife and livestock. Photo by Karl Fleming, USFWS.

Northern Utah Focus Area



This Focus Area contains the watershed for the Bear River, the Ogden River, and a portion of the Jordan River watershed. These three watersheds contribute the majority of the water for the Great Salt Lake. This Focus Area has 68% private ownership with the private ownership being comprised primarily of farming, ranching, private wetland management areas, and municipalities. Northern Utah has diverse habitat types influenced primarily by changes in elevation and precipitation. Wetland habitats are found within this Focus Area

and are often associated with the Great Salt Lake and the valley corridor of the Bear River. The value of the wetland complexes in this area to shorebirds was recognized with the designation as a site of hemispheric importance by the Western Hemispheric Shorebird Reserve Network. The designation of hemispheric importance indicates the area has at least 500,000 shorebirds annually and at least 30% of a species biographic population. The importance of the Great Salt Lake, and wetland complexes associated with it, becomes evident when data from the Great Salt Lake Waterbird Survey is considered.

The upland portions at lower elevations are dominated by sagebrush intermixed with grassland areas which provides valuable habitat to sagebrush dependent species. Interspersed

throughout the area are stream/riparian communities which are important to native fish and neotropical migrants.

Primary Habitat Restoration and Enhancement Efforts

- Upland
 - o Seeding/vegetative manipulation
 - o Invasive Species Control
 - o Grazing Management
- In-stream and Riparian
 - o Channel restoration
 - o Riparian plantings
 - o Invasive species control
 - o Grazing management
 - o Removal of fish barriers
 - o Installation of fish screens
- Wetland Management and Enhancement
 - o Repair/installation of dikes and water control structures
 - o Invasive species control
 - o Grazing management



The Bear River Watershed in northern Utah. USFWS photo.

Northern Utah Focus Area Focal Species (Level I)

- Greater sage-grouse
- Sage thrasher
- Sage sparrow
- Brewer's sparrow
- Cinnamon teal
- Green-wing teal
- Red head
- Northern pintail
- Mallard
- American avocet
- Black-necked stilt
- White-faced ibis
- Columbia spotted frog
- Least chub
- Yellow-billed cuckoo (Threatened)
- Bonneville cutthroat trout
- Colorado River cutthroat trout
- Yellowstone cutthroat trout
- Northern leatherside chub
- Pygmy rabbit

Northern Utah Focus Area Habitat Targets

- Wetland Restoration/Enhancement: 500 acres
- Upland Restoration/Enhancement: 5,000 acres
- In-stream and Riparian Restoration/Enhancement: 4 miles
- Fish Passage Structures: 10

Northern Utah Focus Area Partnership Targets

- Private Landowner Agreements: 25
- Partnerships: 75
- Percent Leveraging: 1:3 Service to partners dollars
- Technical Assistance: 250 staff days



American avocet resting on a PFW program-enhanced wetland, Utah. Photo by Clint Wirick, USFWS.

Plateau Focus Area



This Focus Area is 20% privately owned with the predominate use being grazing or irrigated farmland. The other 80% of the land mass is managed by the BLM, U.S. Forest Service, National Park Service, and the State of Utah. There are three physiographic regions within this focus area and they are the Colorado Plateau, the Great Basin, and the transition zone between the Colorado Plateau and the Great Basin. The landscape consists of a wide variety of habitat types with upland areas consisting of sagebrush, pinyon-juniper, and aspen conifer communities.

Streams and rivers with riparian habitats occur throughout the area with some localized wetland habitat interspersed throughout valley bottoms. This Focus Area contains numerous species that are federally threatened and endangered. Federally listed species found within this focus area include the southwestern willow flycatcher, yellow-billed cuckoo, humpback chub, and virgin chub. The only populations of the threatened Utah prairie dog are found within this focus area and upland work on private property will be a priority when the work can be done to benefit this species.

Primary Habitat Restoration and Enhancement Efforts

- Upland
 - o Seeding/vegetative manipulation
 - o Invasive species control
 - o Grazing management
- In-stream and Riparian
 - o Channel restoration
 - o Riparian plantings
 - o Invasive species control
 - o Grazing management
 - o Removal of fish barriers
 - o Installation of fish screens
- Wetland Management and Enhancement
 - o Repair/installation of dikes and water control structures
 - o Invasive species control
 - o Grazing management



PFW program riparian restoration project before invasive species removal.



PFW program riparian restoration project after Russian olive and other invasive species were removed. Photos by Sue Fearon, Grand Staircase Escalante Partnership.

Plateau Focus Area Focal Species (Level I)

- Greater sage-grouse
- Gunnison sage-grouse (Threatened)
- Sage thrasher
- Sage sparrow
- Brewer's sparrow
- Pygmy rabbit
- Southwestern willow flycatcher (Endangered)
- Yellow-billed cuckoo (Threatened)
- Bonneville cutthroat trout
- Colorado River cutthroat trout
- Southern leatherside chub

Plateau Focus Area Habitat Targets

- Wetland Restoration/Enhancement: 200 acres
- Upland Restoration/Enhancement: 3,000 acres
- In-stream and Riparian Restoration/Enhancement: 3 miles
- Fish Passage Structures: 2

Plateau Focus Area Partnerships

- Private Landowner Agreements: 30
- Partnerships: 90
- Percent Leveraging: 1:3 Service to partners dollars
- Technical Assistance: 150 staff days

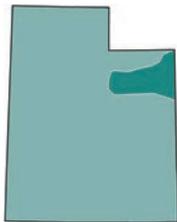


Volunteers helping with riparian plantings along the Escalante River, Utah. Photo by Clint Wirick, USFWS.



Response to invasive species control and planting along a riparian area, Utah. Photo by Clint Wirick, USFWS.

Uintah Focus Area



This Focus Area is 31% privately owned and contains two physiographic regions. The two regions are the Colorado Plateau, and the Middle Rocky Mountains. The landscape is comprised primarily of upland areas consisting of sagebrush, pinyon-juniper, and aspen conifer communities. Scattered within the Focus Area are streams and rivers with riparian habitats and wetlands associated with the rivers. Greater sage-grouse, humpback chub, bonytail, Colorado pikeminnow, razorback sucker and Colorado

River cutthroat trout are found within this focus area.

Primary Habitat Restoration and Enhancement Efforts

- Upland
 - o Seeding/vegetative manipulation
 - o Invasive species control
 - o Grazing management
- Stream and Riparian
 - o Channel restoration
 - o Riparian plantings
 - o Invasive species control
 - o Grazing management
 - o Fish barrier removal
 - o Installation of fish screens
- Wetland Management and Enhancement
 - o Repair/installation of dikes and water control structures
 - o Removal of dikes to restore connectivity of river floodplains
 - o Invasive species control
 - o Grazing management

**Uintah Focus Area Focal Species
(Level I)**

- Greater sage-grouse
- Sage thrasher
- Sage sparrow
- Brewer's sparrow
- Humpback chub
- Bonytail
- Colorado pikeminnow
(Endangered)
- Razorback sucker
(Endangered)
- Colorado River cutthroat trout

Uintah Focus Area Habitat Targets

A PFW Biologist is not located in this focus area so the target for this focus area is primarily technical assistance. The technical assistance will be accomplished utilizing a joint position that will have a sole emphasis of utilizing Farm Bill funding to benefit greater sage-grouse and sagebrush habitat. There is also potential to work with the state, the Colorado River recovery efforts, and the Fisheries Assistance Office to do projects to benefit the threatened and endangered fish species found in the Colorado River and some tributaries located within this focus area.

Other Management Plans Related to the UT PFW Focus Areas

- Intermountain West Joint Venture Coordinated Bird Conservation Plan (IWJV 2005)
- United States Shorebird Conservation Plan (Oring 2007)
- Waterbird Conservation for the Americas, North American Waterbird Conservation Plan (Kushlan 2002)
- Coordinated Implementation Plan for Bird Conservation in Utah (Utah Steering Committee 2005)
- Partners in Flight Physiographic Regions (Pashley 2000)
- Utah Wildlife Action Plan: A plan for managing native wildlife species and their habitats to help prevent listing under the Endangered Species Act (Utah Wildlife Action Plan Joint Team 2015)
- Range-Wide Conservation Agreement and Strategy for Bonneville Cutthroat Trout (Lentsch 2000)
- Conservation Assessment of Greater Sage-grouse and Sagebrush Habitat (Connelly 2004)
- Status Assessment and Conservation Action Plan for the Long-billed Curlew (*Numenius americanus*) BTP-R6012-2009 (Fellows and Jones 2009)
- Lower Bear River Conservation Action Plan (Lower Bear River Conservation Action Plan Implementation Team 2012)
- North American Waterfowl Plan (USFWS 2012a)
- Boreal toad (*Bufo boreas boreas*) Conservation plan in the State of Utah (Hogrefe 2005)
- Conservation agreement and strategy for least chub (*Notichthys phlegenthontis*) in the State of Utah (Bailey 2005)
- Conservation Agreement and Strategy for Spotted Frog (Perkins 1998)
- Gunnison Sage-grouse (*Centrocercus minimus*) Conservation Plan San Juan County, Utah (San Juan County Gunnison Sage-grouse Working Group 2000)

Utah Statewide Goals



Broaden and Strengthen Partnerships

Objective

Accomplish our work through voluntary partnerships.

- 1) Develop at least one new partner in addition to the private landowners for each focus area.
- 2) Minimum 1:3 Service dollar spent on the ground to partner dollar match.

Improve Information Sharing and Communications

Objective

Collaborate and share information and concerns with our partners, stakeholders, potential future partners, decision-makers, and others to protect, restore, and enhance trust resources.

- Complete a yearly annual report detailing number of technical assistance contacts.
- Attend coordination meetings which include; state technical NRCS committee meeting, Intermountain West Joint Venture yearly meeting, Sage-grouse working group meetings, and local Utah partners for conservation development working groups.
- Coordinate with other Service offices, NRCS, TU, DU, Conservations districts, and Utah Department of Natural Resources offices to consolidate efforts for Service trust species.

Enhance Workforce

Objective

Maintain and support the PFW program staff to insure successful implementation of the program and achieve on-the-ground results for Federal Trust Species.

- Ensure all employees attend a minimum of 40 hours of training each year
 - o Media and public outreach training
 - o Grant writing training
 - o Technical training such as GIS, census techniques, etc.
- Leadership program
 - o Attend leadership training and share experiences through job shadowing
 - o Temporary details to work with other programs and branches within and outside the Service.
- Ensure IDP's and employee performance appraisal plans are reviewed and implemented with input from the employees.

Increase Accountability

Objective

Measure, assess, and report the effectiveness, efficiency, and fiscal integrity of the PFW program in Utah.

- Achieve 90% habitat accomplishment within established HabITS polygons.
- 100% projects linked to Priority I species or threatened, endangered or candidate conservation species in HabITS.
- Projects reported in HabITS will have some type of photo associated with the project
 - o 75% will contain pre- and post-restoration photos in HabITS.
 - o The pre- and post-restoration photos will be entered into HabITS within three years of project completion.
- Have a follow up inspection on 50% of the projects within 3 years of project completion and have the inspections entered into HabITS .
- 90% accuracy for data entry into HabITS.
- Complete 100% HabITS data entry by date requested each fiscal year.

Monitoring Plan

Background

The PFW program in Utah has been working with private landowners while being located within the National Wildlife Refuge system since 1992. Early efforts focused on private landowners adjacent to the Bear River Migratory Bird Refuge and the enhancement of wetland and riparian habitat. The program currently works with landowners in three different focus areas throughout the state to restore or enhance wetland, sagebrush steppe, in-stream and riparian habitats. The program has worked with approximately 132 different landowners to complete 158 projects that have enhanced/restored 109,570 acres of habitat. Monitoring has been a component of PFW projects at varying levels and time intervals in the past. Habitat monitoring was performed by PFW biologists, Utah Division of Wildlife Resources (DWR), graduate students, Utah Department of Environmental Quality (DEQ), Conservation Districts, and various other partners. Any species population monitoring has usually been done by the Utah DWR, Trout Unlimited, or graduate students in conjunction with research associated with masters or PhD studies. This monitoring plan will identify basic standardized monitoring be done by PFW staff for every project.



PFW program biologist, Clint Wirick, and a landowner seeding a riparian area in Utah. The riparian project was identified as a priority by three stakeholders. USFWS photo.

This plan will also outline potential for site specific and landscape scale monitoring efforts that could be implemented on PFW projects.

Level I Monitoring

Level I monitoring will be conducted for each agreement within a year of the restoration/enhancement work being completed. A site visit will be performed and standardized information will be recorded for each project. This information will be used to monitor the progress of the work outlined in the agreement developed with the landowner. The information collected and recorded on the compliance form can also be used to complete the close-out reports in HabITS and PRISM, as well as the milestone reports for FBMS. The appropriate data form for Level I monitoring can be found in Attachment 1.

Level II Monitoring (Site specific monitoring)

Level II monitoring efforts for Utah will have degrees of monitoring and be identified as low intensity or high intensity with the designation referring to the expected effort required to complete the monitoring. Level II monitoring completed by PFW will focus primarily on the habitat response Technical training

such as GIS, census techniques, etc. There are high intensity level II monitoring efforts collecting site specific wildlife populations in areas that contain PFW projects and these monitoring activities will be conducted by other entities. Typical high intensity level II wildlife monitoring efforts would include lek counts, population counts, point counts, aerial surveys, electroshocking, and trapping.

Low intensity level II monitoring would consist of photo point(s) and basic field notes indicating habitat conditions, conditions that may have influenced the success of the restoration/enhancement efforts, and presence/absence of focal species for each accomplishment. The low intensity level II monitoring data would be collected using a standardized form at established time intervals.

Riparian areas are extremely important areas for Service trust species in the Western United states. It is estimated that less than 1% of the western North American landscape is riparian yet it provides habitat for more species of birds than all other vegetation types combined (Knopf 1988). The importance of riparian areas for migratory birds has led to a focus



*Nobody cares how much
you know, until they know
how much you care.*

Theodore Roosevelt

Research biologist collecting sage-grouse monitoring data. USFWS photo.

of riparian restoration by the PFW program in Utah. Methodology described in General Technical Report RMRS-GTR-47 would be utilized by PFW staff to perform high intensity level II monitoring for riparian projects (Winward 2000). High intensity monitoring performed for riparian areas would start with a pre-project inventory and then another monitoring effort being completed 5 years after the restoration work is done to determine the change in vegetation and community types. Another monitoring effort 10 years after restoration work is completed would be recommended with additional monitoring being completed on a 10 year interval. If another entity provides funds to help accomplish the riparian restoration and volunteers to do project monitoring the PFW program would defer to their monitoring protocol and include a copy of the monitoring report in the file.

Historic stream channel degradation due to mechanical manipulation of the stream channel or land use practices has provided ample opportunities to perform stream restoration projects throughout the state of Utah. Natural stream channel design is the restoration methods utilized by the PFW program in Utah when channel reconstruction or bank protection is required. Pre-project monitoring is done so that

natural channel design can be used for the restoration plan. Pre-project monitoring includes cross sectional surveys, longitudinal surveys, pebble counts, bank erosion hazard index, bar sample, and Pfankuch channel stability evaluation. If the PFW program performs high intensity level II monitoring for a stream restoration project the standard pre-project monitoring/data collection would be done and follow up monitoring would include cross sectional surveys and the Pfankuch evaluation. The cross sections for the stream restoration monitoring could be done in the same area as the cross sectional survey done for the riparian monitoring. The establishment of cross sectional survey points and a Pfankuch evaluation would be completed within the first year of restoration efforts. Additional monitoring efforts would be completed 5 years and 10 years after restoration efforts with additional surveys being completed on a 10 year rotation. Extensive level II monitoring by the PFW program would require the collection of all pre project data 10 years after the restoration efforts are completed. If another entity provides funds to help accomplish the stream restoration, and volunteers to do project monitoring, the PFW program would defer to their monitoring protocol and include a copy of the monitoring report in the file.

Restoration or enhancement of sagebrush steppe habitat has been a priority for the PFW program in the past and will continue to be a priority in the future because of its value to sagebrush-obligate species. Monitoring of upland range sites has been done throughout the State by the Utah Division of Wildlife Resources (DWR) for approximately 10 years and has included monitoring areas that have received treatments. If PFW in Utah completes a high intensity level II monitoring of upland treatments we will utilize the same methods employed by the UT DWR so the

data collected can be additive to the established data set. The proposed Level II monitoring timetable for upland sites would be pre-treatment, 1 year after treatment, 5 years after treatment and then every 10 years.

Level III monitoring (Landscape scale monitoring)

Any landscape scale monitoring will be done to evaluate habitat conditions, wildlife populations, or the interaction of those two. Landscape scale monitoring will be performed by other entities.

Type of monitoring	Year of completion	3 Years after completion	5 years after completion	10 years after completion	Additional 10 year increments
Low intensity	X	X	X	X	X
High riparian	X		X	X	X
High stream	X		X	X	X
High upland	X		X	X	X

Level III monitoring activities that are applicable to species identified in Utah’s PFW 1012-2016 Strategic Plan.

Species	Northern Utah Focus Area	Uintah Focus Area	Plateau Focus Area
Bonneville Cutthroat Trout	X	X	X
Greater Sage-Grouse	X	X	X
Gunnison Sage Grouse			X
Utah Prairie Dog			X
Waterfowl, Waterbirds, and Shorebirds	X		

Other Level III monitoring activities that are being done in Utah

Monitoring Efforts	Northern Utah Focus Area	Uintah Focus Area	Plateau Focus Area
Upland vegetative conditions	X	X	X
Juniper stands and conditions	X	X	X
Bluehead Sucker populations	X		
Northern Leatherside Chub	X		
Autumn buttercup			X



Attachment 2
UT PFW Level II



Accomplishment Monitoring Form

To be completed prior to Monitoring Accomplishment

Agreement Date: _____ Date Work Completed: _____

PLA Number: _____

Accomplishment Type: (Acres &/or Miles) Upland _____ Wetland _____ Riparian _____

Primary Trust Resources: _____

Accomplishment Objectives:

Photo Point Coordinates (Decimal Degrees)

Photo Point # _____ Lat: _____ Long: _____

Observed Biological and Habitat Monitoring Metrics: (related to accomplishment objectives)

Factors that influence current condition: (i.e. climate, grazing, time since fire or other disturbances)

*See Table 1 in UT PFW Level II Monitoring Guidelines

Cooperator Comments: (are cooperator's objectives being met?)

Are accomplishment objectives being met: Yes No

Observations:

Utah PFW Level II Monitoring Guidelines

- **Timing of Monitoring:**
Attempt to monitor same time of year (i.e. Fall, Spring)

Monitoring for specific wildlife species should adhere to established

Monitoring protocols if applicable. (i.e. shorebird surveys following National Shorebird Survey/Cornell dates, grassland birds following the Breeding Bird Survey time frames.)
- **Minimum of one photo point per accomplishment**
 - Photo point establishment will follow guidance provided by USDA publications concerning:
 - General selection criteria
 - Photo point marking
 - Reference point
 - GPS
 - Image management
- **Standardized photo name (i.e. 64860-14-RL01-2014-04-15-P1N)**
(PLA Number-Year-Month-Day-Photo Point # Direction)
- **Monitoring Veg Response:**
Estimate veg condition related to accomplishment

Objectives related to (height, density, species comp)
- **Comments regarding whether accomplishment objectives are being met could include:**
Concerns, Observations, Recommendations, Future Project Needs

Attachment 3

Utah Ongoing Monitoring Efforts Listed by Focus Area

All Focus Areas

- A. Utah Division of Wildlife (DWR) - Sage-grouse lek surveys
 - i. Document the number of male sage-grouse on designated lek sites.
- B. Sage Grouse Monitoring
 - i. Using GPS transmitters looking at Sage grouse movements, habitat use, habitat characteristics, and vital rates.
 - ii. Monitoring being done by several agencies, Utah State University, Brigham Young University, local working groups.
- C. National Resource Inventory
 - i. Vegetative and soil surveys
 - ii. Permanent points surveyed every few years
 - iii. Conducted by Natural Resource Conservation Service
- D. Utah DWR Range Trend Studies
 - i. Monitor, evaluate and report range trend at designated key areas throughout the state, and inform Division biologists, public land managers and private landowners of significant changes in plant community composition in these areas.
- E. Breeding Bird Survey
 - i. Standardized survey routes and methodology for long-term monitoring of breeding bird trends that is conducted by numerous individuals and organizations.
- F. NRCS Pinyon/Juniper Density Study
 - i. Thematic raster data representing tree canopy cover (% cover per acre) in the following classes: less than 1% or absent; 1 - 4%; 4 - 10%; 10 - 20%; 20 - 50%; greater than 50

Northern Utah Focus Area

- A. Great Salt Lake Ecosystem Project - Great Salt Lake Waterbird Survey
 - i. Survey conducted around and within the Great Salt Lake (GSL) during a specified survey period, and limiting the target species to waterbirds of the families: Gaviidae, Podicipedidae, Pelecanidae, Phalacrocoracidae, Ardeidae, Threskiornithidae, Anatidae, Rallidae, Gruidae, Charadriidae, Recurvirostridae, Scolopacidae, Laridae.
- B. Utah DWR Aerial Breeding Pair Count
 - i. Annual breeding waterfowl GSL area.
- C. Utah DWR Bonneville and Yellowstone Cutthroat Trout Surveys
 - i. Electroshocking used to determine fish/mile population.
- D. Utah State University– Vegetation Response to Juniper Removal
 - i. Line transects
 - ii. line point for shrub cover
 - iii. Daubenmire for herbaceous cover.

Plateau Focus Area

- A. Utah DWR Bonneville and Colorado River Cutthroat Trout Surveys
 - i. Electroshocking used to determine fish/mile population.
- B. Annual monitoring of federally listed plant species, Autumn buttercup
 - i. Annual monitoring of vegetation community, small mammal populations, and plant survival on one of the last know Autumn buttercup sites.
 - ii. Coordinated by USFWS Partners, The Nature Conservancy, and Weber State University.
- C. Bird survey and banding
 - i. Mist net surveys twice a year
 - ii. Birds banded to record recapture
 - iii. Conducted by University of Utah

Uintah Focus Area

- A. Utah DWR Bonneville and Colorado River Cutthroat Trout Surveys
 - i. Electroshocking used to determine fish/mile population.