Appendix 1a.
Madrean LCD Progress Reports

2017, 2018, 2019

Transboundary Madrean Watersheds Landscape Conservation Design Report

Version 1.2
June 30, 2020
Background

The Madrean Watersheds area was selected as one of three Desert Landscape Conservation Cooperative (LCC) Landscape Conservation Design pilot areas in early 2016. Landscape Conservation Design (LCD) is a process and a guide to action that identifies, develops and strengthens large-scale collaborative relationships. It produces information and tools needed by partners to meet common conservation goals by identifying important social values, resources, and stressors across a geography that transcends jurisdictional boundaries. The process leverages existing resource management efforts to identify potential actions and target locations where partners can apply their management tools to meet common conservation objectives. The design includes a map of current ecosystem conditions, priority locations for enhanced management, restoration, or conservation, and potential adaptation strategies and actions that can be applied in priority ecosystems identified by managers and stakeholders.

The Madrean Watersheds area covers approximately 18 million hectares across four states in the U.S. and Mexico (see map at https://desertlcc.org/geographical_area/madrean-watersheds). This unique and diverse area contains some of Mexico’s last standing remnants of temperate old growth forests, the best-preserved cienegas in any North American grassland, one of the largest black tail prairie dog colony complexes found anywhere, the few remaining herds of Mexican pronghorn, and reintroduced Mexican wolves on both sides of the border. At the heart of this geography, the San Pedro River Watershed is one of the most significant intact major riparian corridors in the Desert LCC, and the last major undammed river in the southwestern US.

Mission

The following mission statement was developed with initial input from partners at the September 2016 Tucson workshop, and later completed by the Coordinating Team (see below).

The Transboundary Madrean Watersheds Initiative is a large landscape, international effort to maintain and enhance the interconnected system of mountains, grasslands, deserts and

**WHAT MANAGERS NEED**

*In July 2016, a group of land managers in the Madrean region gathered for a discussion on management challenges and opportunities, and their recommendations for how to make the LCD process most useful to their own work. Here is what they said they need:*

- Efficient ways to assess current management actions
- Opportunities for shared learning with other managers and partners
- A way to raise the national profile of the Madrean/Sky Island region
- A toolbox of adaptation strategies
- On the ground projects and outcomes
- An efficient way to prioritize management actions and locations for maximum impact
waters that supports species diversity, promotes healthy watersheds, and maintains the overall ecosystem integrity that enriches the lives of human communities.

Who’s involved
A wide array of partners have participated in the effort so far. Many of these gathered in Tucson last year, including representatives from state and federal agencies, universities, and NGOs.

The Coordinating Team provides guidance and information to develop the LCD. These key partners (see http://www.desertlcc.org/group/madrean-watersheds-coordinating-team) conduct outreach and participate in regular meetings to ensure the Landscape Conservation Design meets on-the-ground management needs.

Recent accomplishments and activities

August 2015: More than 90 partners from across the Desert LCC gathered for an LCD workshop in Tucson, Arizona. A large breakout group discussion focused on Madrean key resources, values and stressors.

May 2016: A bi-lingual kick-off webinar introduced Madrean area partners to the LCD process and key aspects of the pilot area geography (see https://desertlcc.org/resource/landscape-conservation-design-madrean-watersheds-pilot-area-landscape).

July 2016: Land managers in the Madrean area gathered for a focus group to discuss key management challenges and opportunities, and how to make the LCD process most applicable to managers’ on-the-ground work (see side bar page 1).

September 2016: Madrean LCD workshop in Tucson, Arizona. This two-day workshop was attended by 93 participants from 48 different agencies and organizations (view workshop summary at https://desertlcc.org/resource/madrean-watersheds-conservation-design-workshop-report-september-21-22-2016). The workshop produced landscape goals and objectives for the pilot area, a vision statement, key focal resources, an assessment of high-impact pressures and recommended actions focused

VISION STATEMENT

The following vision statement was developed with input from participants at the September 2016 workshop, and later finalized by the Madrean Coordinating Team.

**Biodiversity** - Transboundary Madrean watersheds are a haven for the unique diversity of native and endemic species.

**Connectivity** - Enhanced linkages connect the diverse life zones of Sky Island ecosystems, from valley bottoms to mountain tops, from southern Sonora to the Gila River in Arizona, enabling persistence of migratory wildlife and allowing for the possible future shift of species and ecosystems in a changing climate.

**Socio-Ecological Services** - Healthy watersheds, functioning ecosystems and cultural resources deliver highly valued benefits to human communities.

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For more information, visit https://desertlcc.org/geographical_area/madrean-watersheds.

on conservation of springs, streams, and grasslands.

*Summer/Fall 2016:* Partners shared information from existing plans and management efforts. These were catalogued and are being uploaded to ScienceBase for easy access and sharing.

*Spring 2017:* Partners began a list of possible indicators for the Madrean LCD. When complete, this list will include indicators for different ecosystems as well as indicators that represent landscape connectivity and biodiversity. This initial list will continue to be developed by the Coordinating Team and partners.

**Upcoming activities**

**Stakeholder Forum:** A *Stakeholder Forum is being developed* to represent the many diverse stakeholders and interests in the area. Forum members will receive periodic briefings on progress and provide targeted feedback and input for the Landscape Conservation Design. If you are interested in joining the Stakeholder Forum, please sign up (https://desertlcc.org/issue/landscape-conservation-planning-and-design).

**Indicators:** The Coordinating Team will work with technical and resource experts to select key ecosystem indicators that can be used to assess current ecosystem conditions and provide new information on where and how best to implement conservation actions and climate adaptation strategies. The Stakeholder Forum will be invited to help rank indicators for inclusion in the LCD analysis. Through the fall and winter of 2017, the Coordinating Team will also develop a process to select indicators that also represent social and economic values.

**Outreach and engagement:** Outreach will continue with key groups identified by the Coordinating Team. If your group would like to receive a presentation or host a discussion, please contact Colleen Whitaker (colleen@swdresources.com).
Background

The Madrean Watersheds Landscape Conservation Design (LCD) is partner-driven conservation blueprint to help guide management actions on the ground across the Madrean transboundary major watersheds (see Figure 1). It is a cross-jurisdictional and bi-national process, guided by partner’s values and needs. The design will work to address a changing bi-national landscape and ecosystem conditions over the next 50 years. It will be a resource to help managers tackle major conservation issues into the future. The design will provide a map of current ecosystem conditions, priority locations for enhanced management, restoration, or conservation, and potential adaptation strategies under different scenarios of climate and human response. The LCD is guided by the Madrean Watersheds Coordinating Team (see sidebar).

The Madrean Watersheds area covers approximately 18 million hectares across four states in the U.S. and Mexico. This unique and diverse area contains some of Mexico’s last standing remnants of temperate old growth forests, rare grassland cienegas, one of the largest black tail prairie dog colony complexes found anywhere, remnant herds of Mexican pronghorn, recovering and expanding beaver populations, the highest bird diversity in the interior of North America, and the highest diversity of desert fish in the Southwest. The area has over 65 Sky Islands, mountains that span ranges from 2500 to 10,000 feet in elevation and supports the most diverse oak and pine communities in North America. Climate change projections are for this region to sustain some of the greatest changes in temperature and water availability in North America.

Recent accomplishments and activities

August 2017 to present: With support from the University of Arizona, and Climate Assessment for the Southwest (CLIMAS), the project team initiated a stakeholder meeting in the Lower San Pedro Watershed to assess future watershed conservation collaboration. This led to a series of 4 meetings from August 2017 to present and the formation of a new Lower San Pedro Collaborative. The Collaborative outlined priority projects and initiated working groups on: cross-county conservation planning among Pinal, Pima, Cochise, and Graham Counties; spatial data gathering and management; and development of a bird watching route through the watershed.

For more information, https://desertlcc.org/geographical_area/madrean-watersheds or Louise@skyislandalliance.
**November 2017:** Partners participated in a technical workshop to refine and prioritize indicators of ecosystem integrity for streams and riparian areas, springs, grasslands, desert scrub, and Madrean evergreen woodland. More than 20 partners joined to help evaluate draft indicators compiled from research over the past 8 months.

**January 2018 to present:** The University of Arizona (UA), Arizona Remote Sensing Center, joined the Madrean Watershed LCD effort to provide GIS services and spatial analysis support. The UA Team began developing data and analysis options for the ecosystem indicators. In May 2018, the UA team began in-depth analysis of the selected priority indicators to assess ecological integrity across the Madrean Watersheds at various scales.

**February 2018:** A connectivity work group met to explore the existing research and designs for connectivity in the region and developed a plan and approach for implementing an expanded connectivity network design across the geography. The approach will build on available data and develop connectivity areas based on montane and grassland “cores” (wildland habitat blocks), as well as developing management actions and conservation opportunities for these areas.

**March 2018:** The Southwest Climate Adaptation Science Center hosted a scenario planning focus group with land managers. Attendees reviewed and refined potential future scenarios and developed recommendations for making the scenarios a useful tool for land managers as they plan for new management actions. Plans are to roll-out newly developed scenario information (in summer and fall 2018) for further development and needs assessment from a local stakeholder (rural-based, nature resource centered livelihood) perspective.

**March 2018:** With funding support from the USDA Southwest Climate Hub, the US Fish and Wildlife Service, Bureau of Reclamation, and Forest Service partnered to launch the Collaborative Conservation and Adaptation Strategy Toolbox (CCAST), a new online platform for sharing on-the-ground conservation case studies. The CCAST platform presents case studies through map-based and thematic galleries. Case study narratives focus on lessons learned and provide resources such as presentations and protocols from projects implemented in the southwest U.S. and northern Mexico. There are now 8 case studies available for the Madrean area, including one focused on Restoring Leopard Frog habitat in Cienega Creek through watershed level eradication of bullfrogs and coordination of Leopard Frog re-establishment at suitable sites.

**May 2018:** The Madrean Conference brought together hundreds of scientists, land managers, students, and conservationists to share the latest science on the Madrean region and build collaboration. We held a day-long session on conservation design development where the latest indicator, ecosystem analysis, connectivity analysis, scenario planning and case study tools were share with the audience. This was followed by a facilitated discussion about next steps for the conservation design and how to maintain the collaborative group working on it in coming years.
On-going: The Madrean Coordinating Team continues to help guide the LCD process, and holds monthly calls to keep partners up to date and gather input on how to ensure the LCD remains relevant to manager’s and practitioner’s needs.

Upcoming activities

Summer 2018: The project team will continue working with the UA to develop the spatial analysis of ecosystem integrity across the project area.

June 2018: Lower San Pedro Collaborative partners will meet to continue work on priority initiatives.

Get Involved

A wide array of partners participates in this effort. The Coordinating Team provides guidance and information to develop the LCD, conduct outreach and participate in regular meetings to ensure the Landscape Conservation Design is relevant to on-the-ground management. For more information and to view past progress reports, please visit the resources section on the Madrean Watersheds LCD webpage.

Check with us for new working groups (e.g., collaborative wildlife monitoring, private lands connectivity) and priorities generated from the Madrean Conference 2018 (May 2018, in Tucson).

If you would like to stay informed about the process and receive periodic updates, please join the Stay Informed on the Madrean Watersheds LCD webpage, or contact Louise Misztal, Executive Director, Sky Island Alliance (Louise@skyislandalliance.org).

Figure 1. Map of analysis of Vegetation Greenness Indicator for Riparian Ecosystems in the San Pedro Watershed.
Background

The Madrean Watersheds initiative is a large landscape, bi-national effort to maintain and enhance the interconnected system of mountains, grasslands, deserts and waters that supports species diversity, promotes healthy watersheds, and maintains the overall ecosystem integrity that enriches the lives of human communities. The initiative is guided by the Madrean Watersheds Coordinating Team and is focused on developing a Landscape Conservation Design (LCD) to foster integration of management actions across the major transboundary watersheds. It is a cross-jurisdictional and bi-national process, guided by partner values and needs. The design seeks to address priority shared management challenges (see sidebar) that are being exacerbated by climate change within a complex landscape. It includes the following products: a map and supporting spatial analysis products to help managers understand current ecosystem conditions, and priority locations for enhanced management, restoration, or conservation; a Collaborative Conservation and Adaptation Strategy Toolbox (CCAST) with regional case studies that can be searched by topic and location; a catalogue of regionally specific adaptation strategies that are cross-walked with management challenges, ecosystem type, and case studies; a compilation of regional vulnerability assessments; potential future scenarios based on climate projections; and a synthesis of information gaps and research/monitoring needs. It will be a resource to help managers tackle major conservation issues into the future.

The Madrean Watersheds area covers approximately 18 million hectares across four states in the U.S. and Mexico. This unique and diverse area contains some of Mexico’s last standing remnants of temperate old growth forests, rare grassland cienegas, one of the largest black tail prairie dog colony complexes found anywhere, remnant herds of Mexican pronghorn, recovering and expanding beaver populations, the highest bird diversity in the interior of North America, and the highest diversity of desert fish in the Southwest. The area has over 65 Sky Islands, mountains that span ranges from 2500 to 10,000 feet in elevation and supports the most diverse oak and pine communities in North America. Climate change projections are for this region to experience some of the greatest changes in temperature and water availability in North America.

Recent accomplishments and activities

June 2018: Lower San Pedro Collaborative partners met to assess future watershed conservation collaboration and to work on priority initiatives. See notes below for August 2017 to present for more info. The Collaborative has outlined projects and initiated working groups on: cross-county conservation

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planning among Pinal, Pima, Cochise, and Graham Counties; spatial data gathering and management; and development of a bird watching route through the watershed.

**June 2018 - June 2019:** With funding support from the USDA Southwest Climate Hub, the US Fish and Wildlife Service, Bureau of Reclamation, and Forest Service, staff continued work to develop conservation case studies for CCAST. There are now 54 case studies in CCAST, including 29 from within the Madrean Watersheds LCD geography. In October 2018, case study staff started a newsletter to highlight new case studies, and share user tips and updates. Additionally, staff collected feedback from users and contributors, to make improvements to CCAST and the case study development.

**June 2018 - June 2019:** The project team continued working with the UA to develop the spatial analysis of ecosystem integrity across the project area. This includes developing an online viewer to make all spatial analysis products publicly available (see Figure 1 below).

**January 2018 to present:** The University of Arizona (UA), Arizona Remote Sensing Center, continues to provide the Madrean Watershed LCD effort GIS services and spatial analysis support. Over the past year they have primarily focused on development of LCD products for the Mojave LCD which has helped inform development of products and information presentation in the Madrean LCD. The UA team completed in-depth analysis of the selected priority indicators to assess ecological integrity across the Madrean Watersheds at various scales near the end of 2018.

**August 2018:** The project team hosted an in-person meeting on indicators identified as important for measuring progress toward LCD objectives, and the status of related spatial analysis. The purpose of the meeting was to review the ecosystem indicators, connectivity areas and linkages, and discuss specific steps forward to complete indicator development for Conservation Blueprint 1.0, as well as the utility/application of the data.

**March 2019:** The project team hosted an in-person meeting to share initial products with the coordinating team and gather input on how to make them accessible.

**April 2019:** The coordination team met in-person to review draft products for inclusion in the Conservation Blueprint 1.0, and discuss how to move forward with the collaborative effort. The group identified measures of success for the effort in the near-term, shared ideas about how products might be effectively utilized, and began planning a workshop for the summer. Staff worked to finalize a draft list of socio-ecological and socio-economic indicators to consider for future development, and a bibliography of literature on methods for developing indicators and ways to use them in conservation planning. LCD staff and members of the Madrean Coordinating Team attended a Santa Cruz Watershed Collaborative forum where watershed indicators were being developed and worked to integrate LCD indicators into the local watershed work.

**April - June 2019:** The core team began rolling out new products for Conservation Blueprint 1.0 by presenting them in detail via two webinars. The first webinar focused on spatial data and analyses, and included a demonstration of a new spatial data viewer developed using data layers related to ecological indicators. The second webinar focused on a few other products. One is a compilation of management strategies for adaptation suggested by partners that could have benefit to the region if coordinated across the landscape. Each strategy has been categorized by ecosystem of interest, the management challenges it would address, and the type of approach to management challenges that is represents. Whenever possible, strategies have been linked to related case studies in CCAST that illustrate how others have carried out similar actions. Other products presented include a list of high-priority
management challenges that partners have identified for the Madrean Watersheds LCD region, and vulnerability assessments from within the region that deal with plants, wildlife, ecosystems, and people.

On-going: The Madrean Coordinating Team continues to guide the LCD process, and holds quarterly calls and/or in-person meetings to keep partners up to date and gather input on how to ensure the LCD remains relevant to manager’s and practitioner’s needs. The LCD is moving into a product rollout phase so staff and the Coordinating Team will be proactively attending watershed partnership meetings and other appropriate meetings in the region to share products directly with end-users.

On-going: In June 2019 the Madrean Coordinating Team applied for supplemental funding from the Landscape Catalyst Fund to support transition of the group to a functioning collaborative that is separate from the previously existing Desert Landscape Conservation Cooperative, and to support coordination as we roll out products and work together on implementation.

Upcoming activities

Summer – Fall 2019: The project team and partners will: go to end-users to share products and gather feedback; further refine products that make up Conservation Blueprint 1.0 based on input; and work with partners to interpret blueprint information and findings to identify priorities for collaborative conservation and restoration.

Get Involved

Madrean Watersheds initiative partners are assessing how we best work together going forward and seeking to develop the coordinating structure that will support ongoing use of the Conservation Blueprint 1.0 and regional integration of work. A wide array of partners have participated in this effort and now is a great time to join and help form the path forward. The Coordinating Team continues to provide guidance to ensure the LCD is relevant to managers, and to develop the initiative into a sustainable collaborative. For more information and to view past progress reports, please visit the resources section on the Madrean Watersheds LCD webpage.

If you would like to stay informed about the process and receive periodic updates, please sign up online, or contact Louise Misztal, Executive Director, Sky Island Alliance (Louise@skyislandalliance.org).