Climate Smart Landscape Conservation Planning and Design Phase I Report

Approach, Methods and Conservation Design Workshop Results

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Executive Summary
In 2015 the Desert Landscape Conservation Cooperative (Desert LCC) made significant progress toward developing a climate smart Landscape Conservation Design for their geography. They developed a methodology for engaging interested partners in conservation planning, hosted two Landscape Conservation Design workshops (one in the U.S. and one in Mexico), developed an understanding of the highest impact pressures and stressors affecting focal ecosystems (springs, including aquatic and riparian resources, streams, including aquatic and riparian resources, and grasslands and shrublands), conducted outreach across the Desert LCC geography to familiarize partners with the Landscape Conservation Design approach and process, and selected three pilot areas in which to conduct further design work.

Key Outcomes
Conservation Design Workshops
Conservation design workshops were conducted in Tucson, Arizona, August 4-5, 2015 and in Aguascalientes, Aguascalientes (Mexico), October 6-8, 2015. There were 145 participants from over 45 organizations and agencies including federal and state agencies, local governments, non-profit conservation organizations, tribes, research organizations and private landowners. During both two-day workshops, participants engaged in discussions about high impact pressures and stressors that are interacting with or driven by climate change and are affecting specific resources, management goals and objectives and how they relate to climate change considerations, current and potential new climate change adaptation strategies, societal values associated with the focal resources, potential pilot geographies, and opportunities to work collaboratively toward longer term conservation goals. Workshops developed a wealth of information on springs, streams and grasslands in the Desert LCC geography.

Pilot Area Selection
Eleven pilot areas were nominated by partners through a structured process and evaluated by the Desert LCC Landscape Conservation Design working group. The following pilot areas were selected by the Desert LCC Steering Committee to be the focus of further landscape conservation planning in 2016-2017:

- Big Bend-Rio Bravo and Lower Rio Conchos
- Eastern Mojave
- Transboundary Madrean and San Pedro Watersheds

These pilot areas represent all three desert ecoregions found within the Desert LCC geography, have a diversity of partners already engaged in landscape-level collaborative efforts and encompass a diversity of conservation issues and opportunities.

Next Steps
The conservation design workshops and selection of pilot areas have built the framework for the Desert LCC and partners to pursue development of a conservation design. Collaborative work in the three
selected pilot areas is being initiated now and is expected to last roughly three years and will produce three unique landscape conservation designs, and support for collaborative implementation. Workshop results, presented here as individual appendices, provide in-depth information on individual resources and geographies and can be immediately used as stand-alone products to guide and inform conservation approaches.

Introduction: The Desert Landscape Conservation Cooperative and Landscape Conservation Design

The Desert Landscape Conservation Cooperative (Desert LCC) is an international partnership that brings together managers, stakeholders, communities and others to collectively address landscape conservation in the Mojave, Sonoran, and Chihuahuan Desert regions of the southwestern United States and northern Mexico. Through collaborative partnerships, the Desert LCC seeks to provide scientific and technical support, coordination, and communication to resource managers and the broader Desert LCC community to address climate change and other landscape-scale ecosystem stressors. In order to better understand the effects of climate change on natural resources and develop potential adaptation responses the Desert LCC is currently working to develop a Landscape Conservation Design through a collaborative process. By working with partners to incorporate climate change considerations and adaptation strategies into existing natural resource management decisions, we can collectively sustain ecosystem function and services and conserve natural resources for people and wildlife.

The design will be focused on the following focal ecosystem types:

- Springs, including aquatic and riparian resources
- Streams, including aquatic and riparian resources
- Arid grasslands and shrublands

Landscape design involves the integration of societal values with ecological goals to describe where conservation can best be achieved. Initial steps in 2015 included determining design priorities through workshops, compiling and curating existing information and resources, determining additional information, tools, and resources needed, and selecting pilot landscapes for further design work.

“Landscape Conservation [Planning and] Design is a process - to design - and a product - a design - that achieves partners’ missions, mandates, and goals while ensuring sustainability of ecosystem services for current and future generations of Americans”

Landscape Conservation Design Minimum Standards Working Group 2014

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1 Focal resources were selected based on input from the Desert LCC Steering Committee, Science Working Group, technical teams focused on critical management questions, Desert LCC partners and stakeholders and participants at an outreach meeting held in 2014 in Aguascalientes Mexico.
The Desert LCC’s primary goal for landscape conservation planning and design is to add value to, and further our partner’s ongoing work to build resource resilience in the face of climate change and other ecosystem stressors. Planning and design outcomes will include:

- spatially explicit data and information about focal ecosystem types
- new information on the effects of climate change and other landscape stressors on focal ecosystem types and other natural resources
- integration of social, cultural and economic information into our understanding of what these resources may look like in the future
- tangible, collaborative adaptation strategies implementable by our partners in pilot areas.

This report summarizes the methodology and results from Landscape Conservation Design work conducted in 2015 including pilot area selection, identification of highest impact pressures and stressors affecting springs, streams and grasslands, and convening conservation design workshops. More information about all aspects of the process is available through the Desert LCC website.

**Methodology and Approach**

**Selection of Pilot Areas**

The Desert LCC geography is large enough that it presents significant scale challenges to effective conservation planning (Figure 1). To address this, the Desert LCC is developing Landscape Conservation Designs in several smaller pilot areas within the Desert LCC geography. The pilot area approach provides a more manageable footprint and offers an opportunity to explore where partners are already most engaged in landscape-scale collaborations. The Desert LCC Steering Committee developed criteria for selecting pilot areas based on the goals and intended outcomes for Landscape Conservation Design. The Desert LCC requested partners nominate pilot areas for selection (see Appendix Q), and conducted outreach webinars in Spanish and English to engage partners and answer nomination questions. Steering Committee approved selection criteria were:

- Nexus to Desert LCC mission
  - Conservation at landscape scale/tie to climate change and other stressors
- Potential to implement design

**Figure 1.** Map of Desert LCC geography and BLM Rapid Ecoregional Assessment ecoregions. BLM REAs are depicted in solid color and do not extend into Mexico.
Partners, cooperation, and resources sufficiently present and ready to implement design

- Habitat and species diversity
  - Includes species and habitats of management interest and vulnerable to Climate Change
- Scalability to a larger geography/process
  - Results applicable to a larger geography and process concept is scalable
- All three conservation priorities addressed (springs/streams, riparian, grassland)

The Steering Committee also articulated the following design considerations or “practicalities” to inform the selection of a portfolio of multiple pilot areas with the idea that the group of selected pilot areas, if considered all together, would meet these characteristics:

- Bi-national Footprint - pilot area portfolio includes land in U.S. and Mexico
- Landscape scale - area is appropriate to meet the intent of a landscape scale analysis but dependent on management questions and indicators
- Data available for desired spatial analysis - to answer management questions and produce a spatial analysis product

The Desert LCC’s Landscape Conservation Planning and Design working group utilized the Steering Committee’s criteria to develop a scoring tool to evaluate nominated pilot areas and develop a recommended portfolio of pilot areas for Landscape Conservation Design. See Appendix P for full information on the final pilot area portfolio, scoring methodology and tool, and special considerations for each pilot area.

**Identifying Highest Impact Pressures and Stressors**

Prior to convening workshops, the Desert LCC team on monitoring (Critical Management Question 2 Team: Monitoring Species/Processes Relative to Climate Change and Related Threats/Stressors) developed a list of pressures and stressors (utilizing Salafsky et al, 2008) that are likely impacting ecosystems and species within the Desert LCC geography and that may be exacerbated or influenced by climate change. 14 main pressures and stressors and 75 associated sub-pressures (Appendix N) and stressors were identified as being highest priority in the region based on the following criteria:

- is induced or exacerbated by or otherwise related to climate change
- applies to resources across large landscapes within the Desert LCC geography (multi-focal or pervasive; threatening multiple areas)
- applies to rare, sensitive, or highly threatened habitats;
- will impact species and ecosystem services
- (severity) will destroy or eliminate conservation target vs. slightly or moderately degrade
- occurs frequency or has high probability of occurring
- is already occurring or likely to occur soon
- irreversibility/permanence
- is actionable; practical management actions to address threat exist

A complimentary goal of this work is to identify species and ecological processes that can be monitored to understand the overall effects on ecosystems, habitats and species. The team worked with Desert LCC
partners and practitioners to further refine the list of pressures and stressors by ecosystem types (Brown biotic communities, 1994). This work will allow the Desert LCC to identify the most appropriate species, ecological processes and services to be monitored to better understand the effects of these pressures and stressors in each ecosystem type. The outputs from this effort fed directly into conservation design workshops where participants utilized initial prioritization results to focus discussions on the highest impact pressures and stressors affecting springs, streams and grasslands. See Appendix N for the full list of pressures and stressors identified by the Critical Management Question 2 team.

**Conservation Design Workshops**

The Desert LCC convened two Landscape Conservation Design workshops in 2015: one in Tucson, Arizona in August, and one in Aguascalientes, Aguascalientes (Mexico) in October. Workshops brought together participants with extensive knowledge of the ecology, threats and management of springs, streams and grasslands and who comprise many of the practitioners that will use the results of the Landscape Conservation Design. Participants included 134 people representing over 45 different organizations and agencies from both the U.S. and Mexico. Workshops were designed to provide a structured, collaborative forum to engage key participants and partners; define planning purpose and scope, clarify existing conservation goals; identify conservation targets; develop geographic scope; and determine resource needs and availability. Workshop outcomes include:

- New coalitions and collaborative relationships to deliver conservation
- Identification of highest impact stressors and pressures on springs, streams, and grasslands that are interacting with or driven by climate change
- Identification of common management goals and objectives for streams, springs, and grasslands that are affected by these stressors and pressures;
- Identification of current and potential new adaptation actions to reduce vulnerability of these resources in the face of climate change
- Identification of potential pilot areas and combinations of pilot areas for future design work.

Workshops consisted of a combination of plenary sessions and smaller breakout group discussions organized by resources and geographies. Plenary sessions provided an introduction to the Landscape Conservation Design process and the Desert LCC, included presentations on tools and science relevant to springs, streams, and grasslands, and introduced all participants to nominated pilot areas. Plenary sessions were followed by active breakout group work which addressed the three focal resources and focal geographies.
Resource Breakouts
Participants worked in three resource breakout groups: springs, streams, and grasslands. They discussed an overarching goal for the resource and developed detailed tables outlining pressures and stressors, management objectives (what they are trying to achieve) and current and potential new adaptation actions. Discussion of the highest impact pressures and stressors was guided by the list pressures and stressors developed by the Critical Management Question 2 team and initial results of expert surveys. Discussion focused on the following questions:

- What stressors and pressures are having the highest impact on this resource?
- What management objectives do you have for this resource?
- How are these high impact stressors and pressures affecting what you are trying to achieve?
- What adaptation strategies and actions are you already implementing to reduce vulnerability of these resources? What new adaptation strategies and actions could you or your partners implement?
- Where are there strategic opportunities to work together for greater impact? Where are important gaps?

Geographic Breakouts
Geographic break out groups were determined by pilot area nominations received by the Desert LCC as well as where the participants’ currently work. At the Tucson workshop, participants worked in four breakout groups: Lower Colorado River, Madrean, Mojave and Rio Grande/Rio Bravo. At the Aguascalientes workshop, participants worked in three breakout groups: Mojave/Baja California/Sonoran Desert; Chihuahuan Desert; Aguascalientes. These sessions were designed to gather information about additional natural resources relevant to the geography, examine current pilot areas, discuss how the focal resources are valued in each region for human and natural communities, and to identify which pressures and stressors are having the highest impact. Participants worked to answer the following questions:

- Additional Resources: What other major natural and cultural resource areas/biotic communities need to be included in a climate-smart conservation design?
- Values: Why do people care about these resources? How are people using these resources?
- What are the most important pressures/stressors in this geographic area and why?
• What kind of information would you need to inform management to address this stressor?

Partner Assessment
The Desert LCC is conducting an assessment to support partner identification and engagement in the Landscape Conservation Design process, as well as the broader Desert LCC network. The assessment will identify areas of overlap, possible gaps in programs, and opportunities for potential collaboration. The first phase of the assessment consists of an inventory of partners and potential partners working on grasslands, streams and springs throughout the Desert LCC geography and is ongoing at the end of 2015. The second phase will look more closely at existing efforts and collaboration opportunities within each of the pilot areas.

For the first phase, information about existing local work and partnerships was collected at conservation design workshops in Tucson and Aguascalientes. This in-person engagement is being augmented with a bilingual online assessment that explores the nature of partners’ work, their primary resource areas of focus, the geographic scope of their work, who they view as key partners/collaborators and information sources, as well as suggestions for others to contact. The assessment will produce a comprehensive partner database for the entire Desert LCC and each pilot area, maps of partner program coverage, and partner network maps in each pilot area.

Summary of Workshop Outcomes and Key Findings
All of the information collected during the workshops provides essential context and scope for pursuing further planning and design development in selected pilot areas in 2016.

Resource breakout session outcomes include:
• Gathering feedback on the resource goal
• Refining the list of high impact pressures/stressors
• Identifying shared management objectives to address the high impact stressors
• Identification of current and new adaptation strategies
• Identification of collaboration opportunities and important information gaps to address
• Increased understanding of issues facing resource managers, and mutual learning among participants

Geographic breakout session outcomes include:
• Identification of resource values and objectives relevant to a geography
• A prioritized list of pressures and stressors
• Inventory of existing efforts and identify collaboration opportunities
Full detailed information on the results of each resource and geographic area breakout session from both the Tucson and Aguascalientes workshops is available in Appendix A-L.

**Key Findings**
The following is a synthesis of the recurring themes and key findings that emerged from comparing and contrasting conservation design workshop results from the Tucson and Aguascalientes conservation design workshops.

**Springs**

**Cultural, indigenous, and community values:** In both Aguascalientes and Tucson, participants discussed the need to explicitly include cultural and community values of springs. It was noted that indigenous cultures express different kinds of values for springs, and that they may value improving nature or maintaining the health of springs via cleaning them out. Cultural values also include religious festivals (particularly in Mexico) which are strongly connected to these ecosystems.

**Groundwater nexus:** Participants at both the Tucson and Aguascalientes workshops noted that a lack of understanding of the relationship between ground water and surface water at springs and the fact that springs are not clearly classified as groundwater or surface water resources hinders their conservation.

**Need for accurate information about springs:** Participants in Tucson identified key administrative/management challenges for springs that include lack of accurate spatial data on springs and lack of information sharing between different entities stewarding springs. This was also confirmed at the Aguascalientes workshop. Management objectives and adaptations strategies focused on monitoring, mapping and inventorying springs and integrating management across boundaries were discussed in detail in Tucson.

**Streams**

**Flow to support ecosystem function:** Participants in both Tucson and Aguascalientes discussed the importance of understanding and quantifying the amount of flow needed to support acceptable ecosystem function. Participants in both locations also noted the need to change perspectives around conserving water for the environment, making it desirable and helping managers, policy makers and others see its value. This is an area where participants noted that monitoring and enhanced understanding needs to inform policy and management.

**Involvement of multiple entities across multiple jurisdictions:** There was considerable discussion in Tucson and Aguascalientes about the diversity of entities that need to come together across multiple jurisdictions in order to effectively address stream conservation.

**Springs and Streams**

**Planning at a watershed scale:** It was noted in Aguascalientes that there is a lack of planning at the watershed scale and this type of landscape-scale planning is much needed for conservation of springs and streams. This will also begin to address the need to involve multiple entities and jurisdictions.
Understanding the rate and magnitude of groundwater pumping: Increased groundwater pumping was identified as a key pressure/stressor on springs in Tucson and springs and streams in Aguascalientes. Gathering better groundwater pumping data at regional scale as well as assessing different sources of pumping are critical next steps for spring conservation particularly in Mexico. This is an area where participants noted that monitoring and enhanced understanding needs to inform policy and management.

Grassland

Unsustainable cattle grazing: Unsustainable cattle grazing was identified as a high impact stressor discussed in detail by participants in Tucson and Aguascalientes. Participants from both locations expressed a need to better understand cattle carrying capacity and best management practices that will support desired grassland species and community structure and support ecosystem function.

Key different pressures and stressors affect grasslands in the U.S. and Mexico: Altered fire regimes and subsequent effects on grassland species composition and structure was discussed in Tucson but not in Aguascalientes, while overuse of water was discussed in Aguascalientes and not in Tucson.

Cross-cutting

Invasive species: Notably, the only high impact pressure and stressor that was discussed in detail for all three focal resources was: Spread of invasive non-native species and undesirable natives.

Desert LCC funding and actions may be most appropriately focused on things we can do in the next few years at a local scale (e.g. inventory springs, build databases) versus longer-term efforts to change policy. We need to understand where projects are on a continuum of bigger, long-term policy changes versus mountain range or site-specific actions that can be taken on a shorter time frame.

Links between springs, streams and grasslands: There were clear links between threats and potential adaptation strategies identified in Tucson and Aguascalientes for springs, streams and grasslands highlighting the importance of considering all of these systems together. In particular, participants noted the nexus between recharge of aquifers for springs and streams, and health of grasslands.

Potential Outcomes and Benefits of Conservation Design

At the end of the workshops, participants were asked to share their thoughts on how Landscape Conservation Design can help them in their work and potential outcomes and/or benefits they see arising from this work. The following information is a synthesis of recurring comments, suggestions, and recommendations.

Working at Multiple Scales

Participants noted there will not be a one size fits all solution, even though there are many similarities between geographies. There needs to be an appropriate balance between working at the scale of a pilot project area and a scale where information can be translated to individual decisions. Participants talked about working at different levels, for example scientific, executive, field work, and to prevent
Participants stressed the importance of considering both ecological and human connectivity for conservation.

Planning at Larger Scales
Participants stressed the importance of being in the room with varied perspectives and experiences which allowed them to share across organizations and jurisdictions and brainstorm new ways to collaborate and approach issues at a larger scale. Planning at larger scales is creating opportunity to solve long-standing challenges such as bringing together cross-boundary data. Consider landscape-scale conservation planning as an opportunity to address water issues.

Challenges
Participants shared that they are working with the Desert LCC and partners because they are dealing with issues too large to tackle as an individual jurisdiction, agency, or organization.

Opportunities
Landscape Conservation Planning and the Desert LCC partnership can provide a much needed landscape context to conservation work occurring in the geography. This includes helping to identify and bring together partners with the same interests and/or landscapes and with common objectives. By working with a diversity of partners and at multiple scales, the Desert LCC is bringing together partners who can contribute to conservation delivery by forming alliances, developing science, and implementing actions on the ground. Participants also noted the importance of a bottom up approach. This will be critical for developing solutions and plans that have an impact on the ground.

Learning Community
Participants recommended the Desert LCC develop a learning community around pilot projects. Participants recommended that the Desert LCC and partners articulate what success will look like and ways to measure it early in conservation design development. They also noted that by developing an inclusive, transparent and well-documented process, the Desert LCC will legitimize the approach.

Special Considerations for Mexico
Participants working in Mexico stressed it would be useful to have a Desert LCC that is integrated within planning and conservation processes in Mexico. They urged the Desert LCC to take into consideration the southern part of the ecoregion including Jalisco, Guanajuato, San Luis Potosí, Aguascalientes and Zacatecas. A particular gap in Mexico is management plans at the watershed and/or landscape level.

Participant Recommendations
Participants specifically recommended selecting pilot areas that intentionally cut across boundaries. They suggested the Desert LCC focus on documenting and sharing success stories and lessons learned to provide examples of what successful large landscape conservation looks like in application. Participants at the Tucson workshop recommended the Desert LCC host a “state of the knowledge” symposium within selected pilots (including policy and science) in order to develop clarity on research and restoration needs/opportunities.