

**Utah's Adaptive Resources Management
Greater Sage-grouse Local Working Groups:
The More You Know, the More You Grow!!!!**

2017 Annual Report



Photo by Brandon Flack

March 2018

Utah's Adaptive Resources Management Greater Sage-grouse Local Working Groups



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Photos: The cover photo shows a female greater sage-grouse (*Centrocercus urophasianus*) fitted with a global positioning satellite (GPS) transmitter capable of providing up to nine locations a day 24-7. In 2018, the local working group partners will have deployed over 340 GPS transmitters and by years-end have over 1 million locations. The photographs on this page captures the essence of the new science that linked increased sage-grouse nest and brood success to landscape level conifer removal treatments. Utah has removed more invasive conifers, over 500,000 acres, than the rest of the west combined. The combination of the new GPS technology and the positive responses of sage-grouse, portend a bright future for the species in Utah, hence the theme for this report.

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Executive Summary

- In 1996, Utah State University Extension initiated a long-term collaboration with the state of Utah to develop a community-based conservation (CBCP) adaptive resources management local working group (LWG) process throughout Utah to begin addressing localized threats to sage-grouse and sagebrush obligate species that inhabit Utah. Prior to 2007, each of Utah's LWGs published their own conservation plans (www.utahcbcp.org).
- In March 2010, the U.S. Fish and Wildlife Service (USFWS) designated the greater sage-grouse (*Centrocercus urophasianus*; sage-grouse) as a candidate species for protection under the Endangered Species Act (ESA) (USFWS 2010). Their decision was based on continued habitat fragmentation and inadequate regulatory mechanisms at the local, state, and federal levels to curtail the impacts.
- In 2013, the Conservation of Greater Sage-grouse in Utah (Plan) was published. The Plan was possible because of the two decades of research and community involvement accomplished through the CBCP partnership.
- In February 2015, Governor Herbert signed an Executive Order (EO) to implement the Plan. When LWG plans and state and federal agency efforts were aggregated into a statewide plan for sage-grouse, the collective result provided an organized approach for addressing the factors used by the USFWS to measure the success of conservation actions. Because of Utah's efforts and others range wide, the USFWS announced in September 2015 that sage-grouse did not warrant ESA protection.
- In 2017, Lorien Belton, Nicki Frey, and Dave Dahlgren published a paper in *Human-Wildlife Interactions* describing this novel process (<https://digitalcommons.usu.edu/hwi/vol11/iss3/7/>). This issue of HWI contains other stories of similar efforts on-going range wide.
- In 2017, we conducted a needs assessment of Utah LWG participants. Overall, respondents valued the LWG process and desired more information about sage-grouse responses to management. Over 85% of the respondents like the idea of scheduling another Utah sage-grouse summit to address LWG participant information needs.
- In 2017, we worked with Utah partners to develop better maps of sage-grouse seasonal habitats in Utah. The maps will be updated in 2019, with location data obtained from over 300 global positioning satellite transmitters deployed on sage-grouse throughout Utah.

- In 2018, Utah will update the state Plan and each of the LWGs will review and update their plans. Since 1996, the Utah partners have published over 40 scientific papers in peer-reviewed journal evaluating Utah's sage-grouse conservation strategy. This research confirms that sage-grouse are positively responding to state management.

A History of Utah’s Sage-grouse Local Working Groups

As half of Utah’s greater sage-grouse (*Centrocercus urophasianus*; sage-grouse) populations occur on private lands, successful conservation depends upon gaining broad support from local communities and private landowners. In 1996, Utah State University Extension, in collaboration with the Utah Division of Wildlife Resources (UDWR), embarked on what is now a 20 plus-year journey to engage those most affected by conservation decisions – the local communities – in a process to balance sage-grouse conservation with economic sustainability. The goal was to provide a process to encourage conservation via incentives, not regulation.

Through the Utah Community-based Conservation Program (CBCP), we began organizing and facilitating sage-grouse local working groups (LWGs) throughout Utah (Figure 1). As part of the CBCP effort, the LWGs developed and implemented “seamless” plans for designated Utah geographic areas that would contribute to the conservation of sage-grouse and other wildlife species and enhance the economic sustainability of local communities. The LWG plans provided the basis of implementation of sage-grouse actions in Utah (Utah Plan 2013). The LWGs conservation plans encompass the historical range of sage-grouse in Utah as identified in the Strategic Management Plan for Sage-grouse (UDWR 2002, 2009) and the Utah Plan (2013). The LWG sage-grouse conservation plans, previous annual reports, and meeting minutes can be accessed at www.utahcbcp.org.

The CBCP has provided long-term support to ensure the LWG administrative needs are met. Since inception, the CBCP has been financially supported by UDWR, Utah State University Extension, the Jack H. Berryman Institute, private landowners, public and private natural resources management and wildlife conservation agencies and organizations. In addition to participating as active contributors to the Utah planning process, the LWGs continue to implement their local sage-grouse conservation plans.

2017 LWG Participant Needs Assessment

To ensure the Utah CBCP LWG process continues to meet the needs of the participants, we conducted an on-line needs assessment survey in the fall of 2017. This survey questionnaire was similar to one we completed in 2013. We emailed the survey to LWG members who were part of the listservs we use to notify members of upcoming meetings and conservation action items. We received over 150 responses with representatives responding from each of the LWGs. Ninety-three percent of the respondents attended meetings, with over 60 % stating they regularly attended the meeting. When asked why they stopped attending, the primary response was a change of employment or responsibilities.

Why do you attend the meetings? What can we do better?

The primary reason most participants attended the meetings was to participate in and learn of news and information (55%), collaboration (45%), open forum for discussion (35%), and new project ideas (25%). We also asked what things might be inhibiting participation. The primary reason was scheduling conflicts, followed by the location of the meetings.

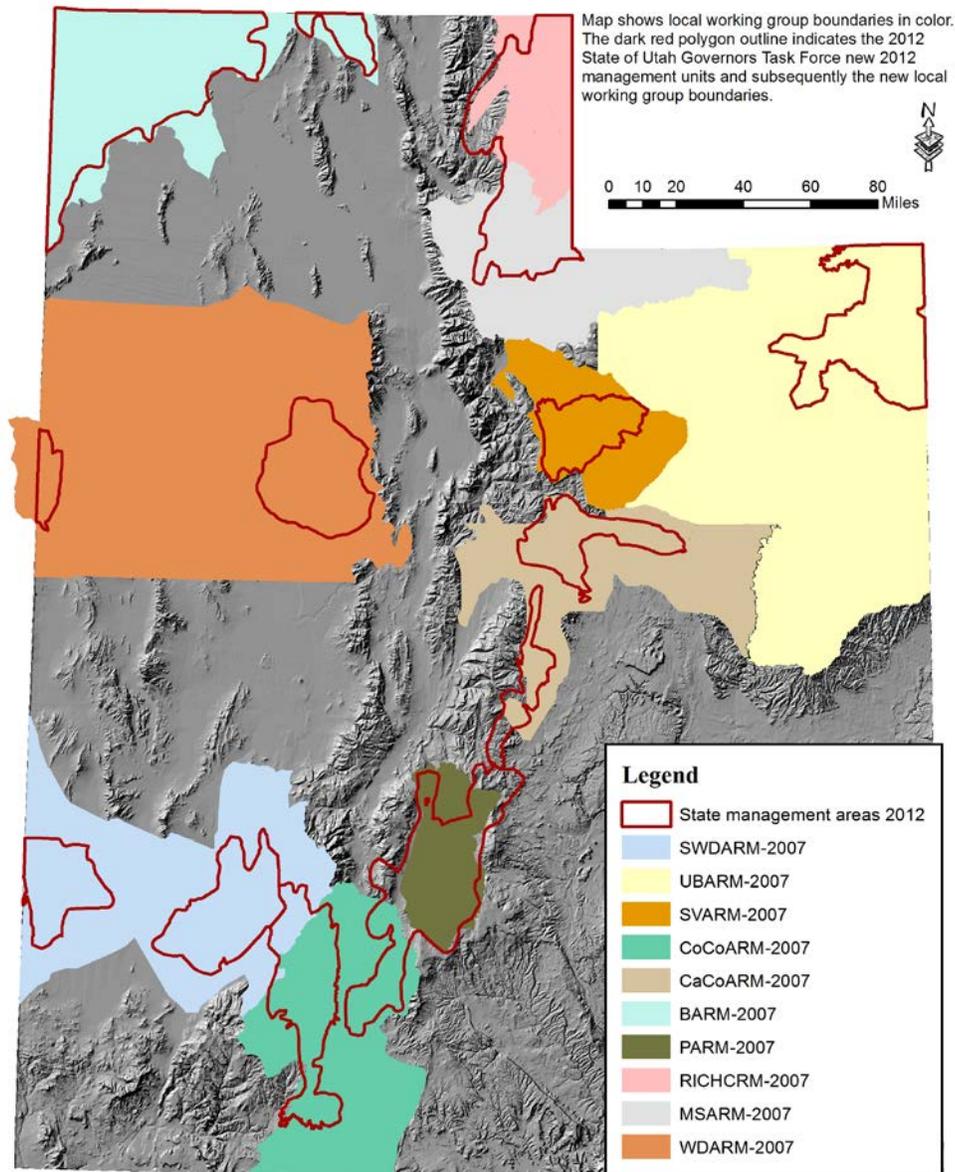


Figure 1. Sage-grouse Management Areas (SGMAs) in Utah (Utah Plan 2013). The SGMAs (outlined in red) represent the best opportunity for high-value, focused conservation efforts for the species in Utah (Dahlgren et al. 2016). The conservation approach outlined in the Utah Plan recognized current land uses as being compatible with species conservation, and identified potential future uses which may cause conflict with the needs of the species. The sage-grouse populations within the SGMAs all lend themselves to increases through appropriate protection and habitat enhancements, so each SGMA identifies and maps areas on the landscape that provide these additional habitat enhancement opportunities (Opportunity Areas) for greater sage-grouse (*Centrocercus urophasianus*).

The CBCP facilitators recognize these concerns and are always looking for ways to combine and “piggy-back” on other meetings to economize on limited time. In response to participant concerns expressed on a similar survey completed in 2012, we implemented an e-mail meeting alert and news network. We asked survey participants if this was useful. Over 90% of the respondents felt the process was useful, and good use of their time, and they were receiving the right amount of information.

We also asked respondents how they participate in their LWG. Most came to learn (50%), share and participate in discussion (40%), and develop field tours or present information (30%). In 2018, we will be experimenting with sending out periodic maps showing movements of sage-grouse that have been equipped with GPS transmitters. These maps will be augmented with specific information about the radio-marked sage-grouse.

CBCP Facilitator report card

We also wanted to know what we do well and not so well. We asked the respondents to rate their facilitator in several categories. These included; 1) responsive to group needs, 2) provide information and seeks answers, 3) timely meeting notifications, 4) timely meeting follow ups, 5) adaptive to new knowledge, and 6) overall facilitation skills. Over 80% of the respondents rated their LWG facilitator as being good to exceptional in all categories. If we include adequate ratings, the percent jumps to over 90%.

Revising LWG Plans and Research

We asked the survey participants if they felt their local plans were represented in the state plan. Respondents agreed that the LWG plans not only provided the basis of the state plan, but helped guide local research. Belton et al. (2017) described Utah’s LWG participatory research process that has resulted in research findings that not only evaluated LWG strategies but have influenced state and range-wide policies.

In line with the LWG participatory research process, we asked respondents to identify their research priorities. Priorities included better information about sage-grouse seasonal habitat-use, effects of predators and predation management, grazing management, sage-grouse response to management actions, managing cheatgrass, and a better way to prioritize habitat projects.

Information sources

We asked survey participants about where they get their information about sage-grouse. Forty-four percent used the LWG web site (www.utahcbcp.org). What was surprising here is that 56% said they rarely or never (16%) visited the CBCP web site for information. Those who visited the site used it most for reading research reports and articles (50%), LWG plans and meeting minutes (37%), and announcement and meeting minutes (24%).

We send out a quarterly four-page newsletter. Over 80% of the respondents reported they regularly read the newsletter and felt the information was valuable. Ten percent reported that

they had never received the newsletter. This is interesting in that the survey was distributed using the same email list-serv that we use to deliver the newsletter.

We also asked LWG participants what topics they would like to see in future newsletters. Respondents indicated they were interested in reading about new science (33%), LWG project features (29%), policies affecting LWG plans and areas (28%), and special features on LWG members (7%).

What can we do better?

We asked LWG participants what we needed to do better. We received a diversity of responses. Respondents indicated that we should devote more time at the meetings discussing sage-grouse responses to management (27%), more time learning about what other LWGs are doing (14%), conduct more field tours (12%), and more time developing projects (12%). Other ideas included regular meeting schedules with more advance notice and held in conjunction with other groups. Over 85% of the respondents like the idea of scheduling another Utah sage-grouse summit. The CBCP organized the last summit in 2013.

Sage-grouse: the more you know, the more you grow.

The LWG plans are research-based. The basic research finding which continues to provide the scientific basis for the Utah Plan, remains – “to grow more sage-grouse – we need to manage their habitats.” In this report we summarize two of our many research activities; one to develop a better map describing sage-grouse seasonal habitats and another documenting sage-grouse recruitment response to mechanical conifer removal. We also briefly review the research being conducted in each LWG area.

Building a better sage-grouse seasonal habitat-use map

In 2017, we completed a process to develop better breeding, summer, and winter seasonal habitat maps for sage-grouse in Utah (Figure 2). The process is presented chronologically below, and covers technical modeling steps which included feedback from state biologists and wildlife managers.

Since the early 1990s researchers at Utah State University (USU) and Brigham Young University (BYU) have been studying sage-grouse ecology in Utah. The research involved capturing and radio-marking male and female sage-grouse with very high frequency (VHF) necklace-style radio-collars and following them throughout the year to monitor their habitat-use patterns and survival. In the case of the females, we were also interested in nest and brood success. To determine habitat selection and if the habitat they were using affected the survival and/or production of radio-marked sage-grouse, the researchers recorded the characteristics of the habitats where the sage-grouse were re-located.

In 2016, USU developed a statewide general sage-grouse habitat map using a database of hundreds of lek locations and more than 20,000 sage-grouse VHF telemetry locations collected statewide. The VHF radio-collars transmit a radio signal that lets field personnel zero in on the

location of each bird, but despite providing nearly 20,000 locations over the past 20 years, these VHF transmitters required extensive field work that was often limited to daytime hours, accessible locations, and weather-permitting conditions.

The 2016 map depicted habitat suitability on a scale from 0 to 100 at 1 km spatial resolution, based on comparing environmental (vegetation, topography, soils, climate) and anthropogenic condition (i.e., developed land cover, road density, powerline density) at active lek and VHF sage-grouse use locations versus inactive lek and random background locations statewide. Because multiple telemetry locations were often associated with a single brood-rearing or non-breeding bird, we used the median values of environmental and anthropogenic variables at these telemetry locations in the model.

We used a random forest model to create a draft sage-grouse general habitat map (Breiman 2001, Cutler et al. 2007). Random forests is a highly accurate non-parametric classification technique that predicts the probability of an outcome (in this case, habitat vs. non-habitat) by averaging the results of many classification trees, each of which was trained on a random subset of the available data. The general habitat map was reclassified into 'habitat' and 'non-habitat' classes such that habitat areas captured 99% of all sage-grouse use locations. These general habitat areas were used to constrain preliminary predictions of seasonal habitats.

Sage-grouse radio-telemetry locations in the USU/BYU database were then classified into three seasonal habitat types based on time of year and type of use. Breeding habitat was defined as areas used by sage-grouse for lekking, nesting, and early brood-rearing, from March 1 – June 14. Summer habitat was defined as areas used by brood-rearing and non-breeding sage-grouse from June 15 – August 31. The June 15 cutoff date between breeding and summer use locations was selected based on the temporal distribution of nesting and brooding use locations (Figure 2). Winter habitat was defined as areas used by non-breeding sage-grouse from November 1 – February 29. As in the general habitat modeling approach, environmental conditions at annual brood-rearing or non-breeding locations associated with the same bird were measured as medians over the multiple locations.

We then modeled seasonal habitats using the same predictors as the general habitat model, with the addition of distance to leks due to its association with breeding habitat. We used a random forest model to estimate the suitability of general habitat areas statewide (from step 1 above) for breeding, summer, and winter use. For each seasonal use class, a suitability threshold was selected such that 85% of all seasonal use locations were captured in the resulting seasonal habitat map. This resulted in models that were neither overly restrictive nor overly liberal. To reduce the 'salt and pepper' effect of isolated or scattered habitat pixels, a 3x3 km smoothing window was applied to each of the seasonal habitat layers, assigning the majority value (habitat or non-habitat) to the center pixel.

In 2017, we presented an overview of the general and seasonal mapping methodology and preliminary maps to biologists and managers from the Utah Division of Wildlife Resources (UDWR), Bureau of Land Management, and Forest Service and asked them for their feedback. Using their feedback we made some changes to the seasonal mapping methods. Because the breeding seasonal use model was not picking up areas around all active leks, distance to leks was

dropped as a predictor variable from the seasonal habitat random forest model, and a 3 km buffer around all active leks was manually included in the breeding habitat model.

The updated seasonal sage-grouse habitat-use models were then sent back to UDWR biologists for further review. We created an ArcGIS Online webpage to share the models with biologists. The webpage allowed the biologists to provide recommended additions / deletions to areas captured by the models. Accompanying the spatial data was an 8-minute webinar communicating the modelling procedure. The biologists returned updated seasonal use models with their comments, additions, and deletions to USU researchers. Most but not all areas in the state received substantive feedback and comments from UDWR biologists.

We reviewed biologist edits and added/removed areas from the seasonal habitat-use models based on available telemetry data. We subsequently met with UDWR biologists about the areas in question to determine their status. Based input received at this meeting, it was determined that it would be preferable to have the final seasonal habitat products reflect both use and potential suitability, as opposed to only areas of known use. This decision resulted in rejecting some areas flagged for deletion by biologists, as biologist comments indicated they were conceptualizing the map as primarily a use map only. We made a number of small edits to the seasonal use layers, including several edits to include seasonal use locations not captured by preliminary models. Finally, all single, isolated habitat pixels were removed from the map (Figure 2).

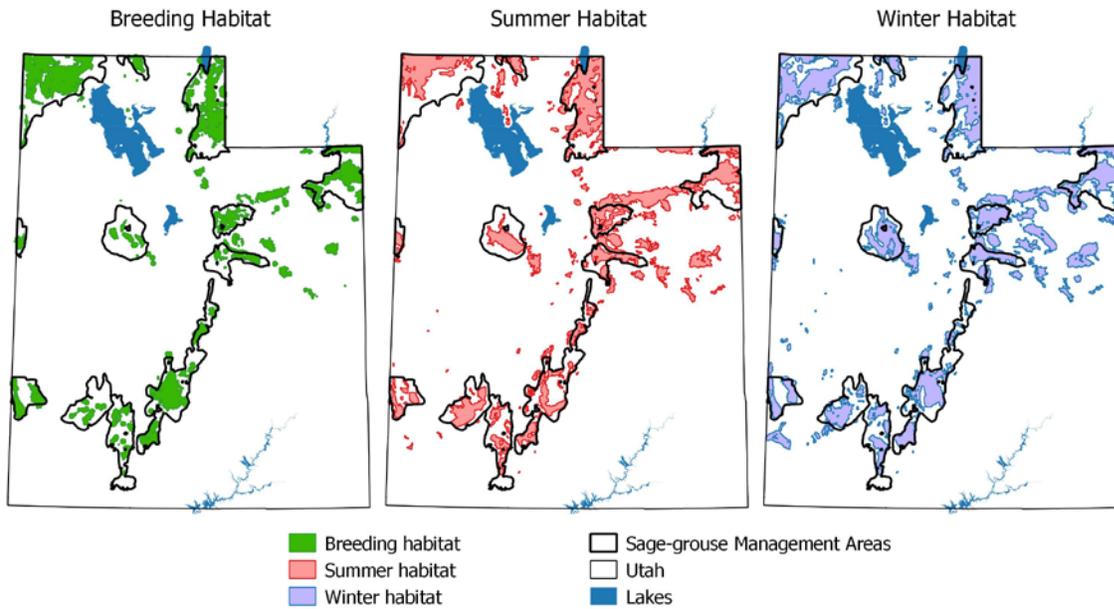


Figure 2. Greater sage-grouse (*Centrocercus urophasianus*; sage-grouse) breeding habitat was defined as areas used by sage-grouse for lekking, nesting, and early brood-rearing, from March 1 – June 14. Summer habitat was defined as areas used by brood-rearing and non-breeding sage-grouse from June 15 – August 31. The June 15 cutoff date between breeding and summer use locations was selected based on the temporal distribution of nesting and brooding use locations (Fig. 1). Winter habitat was defined as areas used by non-breeding sage-grouse from November 1 – February 29.

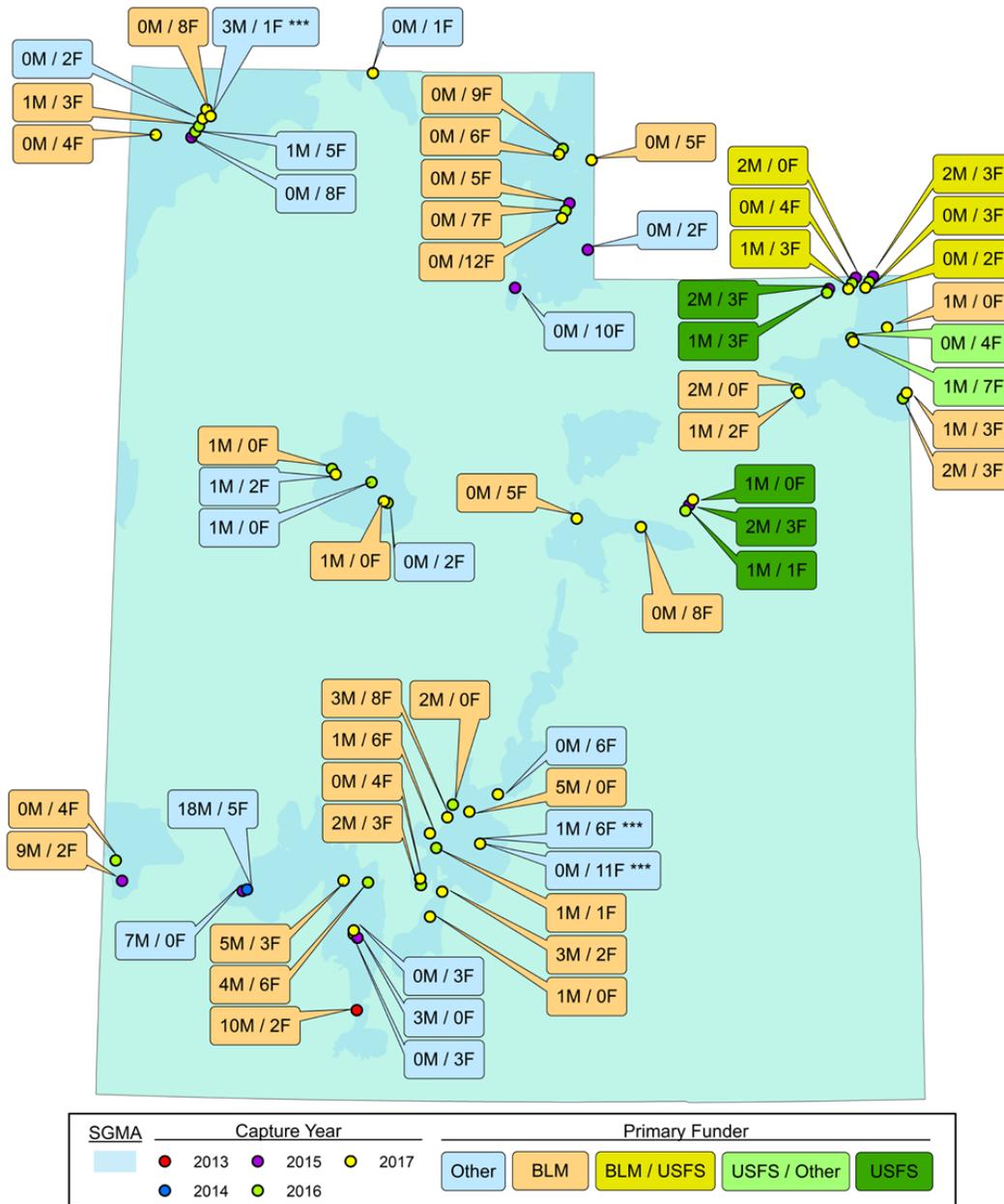
These seasonal maps will be updated in 2019 using sage-grouse location data collected from over 300 global positioning system transmitters (GPS) we started deploying on sage-grouse in 2013 (Figure 3). By 2019, we will have over 1 million new sage-grouse locations to use in updating the existing maps. This process known as the Sage-Grouse Habitat Assessment Framework (HAF) will ensure the conservation of sage-grouse in Utah. Completion of the HAF will identify the vegetation characteristics used by sage-grouse within the seasonal habitats.

In 2017, we hired Michel Kohl to serve as the Utah Sage-grouse HAF Coordinator. Michel is responsible for facilitating coordination among all the partners to develop the seasonal maps that will ultimately direct sage-grouse conservation and management in Utah. To initiate the HAF, we capitalized on the extensive dataset of sage-grouse telemetry locations housed at USU.

To augment this VHF database, researchers began deploying rump-mounted GPS units on sage-grouse throughout the state in 2013 (see the front cover for a photograph of a rump-mounted GPS transmitter). We have deployed 343 GPS units spread across 9 of the 11 Sage-Grouse Management Areas in a large-scale effort to map the seasonal distribution of the species (Figure 3). Although costs of GPS units exceed those of VHF units (\$4,000 vs \$180), they provide multiple locations/day (5-10) throughout the year which means we will be more efficient in our field monitoring while also being provided with a greater understanding of sage-grouse winter use and night-time patterns.

Furthermore, the ability to track sage-grouse via satellites has provided us with a new appreciation for the distances these birds can migrate since birds fitted with VHF transmitters often travelled far outside of the monitoring areas of most researchers. For example, GPS technology has allowed us to follow birds that breed in the area around Henefer, Utah, to their winter range south of Lake Jordanelle; a distance greater than 35 miles and a wintering area we likely would have not considered prior to the use of GPS technology. Upon completion in 2019, the HAF seasonal habitat maps will operate as the sage-grouse distribution maps. With the state and federal agencies in Utah both using these distribution maps, we can be assured that sage-grouse management and conservation in Utah will be better suited to meet future challenges.

UTAH GREATER SAGE-GROUSE HAF DATA SOURCES



This map identifies the primary funding source and number of GPS rump-mounted satellite transmitters deployed on individual sage-grouse (GRSG; n = 115 M, 228 F) in Utah. These data sources will be used to create seasonal habitat maps for GRSG as part of the Utah BLM Habitat Assessment Framework. "Other" funding designation includes Utah Public Lands Policy Coordination Office, Pacificorp, Rocky Mtn. Power, Alton Coal Mine, and private landowners. Asterisks identify grouse that were translocated to Sheeprocks SGMA. Updated 8 June 2017.

Figure 3. We have deployed 343 rump-mounted global positioning satellite (GPS) transmitters on greater sage-grouse (*Centrocercus urophasianus*) in 9 of the 11 Utah Sage-Grouse Management Areas in a large-scale effort to better map the seasonal distribution of the species.

Sage-grouse response to mechanical conifer removal

Utah and other western states have placed emphasis on increasing usable space for sage-grouse in naturally fragmented habitat as a means of increasing both production and connectivity. The reduction and removal of juniper (*Juniperus* spp.) and pinyon pine (*Pinus edulis*) [colloquially called PJ] encroachment in SGMAs where the sagebrush and herbaceous understory is relatively intact may provide the greatest potential to create and enhance sage-grouse habitat in Utah.

Conifer encroachment primarily that of PJ into sage-grouse habitat has been identified as a threat to sage-grouse populations. Utah research suggests sage-grouse will use areas within SGMAs where PJ has been removed within a short period of time (< 1 to 3 years) post-treatment, especially if the treatment site has sagebrush remaining in the understory, mesic areas nearby, and the site is near existing sage-grouse use areas (Frey et al. 2013, Cook et al. 2017). For example, field observations in 2015 documented a sage-grouse female successfully nesting in areas where conifer removal projects were being conducted. The female nested under sagebrush in an area where the conifer canopy had been removed by a bullhog (Sandford et al. 2015). In the four years previous to the bullhog treatment, sage-grouse use had never been documented in the area. Sandford et al. (2017) reported that female sage-grouse on the Box Elder SGMA that nest in or near PJ treatments area had increased nest and brood success. This research was the first to document an effect of conifer removal on sage-grouse production. These data and observations validate that the Utah Plan's effort to increase usable space through PJ removal projects has the potential to benefit sage-grouse populations in Utah.

Box Elder County Adaptive Resources Management (BARM) Sage-Grouse Local Working Group

The Box Elder Adaptive Resource Management Plan (BARM) Sage-grouse Local Working Group (LWG) was organized in 2001 by Terry Messmer. In 2011 the West Box Elder Coordinated Resource Management (WBECRM) group was organized and the effect of the LWG combined into the WBECRM plan. The CRM provides overall direction and guidance for habitat projects within the conservation area and Sage-grouse Management Area (SGMA). The WBECRM established a sage-grouse subcommittee as part of the plan. The committee meets throughout the year to address and discuss sage-grouse specific issues of concern, management actions, and strategies. The subcommittee reports these to the WBECRM. Diane Tanner is the facilitator for the group. David Dahlgren is the WBECRM sage-grouse committee chairperson.



Brush hog – A major management effort in West Box Elder County has been the mechanical removal of conifers that have encroached into sagebrush. Research published by Utah State University confirmed that this management practice has improved sage-grouse nest and brood success. Photo by Todd Black.

Description of Area and General Population Information

The WBECRM encompasses western Box Elder County from the Snowville area west to the UT/NV border and south to the shoreline of the Great Salt Lake. Sage-grouse habitat in this area is broken down into three sub regions, the Grouse Creek, Pilot, and Raft River range. See http://utahcbcp.org/files/uploads/BARMSAGRPlan_Final.pdf for maps and figures.

Although our knowledge of sage-grouse populations in the area is incomplete, research efforts in the area continue to map sage-grouse movements and habitat-use patterns in the Grouse Creek and Raft River Mountains. These research efforts have identified important brooding and winter areas.

Recent Activities and Accomplishments

The WBECRM meets quarterly. They have a local coordinator, Diane Tanner, who plans and supports meeting logistics. The WBECRM is a coalition building process that involves all groups/ownerships and integrates local wisdom and technical expertise in the development of conservation planning and project implementation. The Utah State University (USU) Community-based Conservation Program (CBCP) participates regularly but no longer facilitates the group. CBCP does continue to provide website support. The WBECRM is engaged with state, federal, and private partners in planning projects in the SGMA. There are multiple conifer

removal projects for sagebrush restoration. There is also a beaver reintroduction effort going on in the area as well as watershed restoration using beaver dam analogues (BDAs).

Utah State University Extension has hired a Sagebrush Ecosystem Alliance (SEA) coordinator for the WBECRM area. The SEA is a demonstration project which will assist in enhancing collaborative sagebrush conservation in northwest Utah. This partnership aims to: 1) build field-level capacity for collaborative sagebrush conservation, 2) improve cross-agency, cross-partner conservation and communication in sagebrush management, and 3) create efficiency in managing public land uses and implementing restoration projects in the sagebrush ecosystem. The SEA is supported by the Bureau of Land Management, Intermountain West Joint Venture, Pheasants Forever, INC, permittees, local governments, CBCP, USU Extension, U.S. Fish and Wildlife Service Partners Program, the National Fish and Wildlife Foundation, WBECRM, Utah Division of Wildlife Resources, the Utah Grazing Improvement Program, the Natural Resources Conservation Service (NRCS), the NRCS Sage Grouse Initiative program, the Mule Deer Foundation, and the Jack H. Berryman Institute.

The CBCP continues to conduct research in the SGMA to better understand sage-grouse responses to projects. The current project has incorporated GPS-PTT radios into a multiple-year effort to collect data on sage-grouse habitat selection (Figure 4). The primary objective of the study is to understand how sage-grouse use and are affected by the landscape-level management of conifers removed to restore sagebrush communities. This research is ongoing. Justin Small is the graduate student. His major professor is Dr. Terry Messmer, USU Extension Wildlife Specialist.

Upcoming Year Work Plan

The WBECRM continues to evolve to focus on all of the natural resource and community needs in the SGMA. Habitat improvement projects, including those which address weed and wet meadow areas, will be a focus of work at and between meetings.

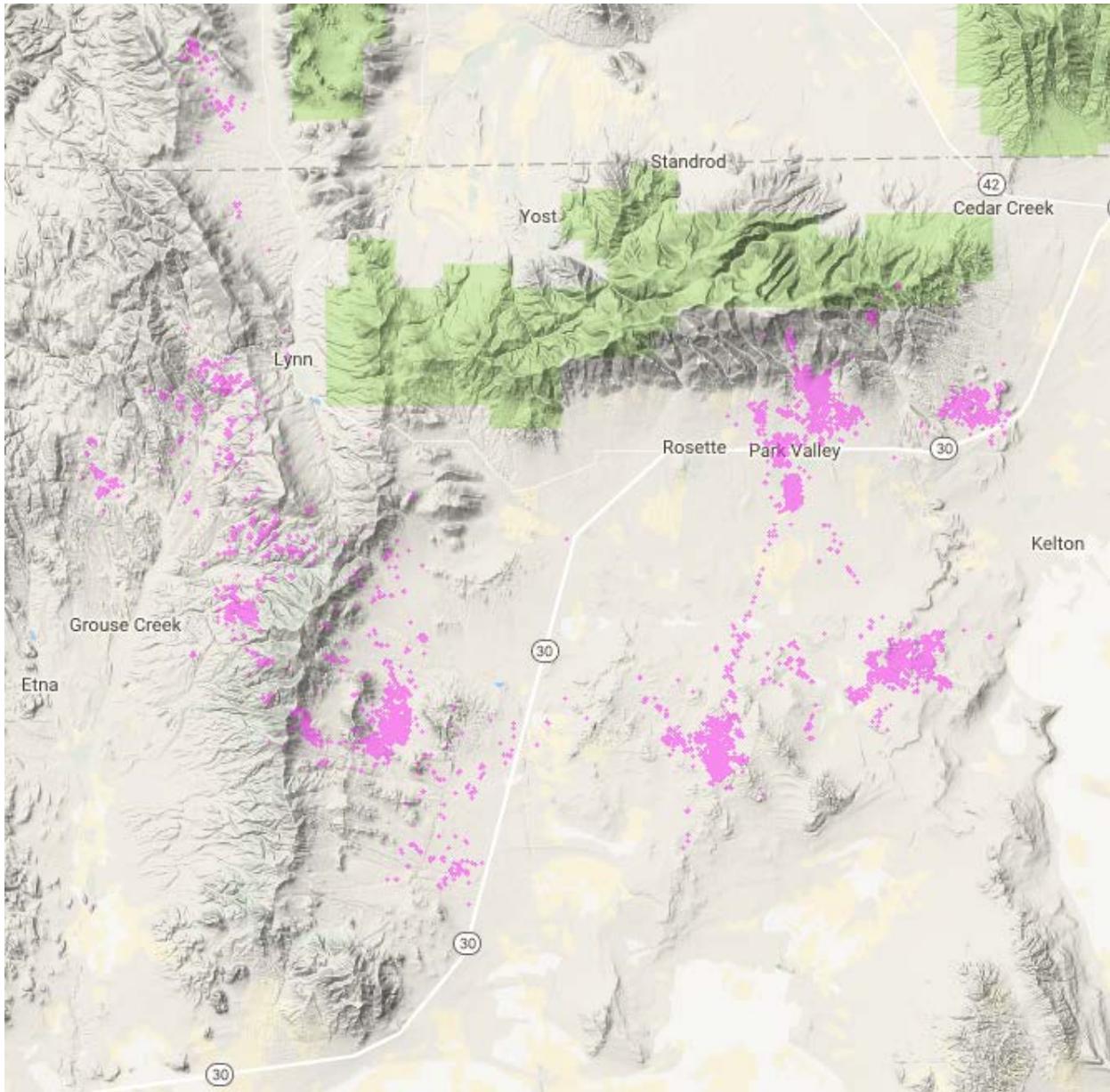


Figure 4. Map of greater sage-grouse locations obtained from GPS-PTT radio-marked female greater sage-grouse (*Centrocercus urophasianus*) in the Box Elder Sage-grouse Management Area. This map demonstrates the large landscapes necessary for sage-grouse populations. The data points represent a very small portion of the population, thus may not represent the entire population.

Castle Country Adaptive Resources Management (CaCoARM) Sage-grouse Local Working Group

The Castle Country Adaptive Resource Management Plan (CaCoARM) Sage-grouse Local Working Group (LWG) was organized in 2004 by Terry Messmer. Lorien Belton is the group facilitator.

Description of Area and General Population Information

The CaCoARM conservation area encompasses occupied sage-grouse habitats primarily in Carbon County, with portions of Utah and Sanpete County. Sage-grouse habitat in this area is naturally fragmented by both geology and topography. Although the sage-grouse habitat locally is in the Carbon Sage-grouse Management Area (SGMA) boundary, the Tavaputs Plateau is outside the SGMA. The LWG continues to work with landowners in the Tavaputs area and watch the population dynamics there in addition to the primary focus on the birds within the SGMA.



Members of the CaCoARM group stand on sediment captured by a beaver-dam analogue (BDA) while looking at pictures of the area before the project. The BDAs are helping to create new sage-grouse brood-rearing habitats. The group visited the private land project on the summer field tour. Photo by Lorien Belton.

Table 1. Meetings and Tours held by CaCoARM LWG during 2017.

Meeting and Tours	Date	Location	# attending	Topics
LWG evening meeting	April 19, 2017	Price DNR	15	Utah’s draft compensatory mitigation program, population updates, field tour planning, staffing changes
Evening field tour	June 21, 2017	Price area public and private lands	18	Sagebrush planting project and a private lands beaver-dam-analogue project
LWG afternoon meeting	September 20, 2017	Price DNR	17	New BLM IMs, project presentations and review, BLM planning updates, BLM PEIS scoping period

Project and Research Highlights

The Castle Country group has become increasingly engaged in habitat project work over the past several years. Private landowners on the Tavaputs Plateau are actively engaged in habitat improvement and monitoring. The group has also gotten more engaged in habitat work on public lands as well. Project proponents bring ideas, questions, and project results to the CaCoARM group for discussion and feedback. Federal agency participation in the group increased in 2017, providing more opportunities to learn from one another and work together on projects. The group is also interested in engaging with local mitigation opportunities once the state sage-grouse mitigation rule is finalized. The field tour this year emphasized how riparian area rehabilitations and improvements could be done at relatively low cost.



Terry Messmer stands near a deeply eroded gully in sage-grouse habitat in the Emma Park area. The group is working to understand how to restore wet meadow areas and prevent erosion to benefit sage-grouse and other species. Photo by Lorien Belton.

Upcoming Year Work Plan

The CaCoARM group will work on revising its local plan during 2018. Additionally, the group plans to learn more about grazing and sage-grouse interactions generally and the local sage-grouse populations specifically. Habitat improvement projects, including those which address weed and wet meadow areas, will be a focus of work at and between meetings.

Color Country Adaptive Resources Management (CCARM) Sage-grouse Local Working Group

The Color Country Adaptive Resource Management (CCARM) Sage-grouse Local Working Group (LWG) is facilitated by Nicki Frey. The main purpose of the LWG is to provide a framework of strategies and associated actions that can be implemented to abate threats, address information gaps, and guide monitoring efforts. Strategies developed by CCARM were designed to be specific to the local area while taking into consideration the guidelines at a range wide level.

Description of Area and General Population Information

The Panguitch Sage-grouse Management Area (SGMA) is located in southern Utah, in Kane, Garfield, Paiute, and Wayne Counties, incorporating more than a dozen, often connected leks. Due to the population exchange throughout this Management Area, and its incorporation of the southern-most sage-grouse lek, it is considered an important population for Utah.

This population uses a series of leks throughout the habitat area, with some males visiting more than one lek per season. The population is distributed north-south in a series of linked valleys and benches, and constrained by mountains and canyons. There is a large range in the number of males in attendance among these leks. Movement of sage-grouse from one valley or bench to another among seasons is necessary to meet their seasonal habitat requirements in the highly variable annual weather conditions of this region. Movements among valleys are not present in each group of sage-grouse, and not all used areas are known to managers.

Recent Activities and Accomplishments

The CCARM continues to be active in sage-grouse research, management, and communicating issues with the group. In cooperation with Dr. Nicki Frey, CCARM has been conducting satellite telemetry research in the Panguitch SGMA since 2013. In 2017, this research expanded to include Buckskin and Bear Valleys, to determine their connectivity to the Bald Hills SGMA and to neighboring Dog Valley. The preliminary data highlights possible travel corridors among Dog/Buckskin/and Bear Valleys, seasonal movement patterns and studied female nesting locations and success.

CCARM partners Utah Division of Wildlife Resources (UDWR) and Utah State University (USU) advised a Master's of Natural Resource Student to analyze data from the last 4 years, to determine the resource selection of Greater sage-grouse in the Panguitch SGMA as it pertains to



Technicians capturing an unsuspecting sage-grouse that will soon be wearing a radio-transmitter. These transmitters provide the LWG with important habitat-use information to guide management project development. Photo by Todd Black.

the use of habitat treatments in the area. The research determined that female sage-grouse prefer these treated areas rather than any native habitat, throughout the brood-rearing season, as well as during other times of the year. Males were not as reliant on these treated areas, and used a variety of native shrub habitats throughout the year. The resulting manuscript will be published online shortly, and has already been distributed amongst the managers working with the Panguitch SGMA.

In addition to data analysis, the partners developed and administered a survey to a random sample of residents within the Panguitch SGMA boundary to determine the level of understanding and awareness residents had regarding sage-grouse distribution and ecology, Watershed Restoration Treatments, and general land management in their local area. The results are intended to highlight areas of information in which the Watershed Restoration Initiative and UDWR need to focus their outreach, education, and communication. The results of this survey were presented to the CCARM and SWARM local working groups. It is currently being drafted for publication within the USU Extension system and will be publically available.

Upcoming Year Work Plan

The CCARM will revise its local plan during 2018. Additionally, the group plans to learn more about sage-grouse responses to habitat improvement projects.

East Box Elder County Adaptive Resources Management (EBARM) Sage-Grouse Local Working Group

The East Box Elder County Adaptive Resources Management (EBARM) Sage-grouse Local Working Group (LWG) was formed in November 2015. The LWG group consists of private landowners, state and federal agency personnel, and conservation district members. The group elected C. J. Roberts and Brett Selman as their co-chairs for the group. The first objectives of the group are to learn more about the sage-grouse population in their area, which consists of nearly all private land. This included lek searches, recording wintering grouse, and communicating with landowners for their knowledge. This group is facilitated by Dave Dahlgren.

Description of Area and General Population Information

The East Box Elder area is the Sage-Grouse Management Area that lies west of I-15 and north of I-84. There are only 2 or 3 active known leks in the area with relatively few birds at each lek. Most of the lower elevations have been converted to dry farming at European settlement. Most of the sagebrush habitat is in the higher elevation rangelands. Much of the sagebrush habitat has been fragmented over the years and fire continues to be one of the most significant threats to the sagebrush communities. Cheatgrass invasion following fire is also an extensive issue in the area. The landownership is predominantly private and there is only a small section of Bureau of Land Management property in the northwest portion. The area is unique in that private landowners are numerous and landownership is not generally in large blocks. This creates its own challenges and opportunities.

Recent Activities and Accomplishments

The LWG purchased a GPS-PTT radio-transmitter to mark a sage-grouse within the area. In 2016, we attempted to locate and trap a grouse on several occasions, but all were unsuccessful. A female sage-grouse was radio-marked in the spring of 2017. However, the female died within a few weeks of capture (Figure 5). Another radio-transmitter is available for the spring of 2018 and efforts will be made to trap another sage-grouse in the area.



The East Box Elder LWG has purchased GPS transmitters to deploy on sage-grouse to learn more about their habitat use. This photo shows a GPS transmitter mounted on the rump of a female sage-grouse. These transmitters provide 4-6 locations a day, 24-7. Photo by Brandon Flack.

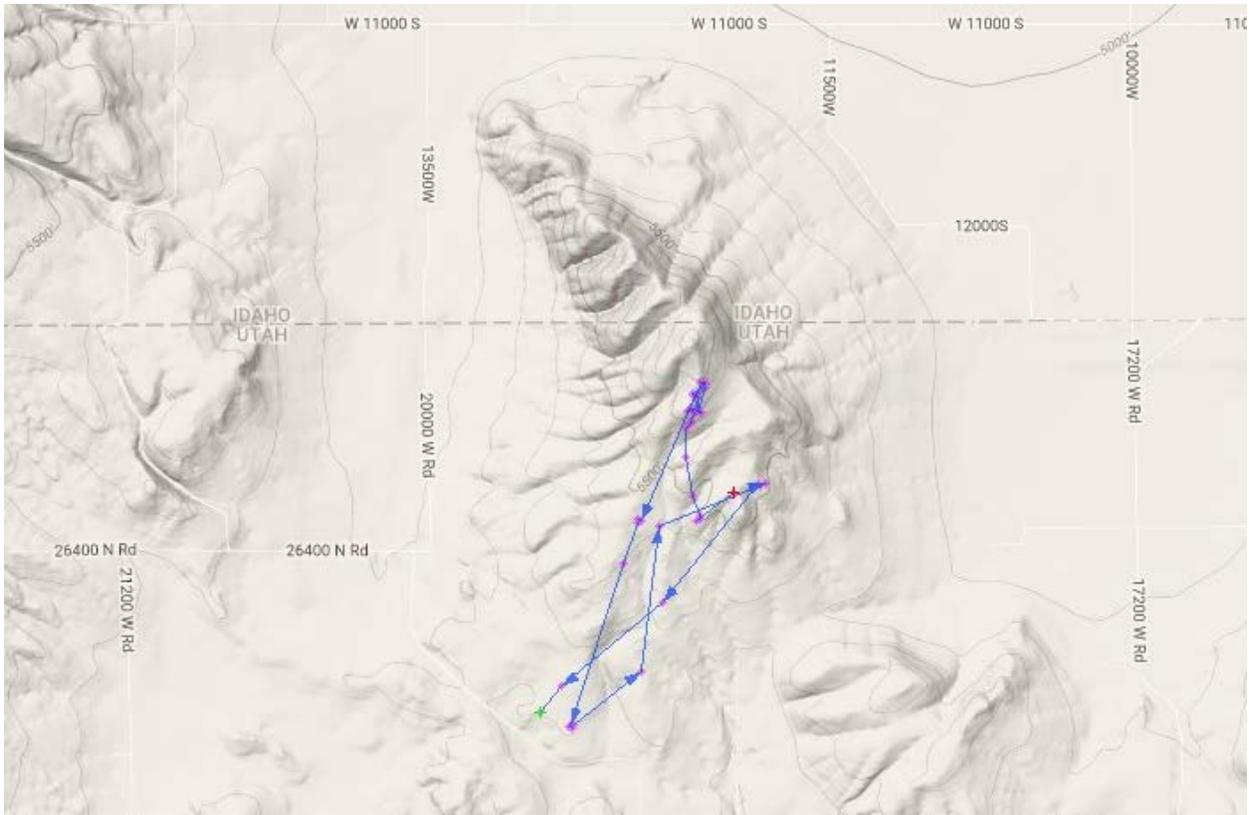


Figure 5. Map of locations of GPS-PTT radio-marked female sage-grouse (*Centrocercus urophasianus*) within the East Box Elder Resource Area, near the Idaho border in the middle of Pocatello Valley. This female was trapped during the spring of 2017 and survived only a few weeks.

Upcoming Year Work Plan

A proposal for a new landfill to be opened on private land in the area was considered by the State of Utah. There has been some debate and conflict within the group concerning this potential development. The group has not been active for nearly a year now. It has been difficult to get momentum within the group. Efforts are underway to start meeting more regularly again.

Morgan-Summit Adaptive Resources Management (MSARM) Sage-grouse Local Working Group

The Morgan-Summit Adaptive Resource Management (MSARM) Sage-grouse Local Working Group (LWG) focuses on southern half of the Rich-Morgan-Summit Sage-Grouse Management Area (SMGA). This group is facilitated by Lorien Belton.



Description of Area and General Population Information

The LWG area covers Morgan and Summit Counties. The two counties consist largely of privately-owned land, particularly where sage-grouse are found. Sage-grouse habitat in these areas occurs at higher elevations and is usually more mesic than some of Utah’s other sage-grouse areas. The sage-grouse populations in the area exhibit highly localized behavior, but are believed to have connections to populations in Rich County and southwestern Wyoming. The most prominent populations live near the Morgan/Summit county line in the vicinity of East Canyon Reservoir.

Vehicles lined up to watch sage-grouse strut at the popular Henefer-Divide lek on the Morgan-Summit country line. This lek may be the most visited lek in the western U.S. Photo by Brandon Flack.

Table 2. Meetings and Tours held by MSARM LWG during 2017.

Meeting and Tours	Date	Location	# attending	Topics
Dinner meeting	February 8, 2017	Wanship	22	Landowner appreciation and research presentation and Q&A
Related meeting		Salt Lake City	12	Application of GPS data to land disposition decisions
Field activities	Spring-summer	East Canyon area	Varied	Finalizing research activities in coordination with private landowners
Regular meeting	November 1, 2017	Coalville	12	BLM planning updates, state mitigation plan discussion, state plan updates

Project and Research Highlights

The group has been very active, both during and between meetings, in providing comments on the state of Utah's sage-grouse mitigation plan. Because much of the sagebrush landscape in the area is in relatively good condition and held in private ownership, easements are a highly relevant tool for conservation activities in the area. Much of the habitat project work relevant in the rest of Utah, such as pinyon-juniper removal, is less relevant here. Group members participated in providing feedback to ensure that mitigation opportunities were also available to private landowners in the MSARM area.

The first local research project, conducted by Utah State University graduate student Brandon Flack, finished up in 2017. His thesis is available for review. The group was grateful to learn a suite of new information about the local sage-grouse population, including confirmation of small areas of seasonal habitat use, and migration corridors outside the SGMA. The preliminary wildlife corridor information from that research provided the impetus for a related partner meeting on how to use data like this to bring more voices to the table in land use prioritization discussions within and outside the Division of Natural Resources. The relationships built during the research project also provided many opportunities for local landowners to engage in sage-grouse research findings and other conversations outside of regular working group meetings.

Upcoming Year Work Plan

The group is ready to revise the local sage-grouse conservation plan in the coming year when the state plan revision has been finalized. The group hopes to promote the use of conservation easements and compensatory mitigation it as an option for local landowners. The group will also emphasize helping develop and evaluate local projects, to the degree appropriate on private lands. Working more closely with Natural Resources Conservation Service and county departments, such as weed management, will be key to this effort.

Parker Mountain Adaptive Resource Management (PARM) Sage-grouse Local Working Group

The Parker Mountain Adaptive Resource Management Plan (PARM) Sage-grouse Local Working Group (LWG) was organized in 1997 by Terry Messmer. PARM consists of state and federal agency personnel, representatives from local government, non-profit organizations, academic institutions, private industry, and private individuals. This LWG is currently facilitated by Dave Dahlgren.

Description of Area and General Population Information

The PARM LWG area covers portions of Garfield, Piute, and Wayne Counties that contain occupied sage-grouse habitats. Sage-grouse habitat in this area is well connected and the majority of the sage-grouse can be found on the Awapa and Aquarius plateaus. It is broken down into three sub regions; the Parker, Fish Lake, and Grass Valley. See <http://utahcbcp.org/files/uploads/parm/PARMfml-10-06-web.pdf> for maps and figures. The sage-grouse populations at Wildcat Knoll and Horn Mountain have been included with the Parker Mountain Sage-grouse Management Area. The stakeholders (e.g., U.S. Forest Service [USFS], Emery County, etc.) working on these two populations have joined PARM.

The PARM area has been the most studied population of sage-grouse in Utah going back to 1998 and there have been several publications made available through these research efforts in addition to annual reports. See <http://utahcbcp.org/htm/groups/parkermountain> for more information. The Wildcat Knoll and Horn Mountain had two years of research with radio-marked grouse from 2008-2009.

Recent Activities and Accomplishments

The PARM group has been meeting regularly. The Mytoge Mountain conifer removal project has been one of the most significant activities this past year. The USFS is leading this effort. The primary objective is to benefit sagebrush conservation and sage-grouse in the area. The Utah Community-Based Conservation Program has put several (up to 5) GPS radios on grouse that have been using the general area of the Mytoge Mountain project (Figure 6).

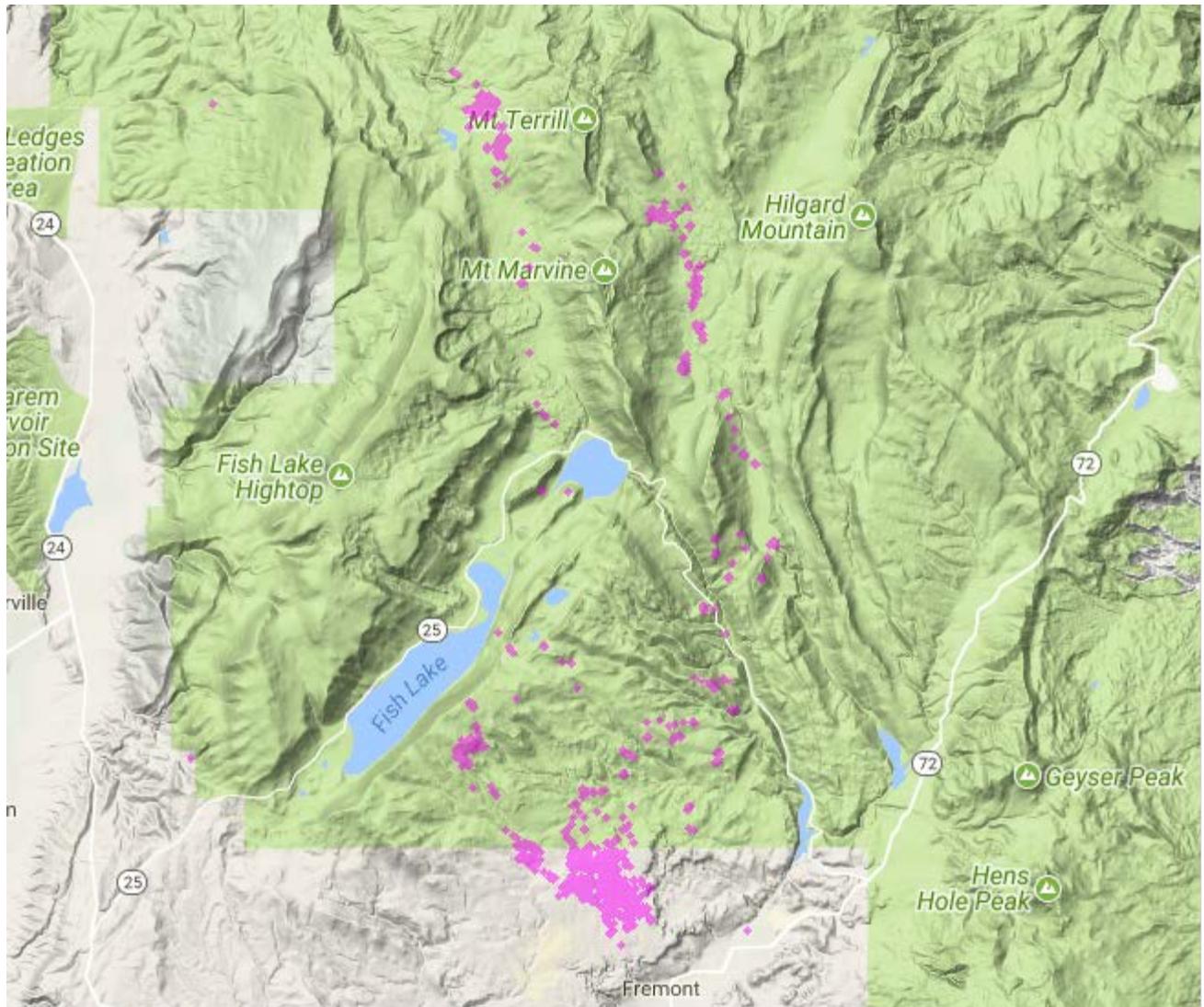


Figure 6. Map of GPS-PTT radio-marked female greater sage-grouse (*Centrocercus urophasianus*; sage-grouse) from the Dog Flat Lek within the Mytoge Mountain Project Area. Of note is the movements of a couple female grouse to the north up the UM Creek and Seven Mile Creek drainages. Please note these points represent a very small portion of the population, thus, these locations do not necessarily represent the population as a whole.

Upcoming Year Work Plan

PARM members continue to collect sage-grouse lek information by meeting one morning in the Spring where group members gather to count all the leks in the Parker Mountain Area during the same morning. Our cheatgrass treatment project has been completed in the Red Knoll area, with post-treatment vegetation surveys in September 2017. These surveys showed that cheatgrass was drastically reduced within the treatment areas. We were unable to get a second treatment last fall though. We will have one more vegetation survey conducted in the early summer to see where we need to go from here.

Rich County Coordinated Resource Management (Rich CRM) Sage-grouse Local Working Group

The Rich County Coordinated Resource Management (CRM) Sage-grouse Local Working Group (LWG) is facilitated by David Dahlgren. The Rich CRM consists of state and federal agency personnel, representatives from local government, non-profit organizations, academic institutions, private industry, and private individuals.



Description of Area and General Population Information

The Rich CRM management area is located in northeastern Utah, and is a significant population center for grouse in three states – Utah, Idaho, and Wyoming. The Sage-grouse Management Area (SGMA) includes Cache, Rich, Weber, Morgan, Summit and Wasatch Counties. The area boundary was determined by consulting with adjacent states, Utah Division of Wildlife Resources (UDWR), and the Morgan-Summit Adaptive Resources Management LWG, and the Rich CRM. It incorporates vegetation types used by sage-grouse, mostly in the Wyoming Basins eco-region.

A major LWG research effort for the Rich CRM has been to evaluate greater sage-grouse response to livestock grazing. The results suggest livestock grazing and sage-grouse conservation are compatible. Photo by Todd Black.

Recent Activities and Accomplishments

The Rich CRM continues to meet regularly. We were able to have several project proposals come through the group before going through the Watershed Restoration Initiative (WRI) ranking process. The major activity within the group is the Three Creeks Grazing Project Consolidation. The Environmental Assessment for the consolidation was approved and the project is starting to move forward at this time. Personnel employed by the Utah Department of Agriculture and Food Grazing Improvement Program and Natural Resources Conservation Service (NRCS) have been applying for multiple grants through Utah WRI elsewhere to help make the necessary improvements to the allotments and pastures to allow the grazing system to change. We anticipate a full change in grazing management by 2020.

Upcoming Year Work Plan

The sage-grouse research initiated in 2011 on the Three Creeks (3C) and Deseret Land and Livestock (DLL) has continued through 2017. Graduate students are completing their data analysis and writing theses. Additionally, the Utah Community-Based Conservation Program has continued to monitor sagebrush community characteristics in the area to assess the federal Sage-Grouse Habitat Assessment Framework for the Bureau of Land Management in Rich County.

This work is ongoing and will help federal managers and other to assess sage-grouse habitat appropriately in the future.

We are also proposing to continue monitoring female sage-grouse that were fitted with global positioning system (GPS) rump-mounted transmitters from 2015-2017 through the 2018-2020 breeding seasons. We will recover transmitters from mortalities, refurbish, and redeploy them on female sage-grouse to sustain a minimum 10 female sage-grouse on the DLL and 3C study areas that are radio-marked. We began deploying GPS radio-collars on sage-grouse in 2015 to scientifically describe the range of sage-grouse behavioral responses to the presence of livestock and grazing.

Completion of this project will provide definitive information regarding sage-grouse behavioral responses to the presence of cattle and the effects of livestock grazing on the vegetation composition and structure based on rangeland ecological sites. This science-based information will help to better define the role of working landscape in species conservation.

Southwest Desert Adaptive Resource Management (SWARM) Sage-grouse Local Working Group

The Southwest Desert Adaptive Resource Management (SWARM) Sage-grouse Local Working Group (LWG) consists of community members from Beaver and Iron Counties and is facilitated by Nicki Frey. The LWG meets every other month to discuss issues and concerns with grouse management and conservation in our region. The Governor's Task Force has recommended the development of two Sage-grouse Management Areas (SGMA) in the LWG conservation area; Hamlin Valley and Bald Hills.

Description of Area and General Population Information

The Bald Hills SGMA is located in southwestern Utah, in Beaver and Iron Counties, and is considered a population stronghold for this region of Utah. This population uses a series of leks throughout the habitat area, with males visiting more than one lek per season. Currently, the population is constrained to the Management Area by vegetation fragmentation and human development; however future improvements could connect this population to the Hamlin Valley SGMA to the west, and further north into Beaver County. The primary land uses in this Management Area are grazing, agriculture, and swine production; predominant land ownership is Bureau of Land Management (BLM) and private. The BLM manages the Bald Hills for multiple uses including conservation, recreation, energy development, and big game hunting. Residential development is present in Minersville, in the north of the Management Area, where most of the agriculture production also occurs. There is potential for wind energy production as well as current and future power transmission lines.

The Hamlin Valley SGMA is located in southwestern Utah, in Beaver and Iron Counties, on the border of Utah and Nevada and is considered a population stronghold for this region of Utah. Although currently isolated from other habitat areas, habitat restoration could link this population to the Bald Hills SGMA. The primary land use in this Management Area is grazing; predominant land ownership is BLM. The BLM manages Hamlin Valley for multiple uses including wild horse conservation, recreation, and big game hunting. Development is limited to scattered houses, generally in the southern portion of the Habitat Area.

Recent Activities and Accomplishments

The SWARM continues to be active in conducting greater sage-grouse research, management guidance, and communicating issues with the group. In cooperation with Dr. Nicki Frey, SWARM has been conducting satellite telemetry research in the Hamlin Valley SGMA since 2015. This is in addition to the satellite telemetry study that was conducted in the Bald Hills SGMA from 2014-2016. The Hamlin Valley study is designed to determine female nest location, success, and recruitment in response to habitat treatments throughout the valley. This study will continue for two more nesting seasons. Currently, Dr. Frey is advising a PhD student that will analyze this data, as well as synthesize and analyze all data that has been collected by Dr. Frey's studies since 2013. This project is also coordinating with Nevada Department of Wildlife to study grouse that use the northern Hamlin Valley in Nevada.

Upcoming Year Work Plan

The SWARM will revise its local plan during 2018. The group plans to learn more about sage-grouse responses to habitat improvement projects. Dr. Frey's PhD student will continue to analyze and synthesize data for the group.

Strawberry Valley Adaptive Resource Management (SVARM) Sage-grouse Local Working Group

The Strawberry Valley Adaptive Resource Management (SVARM) Sage-grouse Local Working Group (LWG) is facilitated by Lorien Belton.



Description of Area and General Population Information

The LWG conservation area covers Wasatch and Duchesne Counties. There are leks and associated nesting/brood-rearing areas both at high elevations around the Strawberry Reservoir, as well as in the lower-elevation Fruitland area in Duchesne County. The birds winter primarily in Fruitland. In recent years, the population has grown increasingly stable. Predator control efforts, particularly with regard to red fox control, have played a large role in helping the sage-grouse population rebound from previous lows.

Mark Farmer (Utah Division of Wildlife Resources) and Anthony Gray (U.S. Forest Service) discuss project plans for habitat treatments around the Strawberry Reservoir. This project was proposed for funding in the 2018 WRI project cycle. Photo by Lorien Belton.

Table 3. Meetings and Tours held by SVARM LWG during 2017.

Meetings and Tours	Date	Location	# attending	Comments
Spring Meeting	Cancelled due to low interest			
Field Tour	Not held			
Meeting	November 29, 2017	Heber	9	Grazing and sage-grouse information, HAF framework, project and fire updates, state plan revisions

Project and Research Highlights

The planning for the next suite of habitat improvements in the Strawberry Valley has been moving very slowly. One project in Trout Creek was implemented this summer in an area where sagebrush was treated ten years previously to increase forb and grass diversity. An important first step in beginning the next round of projects was submission of a pre-treatment weed control proposal in the co-op creek area to combat a substantial musk thistle problem which could severely limit the success of any brood-rearing habitat enhancement projects. The group

maintained communication with Wasatch County regarding developments near Strawberry Reservoir which have the potential to impact sage-grouse, although on a very extended implementation timeline. A key project in sage-grouse wintering areas was designed and proposed for funding through the Watershed Restoration Initiative.

Upcoming Year Work Plan

The group hopes to do considerably more planning for habitat projects in the area. Developing multiple project proposals for brood-rearing habitat improvement projects will require involvement from the Natural Resources Conservation Service and U.S. Forest Service. Group members will also be working strategically with local private landowners of key winter habitat to assist with appropriate project planning. The group will also work on local plan revisions during 2018, and work to engage Brigham Young University researchers in the group again to learn about results of the most recent research.

Uintah Basin Adaptive Resource Management (UBARM) Sage-grouse Local Working Group

The Uintah Basin Adaptive Resource Management (UBARM) Sage-grouse Local Working Group (LWG) is facilitated by Lorien Belton. It is closely tied to the Uintah Basin Partners for Conservation and Development (UPCD), often coordinating meeting scheduling between the two groups.



Description of Area and General Population Information

The Uintah Basin sage-grouse group covers parts of Duchesne, Uintah, and Daggett counties. A large population with multiple leks inhabits the Diamond Mountain area north of Vernal. This area has mixed landownership, including private, state, and federal lands, and is used primarily for agricultural purposes. The Diamond Mountain population is one of the few populations in Utah that is robust enough to support a limited sport hunt in the fall. Additional sage-grouse populations occur south and west of Vernal in areas including Forest Service land on Anthro Mountain, and Bureau of Land Management (BLM) land further south. The southern populations in particular are in areas that have been highly impacted by oil and gas development. Some populations also occur farther south into the Book Cliffs. Populations on Seep Ridge, Deadman Bench, Little Mountain, Anthro Mountain, and Diamond Mountain have been the subject of research studies over the course of multiple years.

The 2017 joint tour with UPCD and UBARM visited wet meadow restoration sites on Forest Service land. Photo by Lorien Belton.

Table 4. Meetings and Tours held by UBARM LWG during 2017.

Meetings and Tours	Date	Location	# attending	Comments
Meeting	March 21, 2017	Vernal	16	Population research, wet meadow hydrology, partner updates
Field Tour	June 27, 2017	Cart Creek Watershed	13	Riparian and wet area restoration (joint tour with UBPCD)
Meeting	September 19, 2017	Vernal	12	BLM secretarial order and planning updates, state sage-grouse plan update feedback

Meeting	December 5, 2017	Vernal	14	Population research updates, partner updates
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Project and Research Highlights

The group has been very focused on the incoming data from the GPS collared birds, particularly in the northeastern areas. Seasonal bird movements and corridors have been of particular interest for project evaluation and planning on an anecdotal level. Observing the birds' use of previously treated areas is exciting for the group, and provides a source of ideas and feedback about new project areas.

The group also provided robust early comments on the state plan revision, the relationship of state and federal plan implementation challenges, implementation and interpretation of the original "opportunity areas" concept and map, and interpretation of the current plan's key objectives.

Upcoming Year Work Plan

The group is interested in revising the local sage-grouse plan in the coming year. As many group members are also highly engaged in the Watershed Restoration Initiative project planning process, there will no doubt be significant effort to propose projects that reflect what the group has learned from the multi-agency sage-grouse tracking efforts on Goslin Mountain, Three Corners, and other areas where increasingly more is known about seasonal habitat usage and bird movements.

West Desert Adaptive Resource Management (WDARM) Sage-grouse Local Working Group

The West Desert Basin Adaptive Resource Management (WDARM) Sage-grouse Local Working Group (LWG) is facilitated by Lorien Belton. The group covers two areas: Ibapah, on the western border of Utah with Nevada, and the Sheeprock Mountains (in Tooele and Juab counties). Due to concern over population declines in the Sheeprock, the WDARM group has also become the Technical Committee tasked for overseeing a series of enhanced efforts in the Sheeprock to reduce threats to sage-grouse and help the population rebound. Since July 2015, WDARM has increased its meeting frequency from three-four times a year to approximately every other month. The group will continue its increased activity until the urgent need for coordination and implementation goes down. Although the majority of the groups’ focus is on the Sheeprock population area, the group tries to meet once each year in Ibapah.



The 2017 joint tour with UPCD and UBARM visited wet meadow restoration sites on Forest Service land. Photo by Lorien Belton.

Description of Area and General Population Information

The WDARM LWG conservation area encompasses sage-grouse habitats in Tooele and Juab counties. The two primary population locations are far apart: one in western Tooele County in the Ibapah region (including the Goshute Tribe’s land), and the other at the eastern side of the two counties, known as the Sheeprocks. These more eastern populations include birds in the Vernon area as well as in the Tintic Mountains. Population trends in the area have declined over the last few years. In 2015, lek counts which rebounded in other part of the state, including Ibapah, did not rebound in the Sheeprocks.

Table 5. Meetings and Tours held by WDARM LWG during 2017.

Meetings and Field Tours Type	Date	Location	# attending	Comments
Meeting	January 26, 2017	Tooele	23	Research updates, BLM travel management planning, WRI project review
Meeting	March 15, 2017	Tooele	16	Riparian restoration, seeding success

				research, recreation research baseline data
Work day	October 31, 2017	Vernon Creek	Unknown (~12?)	Working group members were invited to assist in building BDAs on Vernon Creek
Field Tour	Postponed due to project delays	Tintics	NA	Site visits to riparian projects and water monitoring were delayed due to project timelines
Meeting	November 30, 2017	Tooele	23	BLM policies, hydrology research

Project and Research Highlights

The group scaled back its previously very aggressive meeting schedule from the previous year. However, the group remained quite active, with several research projects going on in the area and a wide array of projects. Utah State University (USU) research headed up by Melissa Chelak, PhD student, involved many group members in a second year of translocations of sage-grouse into the Sheeprocks area. The group uses periodic research updates to constantly revise and adapt project plans and priorities. The completion, late in the year, of the instrumentation of several watersheds in the Tintic Mountains marked the first step in a project designed to assess the water quality and quantity impacts of conifer removal in spring systems. The long-range planning for projects in the area allowed the project to be designed in a way that will provide several years of data before the trees are cut.

In addition to research, the group actively communicates in multiple informal subgroups about habitat treatments and the fire/fuels staff at Bureau of Land Management (BLM) work well with the wider group on many aspects of project planning, implementation, and reporting. This year saw several water improvement projects implemented, including spring projects and beaver dam analogues (BDAs) for riparian restoration.

Upcoming Year Work Plan

The West Desert group is very active. The focus for 2018 for the group will include continued conifer project implementation, the third year of the translocation research, preliminary data from the groundwater project, and involvement with a USU recreation study in the Sheeprocks. Finding time to balance research presentations, project planning, and other discussions in the group's busy agendas will be a challenge!

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