Sagebrush Science Initiative Summary of Funded Proposals

The Sagebrush Science Initiative RFP indicated research projects should develop science products that have a clear tie to sagebrush dependent species conservation planning or management at landscape or range-wide scales. The RFP stated that because of the recent and ongoing focus on sage-grouse science and management, this initiative **will not fund sage-grouse** projects, but projects evaluating the effectiveness of sage-grouse management prescriptions at conserving other sagebrush obligate species ("umbrella species concept"), or impact of these prescriptions on other focal species will be considered and **are encouraged**.

The following proposals ranked highest among reviewers and were approved for funding:

1. **Building a decision support tool for pinyon-juniper removal: Maximizing benefits to sagebrush- and forest-obligate songbirds**. Dr. Michael Falkowski, Colorado State University.

   This project expands upon an already funded SGI initiative to optimize locations for conifer removal to benefit sage-grouse using the Falkowski conifer map layer (funded through LC MAP grant) and Doherty breeding density map. Adds capability to also optimize for sagebrush dependent songbirds (and potentially pygmy rabbits) while minimizing impacts to PJ obligates such as Pinyon Jays. Will import directly into "dashboard" decision support tool.

2. **Effects of cattle grazing on sagebrush-obligate and sagebrush-dependent birds**. Dr. Courtney Conway, Idaho Coop. Unit.

   This project expands upon a large, multi-agency collaborative study (Univ. of Idaho, Idaho Game and Fish, BLM, Great Basin LCC & two grazing Associations) evaluating the impacts of alternative grazing systems on sage-grouse over a 10-year period using a staggered entry BACI design. "This project will evaluate the effects of grazing management prescriptions (intended to be compatible with greater sage-grouse) on other sagebrush-obligate or associated avian species. The results will contribute to an adaptive management process by: 1) assessing current state of populations of sagebrush-dependent birds as well as limiting factors, 2) compilation of models describing population-habitat relationships that can lead to species-habitat decision support tools, and 3) monitoring the impact of management actions (cattle grazing) on populations that will allow feedback to evaluate program effectiveness."

3. **Pygmy rabbits under the sage-grouse umbrella: Assessment at range-wide and regional scales.** Dr. Janet Rachlow, Univ. of Idaho.

   This project will develop a range-wide distribution map for pygmy rabbits through compilation and synthesis of existing presence-absence data and development of a predictive MaxEnt model. "The proposed work would evaluate how well sage-grouse habitat conservation also supports landscapes inhabited by pygmy rabbits at both regional and

range-wide scales, and this information can be used to inform integrated habitat conservation, restoration, and management that targets both of these sagebrush obligates." It is part of a larger intensive sage-grouse and pygmy rabbit distribution and habitat use study in Idaho supported by BLM, Forest Service and Idaho Department of Fish and Game.

4. **Evaluating biodiversity of sagebrush-dependent species within sage-grouse habitat: an example from the Wyoming Basin.** Dr. Cameron Aldridge, CSU, USGS.

"We will use recently-developed models (see Hanser et al. 2011a) mapping the occurrence or abundance of six sagebrush obligate or near-obligate species of conservation concern (four songbirds, one reptile, and one mammal). We will evaluate how important habitats for each species overlap with similarly developed sage-grouse habitat occurrence models (Hanser et al. 2011b), as well as how sage-grouse priority habitats overlap with biodiversity hotspots for the other sagebrush species." This project will evaluate the degree to which sage-grouse conservation can act as an "umbrella" for other sagebrush dependent species within the Wyoming Basins ecoregion, the Utah-Wyoming-Rocky Mountain ecoregions in their entirety and portions of Southern Rocky Mountains and Middle Rockies-Blue Mountains ecoregions.

5. **The influence of climatic conditions on reproduction of sagebrush-dependent birds: Implications for climate vulnerability assessments and habitat prioritization efforts.** Dr. Anna Chalfoun, Wyoming Cooperative Fish and Wildlife Unit.

"We propose to evaluate reproductive vital rates of sagebrush songbirds in relation to key aspects of local climate. To accomplish this we will leverage several large existing datasets of nesting observations from over six thousand nests across multiple years and sites, archived weather station data (temperature, precipitation, and relative humidity), and gridded climate datasets (e.g., PRISM). To further examine whether particular landscapes and/or microhabitats may confer more protection in the face of increasingly more extreme weather events (e.g., high temperatures and drought) expected with climate change, we will incorporate habitat data collected remotely and at nests into climatic response models. Finally, we will initiate a new field effort during 2017-2018 designed to assess whether microhabitats buffer ambient conditions, and the associated fitness consequences."

6. **Assessing the regional response of avian and small mammal sagebrush communities to pinyon and juniper removal**. Dr. Kevin Shoemaker, Univ. of Nevada, Reno.

This proposal adds sagebrush and PJ dependent birds and small mammals to an ongoing collaborative (NDOW, USFWS, NPS) 4-year study entitled "Measuring the regional impacts of pinyon and juniper removal on insect, bat, and reptile communities", examining the non-target ecological impacts of pinyon and juniper (PJ) removal across the Great Basin ecosystem of northern Nevada. Using a BACI design, one study site is the Sheldon National Antelope Refuge.

Round Two Projects Funded:

1. **Modeling species-habitat relationships, assessing threats, and prioritizing areas of conservation for lizards and snakes in sagebrush ecosystems.** Dr. David Pilliod, USGS, Forest and Rangeland Ecosystem Science Center, Boise.

   The proposal utilizes data from individual Heritage Programs, state non-game programs, and other sources on occurrence of lizards and snakes, and plans to develop biome-wide occurrence models from this data. From the proposal: "In exchange for this information, we will be providing to the states: (1) comprehensive species occurrence data with data record corrections; (2) maps of lizard and snake hotspots within each state; and (3) spatial models of species occupancy, including predicted changes in distribution under future climate scenarios. We will work with state (fish and game, state lands) and federal (BLM, USFWS, USFS) partners during the release of preliminary results to ensure that products covering predicted distribution and conservation prioritization meet their needs.

2. **Identifying and prioritizing mule deer migration corridors and winter ranges across sagebrush ecosystems of the Western U.S.** Dr. Matt Kauffman, USGS, Wyoming Cooperative Fish and Wildlife Unit.

   This proposal resulted from a collaboration with the WAFWA Mule Deer Working Group and the Wyoming Migration Initiative and has 3 objectives:
   1) *Develop a standalone program which simplifies the technologically challenging analyses outlined in Sawyer et al. (2009b) into a user-friendly software add-on that can be implemented by biologists and managers using their own GPS collar data.*
   2) *Work with biologist and managers of state agencies to analyze mule deer data sets. Specifically, using the program outlined in objective 1, we will assess the broad applicability of the analysis methods to identify migration corridors. This step will include the development of a list of key issues and considerations for analyzing these types of data and when designing new studies on migratory mule deer.*
   3) *Hold training workshops across the West for biologists and managers who have GPS collar data on mule deer and are interested in identifying and prioritizing migration corridors in their respective units/districts. These workshops will be the springboard to disseminate the migration analysis program and collated information from objectives 1 and 2.*

3. **Developing a multi-species decision support tool at a regional scale.** Dr. Andrew Jakes, University of Montana.

   The proposal seeks to optimize conservation investments through three large-landscape level objectives:
   1) Identify multi-species overlap of sagebrush migratory corridors to directly target conservation opportunities using cultivation risk assessment models.

2) Test if hoofed (i.e. pronghorn) and feathered (i.e. grassland birds, waterfowl) species can be managed under the Greater Sage-grouse 'umbrella'. First, model seasonal range selection of pronghorn and then develop a multi-species decision support tool using overlaid seasonal range and migratory pathways to target management tools and conservation opportunities.
3) Test fencing effects on multi-species seasonal range and migratory pathways to target priority areas for management applications.