

**Recommendations to the Western Association of Agricultural Experiment Station
Directors and the Western Extension Directors Association from W506 – Using Science
Based Solutions in Conservation of Threatened and Endangered Species: Sage-grouse Case
Study**

Submitted on March 14, 2017

The rapid response research committee, W506, was created following the March 2015 Western Association of Agricultural Experiment Station Directors (WAAESD) and Western Extension Directors Association (WEDA) joint meeting in Breckenridge, Colorado. Originally, WAAESD directed the committee to be formed in response to the approved Western Perspective, Western Agenda. At the following joint meeting held in Santa Fe, NM, WEDA formally made this a joint committee. WAAESD appointed John Tanaka and WEDA appointed Terry Messmer as co-Administrative Advisors. WAAESD also appointed Sarah Lupis to the administrative committee. The proposal was written and approved and researchers were solicited. In addition, at the time this committee was formed, Governor Matt Mead from Wyoming was the Chair of the Western Governors' Association (WGA) and his initiative was "Conservation of Species" that is now in its second year.

The first W506 meeting was held in Park City, UT on August 9-10, 2016. Seventeen members and guests were present. The focus of that meeting was to address Objective 1 of the project:

1. To develop a process for scientist collaboration on assessing the best available science related to threatened and endangered species. This includes our ability: a. To understand the existing process for submitting science to the USFWS [U.S. Fish and Wildlife Service]. b. To understand how land-grant universities are currently engaged in the process of ESA [Endangered Species Act] determinations. c. To find how land-grant universities can better engage in the process. d. To recommend how the process can be improved.

The second W506 meeting was held in Tucson, AZ on January 17-18, 2017. Fifteen members and guests were present. We completed Objective 1, which is addressed in the following set of recommendations, and made progress on the remaining objectives that will be reported on later.

To assist with this process, our invited guests at the first meeting in Park City, UT were Dr. Patricia (Pat) Deibert, sage-grouse coordinator for the U.S. Fish and Wildlife Service, Ms. Kathleen Clark, Director of the Utah Public Lands Policy Coordination Office, and Mr. David Willms, a policy analyst from Wyoming Governor Matt Mead's office. Dr. Deibert subsequently offered to serve in an adjunct role for W506 and will continue interacting with Land Grant Universities (LGU) through this mechanism. While we continued to work on some of the sub-objectives at our 2017 meeting, an initial set of recommendations was produced at this inaugural meeting. We invited Dr. Kevin Doherty, USFWS Research Scientist, to participate in the second meeting to discuss the process used by the USFWS to gather and assess the best available science to make the 2015 ESA listing determination for the greater sage-grouse. Drs. Doherty and Deibert were directly involved in the USFWS data call and data analysis. Drs. Deibert and

Doherty also represent the USFWS on the Western Association of Fish and Wildlife Agencies (WAFWA) committee that is developing a Range-wide Sagebrush Conservation Strategy.

Using information provided by Drs. Deibert and Doherty, the diverse experience of the committee members, and our subsequent discussions, we identified the roles of various groups in the ESA process. The roles are briefly summarized below.

To set the stage as to the importance of this activity and why every LGU should be concerned, the following table compares the number of listed species in 2005 and 2017. In 2017, there are now 1,652 species listed as threatened or endangered in the U.S. compared to 1,264 in 2005. There have been 76 species delisted over the life of ESA.

Number of listings by state or territory.		
	2005	2017
Alaska	7	12
Arizona	54	65
California	291	301
Colorado	31	32
Hawaii	312	500
Idaho	23	16
Montana	15	15
Nevada	37	39
New Mexico	39	52
Oregon	50	56
Utah	43	43
Washington	38	47
Wyoming	15	12
Outlying Islands	15	
American Samoa		6
Guam		32
Northern Mariana Islands		28

Role of the Western Governors' Association in ESA Decisions

The WGA is a bipartisan organization with the chair rotating between parties each year. Each Chair selects an initiative that WGA works on for 3 years. The WGA strives to reach a consensus on policy issues of importance to western states and its bipartisan approach attempts to ensure there is a unified voice in their decisions. To build this consensus, the WGA seeks expert opinion on the issues and seeks to influence the decision makers at the federal level when appropriate (legislators, agencies, etc.). Given that the LGU's are state educational units, the western governors may also seek to influence the direction and priorities of LGU's through special project funding and appropriations. The WGA seeks to promote the use of science and, in the case of endangered species; the WGA may be the insertion point for social science in the

discussion, especially as ESA relates to western communities. The WGA also works with Governors in each state to develop and support multi-state initiatives that can serve as a clearinghouse for information relative to the effects of proposed land uses and utilities on wildlife and their habitats. The most recent example of this is the Critical Habitat Assessment Tool (CHAT).

In 2008, the WGA adopted their Wildlife Corridors Initiative Report and created the Western Governors' Wildlife Council. The WGA tasked its members with developing policies and tools to identify and conserve crucial wildlife habitat and corridors across the region. The Wildlife Council first approached the Governors' directive by launching regional pilot projects in 2010 with support from a grant from the Department of Energy. The year-long pilot project allowed the Wildlife Council to test the framework outlined in their White Paper, helping to refine their vision. In August 2011, the Wildlife Council established a plan to develop a West-wide tool with the goal of launching a public and regionally compatible crucial habitat GIS tool by 2013. CHAT was launched in 2013 and managed by WGA. In April 2015, WGA transferred full responsibility for CHAT to WAFWA, and the tool was renamed the WAFWA CHAT (<http://www.wafwachat.org/about>).

Role of Federal Agencies

Two federal agencies (USFWS and National Oceanic and Atmospheric Administration [NOAA] Fisheries) promulgate the rules that establish the process when considering the listing of a species for ESA protections. NOAA Fisheries provides science-based conservation and management for sustainable fisheries and aquaculture, marine mammals, endangered species, and their habitats. USFWS is responsible for all other plant and animal species that may be under ESA consideration.

To establish and incorporate the best available science when considering a species listing, USFWS and NOAA staff reviews the published literature as well as solicits biological opinions and analysis from experts within regulatory agencies and from external sources regarding the conservation status of the species relative to five listing factors in the ESA. Typically, the term “best available science” refers to research that has been published in a scientific journal after an external peer-review process.

Based on this process, the USFWS and NOAA Fisheries can also determine whether additional data are needed to make a decision and take additional actions to obtain these data through contractual arrangements with experts. These internal or contracted experts may subsequently produce scientific publications that may be subject to external peer-review. The USFWS and NOAA Fisheries may choose to enter these publications as part of the scientific record.

Throughout the process, the USFWS and NOAA Fisheries may consider conservation actions or plans developed and implemented by federal and state agencies to mitigate species conservation threats. In the case of the greater sage-grouse, state conservation plans and sage-grouse amendments added to existing Bureau of Land Management (BLM) Resource Management Plans (RMPs) and U.S. Forest Service (USFS) Land Use Plans (LUPs) weighed heavily in the

USFWS unwarranted listing decision. In some states, LGU scientists were pivotal in providing the best available science to develop the state plans, RMP, and LUP amendments.

Role of State Fish and Wildlife Agencies

The western states and territories have a long history and tradition of successful wildlife management and conservation. The state and territorial fish and wildlife management agencies are members of the Western Association of Fish and Wildlife Agencies (WAFWA). WAFWA represents 23 states and Canadian provinces, an area covering nearly 3.7 million square miles of some of North America's most wild and scenic country. WAFWA's reach encompasses more than 40 percent of North America, including two-thirds of the United States. WAFWA supports sound resource management and building partnerships at all levels to conserve native wildlife for the use and benefit of all citizens, now and in the future. The Association of Fish and Wildlife Agencies (AFWA) also represents the state fish and wildlife management agencies nationally. AFWA and WAFWA meet twice a year as a group to coordinate fish and wildlife management policies actions which are recommended by various sub-committees and working groups.

In the case of the greater sage-grouse, significant contributions to the science, management, and conservation of the species have been achieved under state management authority and through WAFWA. The first state strategic plans for greater sage-grouse were developed in 1990's and have been revised periodically as new information became available. Each plan iteration has incorporated the latest research on local sage-grouse ecology and responses to management actions as well as consolidated state-wide strategies to guide future management and conservation. These cumulative actions validate the role and impact of state management authority and role of voluntary conservation measures in achieving certainty in sage-grouse conservation.

The western states with sage-grouse populations within their borders entered into a Memorandum of Understanding (MOU) to provide for cooperation among the participating state and federal land, wildlife management and science agencies in the conservation and management of greater sage-grouse, sagebrush habitats and other sagebrush-dependent wildlife throughout the Western United States and Canada. WAFWA in the 2006 Greater Sage-grouse Comprehensive Conservation Strategy identified the need to shift emphasis from conservation planning to conservation action implementation incorporating adaptive management principles to inform and guide future management practices.

States, USFWS, the U.S. Geological Survey (USGS), Natural Resources Conservation Service (NRCS), and Farm Service Agency (FSA) signed the MOU in 2008. Missing from this MOU were the LGUs. The Parties to the MOU agreed (1) sage-grouse are an important component of sagebrush ecosystems and serve as an important indicator of the overall health of this important Western North America biome, (2) cooperative efforts among the Parties, consistent with applicable statutory and regulatory requirements, are necessary to conserve and manage North America's sagebrush biome ecosystems for the benefit of sage-grouse and all other sagebrush-dependent species, and (3) to maintain the many other values sagebrush systems provide. The Parties adopted an adaptive management approach to the implementation of the conservation strategies that acknowledge that in the face of uncertainties as outcomes from management

actions and other events become better understood through monitoring, evaluation of actions, incorporation of new scientific understanding, and the sharing of data and information, we produce better understanding and improve the management and conservation of the sagebrush biome, sage-grouse and all other sagebrush-dependent species; and, develop partnerships with agencies, organizations, tribes, communities, individuals and private landowners to cooperatively accomplish the preceding objectives.

The Parties maintain the Executive Oversight Committee (EOC) composed of the Director of each WAFWA member agency, or their designee, from each state and province within the range of the greater sage-grouse, and one (1) management representative from each of the signatory federal agencies to this agreement. The EOC periodically reviews overall progress in implementing the Comprehensive Strategy and conservation measures for other species of conservation concern in the sagebrush biome.

Role of LGU Scientists

Because of the dynamic and time sensitive nature of the USFWS ESA process, BLM and USFS plan amendments, and state efforts, the faculty appointment of an LGU scientist (e.g. salary apportionments and base funding), and the limited funding currently available to support emerging ESA research needs, most LGU scientists have not been fully engaged in ESA issues that may affect their states. The LGU scientist often pursues funding sources identified by affected stakeholders. Because these funds may also be limited, the LGU scientist may seek to create a funding partnership (state, private, and federal) where each stakeholder group commits to funding a portion of the research. These partnerships are often difficult to build, but tend to increase stakeholder interest in the research and create ownership in both the research process and the outcomes.

Once funding is obtained, the LGU scientist may conduct research with or without graduate students or other research collaborators. Throughout the process, the LGU scientist is often principally concerned with data quality control and the ability to publish the results in peer-reviewed journals. While in a different context, and depending upon the journal, the LGU scientist and the affected stakeholders may also seek to understand how the results can be applied to policy and management. Because of the land-grant mission, the LGU scientist may work with extension faculty to communicate the research results on a timely basis with affected stakeholders prior to publication.

The LGU research and extension scientists are frequently asked to peer-review other scientists' results by scientific journals, federal review boards, and other types of external review such as providing expert advice and opinions as expert witnesses in court cases. As such, and because of these roles, they are well aware of the published literature and other experts in their disciplines. As part of their LGU roles, the LGU scientist also seeks to educate and communicate with diverse stakeholders regarding the management and policy implications of research and how results may apply to their location. In the case of species being considered for ESA listing, the LGU scientist may communicate directly with the USFWS staff conducting the ESA review.

Roadblocks

In our discussions, we identified several roadblocks to effective LGU participation in the ESA process that can inhibit the goal of ensuring the best available science regarding the conservation status of a species within each respective state is fully considered.

Policy and Science

Both LGU scientists and administrators must have a better understanding of the USFWS and NOAA Fisheries listing and information gathering processes. The W506 participants acknowledged that at times, conservation policies preferred by decision-makers may be inconsistent across the science disciplines. For example, policy makers may prefer increased emphasis on socio-economic considerations in ESA listing decisions over biology even though the ESA mandates such decisions be based strictly on biology. However, under the current ESA decision framework, social and economic information is only considered in critical habitat designations after a decision has been made to list a species. The diversity of scientific disciplines found at a LGU (biological, economics, and sociology) offer ESA stakeholders ready access to scientists who can address questions regarding species biology and ecology and the social and economic impacts of a listing decision. The challenge remains how LGUs increase the visibility of LGU scientists without competing with potential research partners in US Geological Survey (USGS), USFS, USFWS, and other state universities that may be competing for the same pool of research funds. This challenge may actually become an opportunity for the LGU scientists to leverage LGU funding. To do this LGU scientists and administrators need to understand the complexity of the processes and where LGU research and expertise may best be inserted.

Even though the ESA calls for the use of the “best available science,” a common perception among stakeholders is that USFWS decision-makers prioritize information from familiar and expedient sources of scientific results. In the case of the greater sage-grouse, the USFWS contracted with USGS scientists predicated on limited response time and the historical and existing administrative relationships between USGS and USFWS. In the case of the greater sage-grouse decision, USGS scientists contacted LGU scientists to solicit data.

Because of this process, the states developed perceptions that the USFWS did not fully consider the merits of the science generated by LGUs. As a result, the states perceived that USFWS was more interested in developing standard conservation policies that could be applied range-wide rather than regionally. However, this type of approach may not have been in the best interest of species conservation because it did not recognize the range of variability in sage-grouse populations and habitats. This range of variability was incorporated in the state plans and remains a point of contention and litigation regarding BLM and USFS Resource Management Plan (RMP) and Land Use Plan (LUP) amendments. For LGU scientists involved in state conservation planning efforts, there may be some professional risk if the LGU scientist’s results are used in an advocacy role, whether real or perceived.

Funding

There are few consistent ways that individual states fund LGU researchers and the projects they undertake. In the sense that there are large federal funding programs, the priorities for funding may not align with the questions important at state or local levels. Much of the federal formula funds received by LGUs go to salaries or are used to support research interests of a faculty member rather than that of stakeholders. As an example, because social science (e.g., sociology and economics) cannot be included in ESA listing determinations, there is little incentive for the federal government to fund social science research at this level even though governors, commissioners, and local communities are vitally interested in these types of impacts to their communities and constituents. Even though social science may be considered after listing (e.g., when choosing to designate critical habitat for a listed species), obtaining scientifically valid results at that point may be too little and too late. There may be opportunities for new revenue streams such as the Wildlife Conservation and Restoration Program administered by the Association of Fisheries and Wildlife Agencies are potentially available. However, for LGU scientists to access this potential new fund source, they would need to have developed working and professional relationships with their state wildlife agency. There may also be disconnect on whether Agricultural Experiment Station (AES) and Cooperative Extension Service (CES) funding is responsive to the needs of the citizens of the state versus the interests of the individual faculty that likely varies from state-to-state.

Consultation

W506 participants expressed some concern over a perceived lack of any kind of formal consultation with LGU scientists by the USFWS, NOAA Fisheries, BLM, and USFS, and respective state agencies in the ESA process. This may reflect the failure of LGU scientists and administrators to develop and facilitate personal and professional relationships with the agencies and a lack of visibility (knowledge or awareness) on the part of agencies regarding the range of expertise housed in LGU's. The lack of relationships may also contribute to the perception of the agencies only talking with their trusted sources noted above.

W506 participants felt the multistate research mechanism is underutilized to address ESA issues. Most participants and LGU scientists, were not aware that this mechanism exists or how to get involved. A blast email from AES and CES directors to faculty may not be sufficient for recruiting participants. There are few incentives for faculty to participate and what incentives there are vary widely across the systems with each state developing its own rules. In some states where only one participant is funded, other faculty may be missing opportunities.

At the university level, there may be internal structural barriers to collaboration and participation. There may be competition or artificial boundaries internally with college cost centers and extension being cut out especially where AES and CES are not under the same structure. Universities with separate Agriculture and Natural Resource colleges and AES and CES in different administrative units exemplify this issue. There may also be an internal lack of awareness of the capacity of AES and CES and often there is a disconnect between the two.

It may be perceived that LGU's do not consider federal agencies as clients or stakeholders. As an example, The National Information Management and Support System (NIMSS) is not searchable enough to be useful to USFWS.

Recommendations for Improving How LGU Scientists Get Involved in the ESA Process

Based on the background provided above and the resulting discussion, W506 developed a number of recommendations regarding the roles AES and CES directors could play in improving the climate for LGU research and extension scientists to more effectively participate in the conservation of species and the ESA process. The overall list was refined into seven specific recommendations that are then expanded below for more context.

1. Each LGU should create a dynamic, searchable database of research (e.g., University of Wyoming AES example, <http://www.wyagresearch.org/research/index.php>), including information about faculty/specialist expertise and capabilities.
2. Each LGU, including AES and CES should encourage and facilitate scientists and leadership to develop professional relationships with counter-parts at USFWS, NOAA Fisheries, and other agencies.
3. AES and CES should promote capabilities of LGUs and focus on the Western Perspective and Western Agenda document.
4. AES and CES Directors should work with USFWS and NOAA Fisheries to create a process to solicit LGU contributions early in the listing process.
5. AES and CES Directors should allocate new resources to facilitate development of interdisciplinary collaborations that structure social science activity into multi-state, large-scale research efforts.
6. AES and CES Directors should discuss, coordinate, and decide actions to expand resources and create minimum consistency to support faculty to participate in regional/multi-state efforts. (e.g., WAFWA, AWFA, MRF, USGS, etc.)
7. AES and CES Directors should establish ESA-initiative(s) across the Western Region to coordinate region-wide ecological and socioeconomic/policy efforts.

Additional explanation of each recommendation follows.

1. **Each LGU should create a dynamic, searchable database of research including information about faculty/specialist expertise and capabilities.**

The database should include all outputs (e.g., academic publications, fact sheets) from LGU scientists, not just those with AES/CES appointments, and include a brief abstract in layman's terms. The University of Wyoming's database may serve as one example (<http://www.wyagresearch.org/research/index.php>). To be useful and pertinent, this database must be kept up-to-date on a website that state and federal agency personnel can access to better find and engage with LGU faculty when needs arise to obtain expertise about species that may be considered for ESA listing.

While we believe USFWS should more readily reach out to LGUs, it is also incumbent upon LGUs to make greater efforts to raise visibility and awareness of the expertise available to important agency stakeholders who should be encouraged to draw on this expertise early in the process. Each LGU should develop a formal mechanism and associated funding through which USFWS and NOAA Fisheries could identify area

experts and develop relevant research, data collection, and monitoring for species in which USFWS needs greater knowledge – ideally to identify those species in partnership with USFWS several years out. This should manifest itself as single or multistate multidisciplinary research, data collection, and monitoring efforts. It would include producing scientific outputs addressing identified potential threats. We envision this to include developing social and economic sciences to inform decision makers about possible outcomes of listing or other species/ecosystem conservation efforts – this would be timely as the designation of critical habitat, which considers economic impact, occurs when listing a species as Endangered and would substantively contribute to the body of knowledge necessary to make defensible decisions. The key would be the ability to provide useful output to USFWS and NOAA Fisheries within the time frame mandated by the ESA.

2. Each LGU, including AES and CES, should encourage and facilitate scientists and leadership to develop professional relationships with counter-parts at USFWS and other agencies.

These relationships must occur at the national level, through the states, and go to the local level. AES and CES Directors need to develop a relationship with USFWS, NOAA Fisheries, and other agencies at the national, regional, and state levels to increase awareness of LGU scientific capability in terms of ESA. An example of this comes from Utah, where the AES and CES Directors regularly attend meetings of the Utah Partners for Conservation and Development (Utah PCD). The Utah PCD is a state-level partnership of natural resource oriented agencies and organizations. The purpose is to maintain communication and cooperation at the director-level needed to leverage resources and increase effectiveness. Core values that have been the basis of cooperation are protecting Utah's biological diversity (wildlife and vegetation), improving water quality and water quantity (yield) for municipal, agricultural and natural resource uses, promoting sustainable agriculture through working, productive farms and ranches, and improving outdoor recreation opportunity, access, delivery, and quality. https://www.blm.gov/style/medialib/blm/ut/natural_resources/healthy_lands_initiative.Pa.r.52130.File.dat/New%20UtahPCD%20booklet%20p1-2new.pdf.

Utah also has developed a Utah Community-Based Conservation Program (www.utahcbcp.org). This program developed in 1996 to begin addressing localized threats to sage-grouse and sagebrush obligate species that inhabit Utah. The CBCP has enhanced communications and collaboration among private stakeholders, local, regional and state governments, and state and federal management agencies and mitigated regional and statewide conservation threats to sage-grouse and other sagebrush obligate species. In 2013, the Conservation of Greater Sage-grouse in Utah (Plan) was published. The Plan would not have been possible without the two decades of research and community involvement accomplished by the CBCP. When CBCP local working group (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. This effort was

funded by an appropriation provided by the Utah Legislature to USU Extension that was leveraged with funding from other state and federal agencies.

The Extension Committee on Policy (ECOP) and Experiment Station Committee on Policy (ESCOP) may also be appropriate at the national level to develop relationships with agency leadership, though individual LGU's can do the same. AES and CES Directors should invite agency personnel to field days at the local level.

LGUs should focus on engaging USFWS, U.S. Forest Service (USFS), Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA), Natural Resources Conservation Service (NRCS) and other relevant natural resource management agencies that are required by regulation to implement the laws of the United States (ESA, Clean Water Act, Clean Air Act, etc.). In some states, there is a need to clarify the relationship between state agency offices and AES or CES. There may be people within a Governor's office assigned to be agency contacts, but rarely are LGUs seen as an agency.

Multistate committees such as W506 should foster relationships between LGU scientists and staff of key federal and state agencies. CES and AES should recognize our broad scale of clientele to include state and federal agencies along with local communities and individuals.

3. AES and CES should promote capabilities of LGUs and focus on the Western Perspective and Western Agenda document.

Programs should foster clearer expectations and formal understandings of the role of CES and AES research and education. There is a need for mutual education of LGU scientists and administrators and state and federal agency decision-makers. For example, in many states, LGUs have not been briefed on the state Wildlife Action Plans and it is likely that agencies have not seen the WAAESD/WEDA Western Perspective and Western Agenda. In addition, Directors and scientists need to understand new threats and land uses to see what issues lie on the horizon and how they relate to the Western Agenda.

Directors should identify ways to make better connections with state wildlife agencies so that faculty expertise is available. States that provide habitat for listed species are asked to provide data to the USFWS and AES could coordinate and provide data that may be available in the laboratories of various faculty members.

AES and CES need to emphasize natural resource projects equally as much as production agriculture projects and in reality integrate the two. LGUs need to be less independent among disciplines and figure out how to enhance multidisciplinary and collaborative work. We need to work with private entities to improve their knowledge and understanding of natural resource stewardship so industry can be proactive in addressing conservation needs or concerns.

4. AES and CES Directors should work with USFWS and NOAA Fisheries to create a process to solicit LGU contributions early in the listing process.

Several ideas were suggested. Peer review of USFWS findings should have a better system and could be formalized. LGU representatives should engage USFWS (e.g., through training, symposia, conferences) to inform decision makers of the capabilities LGUs represent and the value in engaging LGUs as objective third-party partners in pre-listing/ critical habitat (CH) designation and the listing/CH designation process. Send faculty to relevant training in the how USFWS conducts business such as their course in “Introduction to Species Status Assessment (CSP3910)”
<https://nctc.fws.gov/NCTCWeb/catalog/CourseDetail.aspx?CourseCodeLong=FWS-CSP3910>.

AES and CES Directors should request that Western Governors’ Association encourage USFWS to consult LGUs in the early listing process. WGA could facilitate this by creating some relevant, small working groups to define how to best move forward.

Directors could work within their individual states to get LGU funding for ESA research and education as a legislative priority. WGA could also work with others to build better funding partnerships or develop a fund to help LGUs respond more rapidly to ESA research and education needs.

A primary goal of our recommendations is to build relationships that establish recognition of LGU scientific expertise for species and systems impacted by ESA listing decisions. While it is unlikely that any one LGU will have all the expertise needed, as a region, it is likely we will have significant relevant expertise that would benefit the USFWS and NOAA in status review and candidate analysis. Local and state input into the ESA process is also likely to benefit the states because resource management plans can be more closely tailored to local conditions. LGUs could develop a mechanism by which they can meaningfully engage in providing information or conducting peer reviews. While listing decisions are based on biological threats, LGUs have the disciplinary expertise to evaluate the biological, ecological, social, and economic impacts of those threats. An open discussion and review of the vetting process of the ideas used to make the decision should make the listing process more transparent.

5. AES and CES Directors should allocate new resources to facilitate development of inter-disciplinary collaborations that structure social science activity into multi-state, large-scale research efforts.

Focused collaborations would provide a more comprehensive analysis of landscape-level impacts for ESA issues and justify the need for baseline social science data in western states to federal agencies for resource management needs in the absence of required NEPA elements. This should be done during FY17 by establishing a framework to develop this explicitly.

It is known that social and economic issues are legislatively prohibited from listing determinations under ESA. Regardless, many of the stakeholders for LGUs are concerned about how such listing decisions may affect the citizens of the state and their

communities. Once a species is listed, social and economic information can be considered in the designation of critical habitat. If LGUs wait to develop that information until the listing decision is made, it will often be too late for meaningful input. A potential mechanism to encourage LGU scientists to address general paucities in socio-ecological information in ESA analyses would be the establishment of seed grants by AES and CES Directors for engaging in such research and outreach. AES and CES Directors should also create a mechanism for recognizing such contributions.

6. AES and CES Directors should discuss, coordinate, and decide actions to expand resources and create minimum consistency to support faculty to participate in regional/multi-state efforts.

If LGUs are going to meaningfully participate in the conservation of species, they need to develop a new model or way of doing business. In addition to state and federal agencies, LGU scientists should be regularly interacting with many other groups and it will often take more than one discipline to be effective.

If AES and CES Directors desire to implement far-reaching multi-state research and extension activities, it is our recommendation that each individual state needs to eliminate inconsistencies about resource support. Directors need to create minimum levels of sustainable funding to enable multiple faculty per state to attend and participate in these efforts. Directors need to create an expectation among themselves for recruiting faculty from across an interdisciplinary pool to participate.

LGU scientists need to be encouraged as soon as possible to participate in multistate projects such as W506 in order to be more effective in getting their knowledge into the ESA process. We recommend revisiting and then solidifying clear and consistent policy as outlined below.

Some specific actions the AES and CES Directors could take to improve participation by their scientists and educators include, but are not limited to:

- Work with Deans, Department Chairs or Heads, and other administrative or institutional heads should better “advertise” the utility and opportunity afforded by multi-state HATCH projects.
- Develop pathways and incentives for LGU research and Extension faculty to collaborate on shared scientific objectives.
- Provide travel costs for multiple faculty that are part of research groups from the same university to attend meetings
- Develop relationships/agreements with state entities (agencies, legislature, NGOs) to provide funding for research needs
- Find ways to be more flexible in funding research opportunities to meet the needs of arising issues
- Work with Deans, Department Heads, and other administrative heads at each institution to provide guidelines for faculty needing assurances (in-writing) of

support to engage in these difficult and controversial problems. Faculty also need to understand the difference between providing scientific results and advocacy.

- Coordinate multi-state Hatch grant program to provide seed/partial match to accomplish this.

7. **AES and CES Directors should establish ESA-initiative(s) across the Western Region to coordinate region-wide ecological and socioeconomic/policy efforts.**

This would overcome the gap with federal agency policy levels that dictate landscape or regional-level decisions for species that cut across state boundaries and look at more complex levels and scales of interactions via the more coordinated effort. There are likely many alternative models to accomplish this.

AES and CES Directors could establish a regional policy analysis entity that enables (but does not require) participation from each institution in order to facilitate communication, coordination, and relationship building across local, state, and federal entities for more effective policy on transboundary ESA processes. The Directors should consider designating or appointing someone to lead this effort. Establishing such an entity would require Directors to reallocate personnel and financial resources to focus on a Western Initiative. Such an entity could undertake a myriad of tasks.

- Be the focal point to establish relationships with federal agencies at the national or regional level to convey proposals from LGUs for funding range-wide research on species of concern.
- Could serve as a neutral third party to convene conferences and workshops to seek to come to broad consensus on definitions of terms such as best available science.
- Help coordinate the submission of LGU scientific information, identification of important data gaps, and conduct of research.
- Help coordinate scientific synthesis of the literature and peer review of such syntheses and science used in making a decision. Criteria could be developed relative to agreement on rigor of the science, experimental design, sampling design, and inferential space violations.