



Appendix 2b.  
Connectivity Area Workshop Report  
2018

Transboundary Madrean Watersheds Landscape Conservation  
Design Report

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Version 1.2  
June 30, 2020

**DLCC Madrean Pilot Area**  
**Connectivity Working Group meeting**  
Tuesday, February 2, 2018 \* 1-3PM

**Participants:** Paul Beier (skype), Sallie Hejl, Damian Rawoot, Scott Wilbor, Louise Misztal, Sami Hammer, Colleen Whitaker, Myles Traphagen, Angela Dalby (phone), Julia Sittig

Scott - overview presentation of connectivity work to-date

- Scott's map of combining different products represent some work done on individual species (e.g., black bear), and other work done on multiple species.

Group discussion: what are important remaining needs that we can fill with LCD

- Habitat quality is a concern - many models only take into account delineation of areas, not what the quality of those areas is.
- UA team is helping with some portions of spatial analysis.
- Goal is draft product by end of March (protocol to be further refined)

**Geographic Scope**

- The edges of the project area will be fuzzy. We will draw general lines, but certain areas/corridors may lie outside of that area.
  - However, we will need to define a general area for the purpose of spatial analysis - analysts will need to know the bounds of the products they work with.
- Stay west of Highway 45 - this is the boundary with Chihuahuan desert, and has lots of agricultural use.
- The Madrean Pilot Area boundaries were generally decided two years ago, when people submitted the application for the Madrean pilot area.
- ALIA product (from USGS) could provide a good geographic area.
- We want to avoid defining hard boundaries in Mexico before discussing it with Mexican residents first.

**Analysis**

- We should strategize based on whether the management actions would occur in the US, in Mexico, or both places.
  - It is difficult now to make decisions on actions for Mexico because there isn't as much information on corridors there.
  - Some level of analysis and action can be taken at the bi-national scale now
  - Depends on the audience - County planners, regional transportation agencies, state transportation agencies... what about Mexico?
- Need to define what we want to observe (e.g, species that move between mountain ranges versus within ranges, etc.) The products will follow.

**Audience/Consumers of Corridor Products**

- US - Existing watershed-based stakeholders, who deal with the various ecosystems we're developing indicators and adaptation strategies for.
- Mexico - watershed groups do not exist.
- Regardless of the organizations that take the management actions, we are targeting our products toward whomever is managing the land.

## Methods

- Focus on vegetation? Could prioritize corridors using protective status to overlay vegetation, then use IUCN categories to target management actions.
- Assemble a list of focal species. Paul depends on input from local stakeholders to decide which species to analyze. He has attended workshops for identification of focal species before doing connectivity analyses.
- It is good to offer multiple options for linkages. For example, the Santa Catalinas-Tortolitas linkage design ended up with two strands of the original three identified in Paul's study. Coming up with a group of strands for managers to work with allows some flexibility.
  - Even if the lowest-quality corridors are conserved, you will end up with something that is relatively unmodified. Regardless of whether the focus is placed on wildlife movement, vegetation, etc., there will be good connectivity options.
- Could do a more coarse analysis that identifies the human-impacted areas, and leaves all areas of non-impacted areas.
- **Identify the threatened pinch points from existing models, and offer management recommendations for mitigating those pinches?**
  - Example pinch points: Border wall, Lower San Pedro utility corridor.
  - Focusing on pinch points would allow for multiple methods and flexibility. However, protecting/conserving/guiding management of pinch points that end up not being in good corridors is a risk.
  - The most major wildlife movement pinch points are funnelled by human development and often it is riverine features providing the delineation.
  - Road density, agriculture, and development density are more important to consider than highways when defining Cores.
  - **Pinch points would be useful, pragmatic tools to guide managers (they would highlight the conservation needs and threats that should be considered in planning).**
    - For managers who are reluctant to manage proactively (e.g, State Land Department), the pinch points could provide ideas for land exchange or mitigation of land degradation elsewhere.
- **Mexico and the US have some differing threats to corridors**, as well as, for example, Mexico has unregulated hunting, and the data on hunting will not be easily available.
  - **Some data gathering may require talking to local stakeholders.**
  - **Some modeling could occur now, and other data could be analyzed later when available. "Pinch points" could still be identified based on the data we have.**
- Ridgetops - some species move along ridgetops, so taking the area from a stream to the ridge is one way to incorporate ridges into efficient corridor areas.
- We will have to take a step-wise approach that involves using the best available data,
- Border area, identifying pinch point priorities on the ground presently, then identifying potential future threats based expert opinion/scenario planning.
- Many mines are being planned in the southern Santa Ritas and Patagonias, these are known threats to valuable Cores.

## Methods Team Members Have Used

- Myles did a line-and-stick approach with the white-sided jackrabbit in the Chihuahuan desert into Mexico. The biggest factor in grassland connectivity was agricultural development (rabbits did not follow drainages or other features; they avoided development).

- Line and stick method - using areas you know a species uses, plus information on existing cores, to conceptualize the corridors used by the species.
- Louise used expert input to draw corridors for her Master's project. There was good participation from agencies in Mexico. Could build on her work for the DLCC.
- The Madrean conference is a chance to talk about corridors - Juan Carlos applied to lead a GIS session.
- Using expert opinions - Myles spoke with a scientist who answered a question on connectivity through reasoning gained through seasons of field work. (No ridge-nosed rattlesnakes are present in the Chiricahuas because it is impossible for canyon-bottom snakes to go the distance within grasslands.) Sometimes expert opinions are invaluable in connectivity modeling - faster than doing the science first.
- UA is already looking at grassland extent and quality in the Madrean pilot area. They could provide an update on high-quality ecosystem areas (to help Core identification).
  - → Scott, Julia - mention to UA at Friday meeting
- Don Swann did a study on connectivity and management actions.

### **General Approaches** (notes also in the Connectivity Approach document)

- Stakeholders have been interested in two different scales/approaches to connectivity: trans-elevational gradients, and core area connections. **If we use a broad core area approach (with full trans-elevation gradients incorporated), we could assure that low to high elevation lands are considered with Core area delineation, hence providing for climate adaptation.**
- Can large blocks of private lands be core areas? Core areas can be based on habitat quality, and there is a good chance that the large private properties will stay open. However, areas like the Sonoita/Elgin area has smaller ranchettes that could close in over time.
  - **Could look at census track data and other info in the Scenario Planning process, to help predict whether core areas and (coarse) corridors would remain open in the future.**
- **Use the Human Modification layer as an approach to identify core areas**
- Incorporating Mexican input - Develop an approach, with locations, species, and specific questions to ask people (binary answers). Then meet with Mexican stakeholders.
  - Have a set of questions specific to each location, based on polygons. Start with the Sky Island layer.
  - Have the questions formed before the Madrean conference.
- Look at Paul's and AZGFD Linkage Reports for specifics and types recommendations for Linkages.
- Include Pima County, Sentinel Landscapes Restoration collaborative, etc, and conservation lands inclusion from these other efforts (Damian will provide conservation easement protections from his thesis work). We should include Pima County CLS data.

### **Connections to other components of the DLCC process**

- Indicators - ask the UA team to analyze habitat quality, so the Corridors team can identify blocks of quality habitat
- Scenario Planning - Predict which core areas may remain open into the future (on private lands, etc).
- Desert LCC in general - Even if the effort ceases to be funded, stakeholder-led efforts are likely to continue through other collaborative mechanisms

### **Next Steps**

- Sami and Scott - by February 20th, Compile Louise's work, Sky Island Core data, Grassland layer, and Madrean Woodland layer
- Colleen - Send a Doodle to today's participants, plus Don Swann, Matt Grabau, and Jeff Conn, Mirna, Angela, for next meeting to develop the questions related to the baseline data
- Team - Use baseline information to develop questions to ask about each core to core connections (and within cores) (e.g., what are the pinch points and threats?)
- Get input on questions from stakeholders
  - Myles - contact Mexican biologists
- Incorporate stakeholder input before the Madrean conference
- Present Draft 2 at the Madrean Conference for refinement (pinch points, etc)

## Madrean LCD – Connectivity working session Handout (2.13.18)

### Summary of input received from partners through previous engagement

#### November 2017 Workshop

##### Group Connectivity Discussion

- How to include expert opinion?
  - Need to incorporate expert opinion – LANDSAT, REGAP, and other models can mischaracterize landscapes; we can integrate the knowledge of on-the-ground efforts.
  - Consider a hybrid approach of starting with models and refinement through expert opinions.
  - Could begin with expert opinion rather than existing models. For the Cienega process, the partners told the modelers what they saw and needed, and models were made based on the on-the-ground knowledge.
  - Expert opinion could be based on core patches.
- Considerations for models
  - Connectivity is often based on areas between known “cores”, and it is likely that we are missing some of the existing cores.
  - Define what we want to connect
  - The role of escarpments in aerial movement of top predators.
  - Drainages can facilitate aerial movement. Existing models use slope to identify drainages.
  - Pronghorn and grassland birds need connectivity across grasslands, not drainages.
  - Issue of lack of models from Mexico - The only model Scott found for Mexico was for jaguars
  - Example from a California connectivity planning process: They stepped back and defined the areas and values to be connected before moving forward on models.
- Connectivity between water sources
  - The lack of connectivity between springs and surrounding watersheds have actually helped to protect biodiversity. Bullfrogs and crayfish are unable to expand their range because of the lack of water.
  - But need to consider harmful impediments such as dams.
- Climate Refugia
  - Connectivity modeling has not been done for climate refugia.

- The persistence of any large-scale species depends on their ability seek their best-quality habitat.
- Consider connectivity across elevation gradients – need to prevent roads and other development from cutting through corridors. Jaguar depend on high-elevation habitats that require upslope movement.
- Potential Indicators
  - Species
    - We know top predators are indicators for connectivity, are there other species (plant or animal) that are good indicators?
    - We don't know much about plants and dispersal related to connectivity.
    - A suite of focal species was used in the AZGFD connectivity model - it included herbivores, Gila monster, desert tortoise, etc.
  - Road density
  - Wildlife: Bill Radke is giving local landowners wildlife cameras. Could have volunteers monitor cameras.
  - Landscape integrity – roads, transmission lines, etc.
  - Gene flow across populations (John Wayne, Melanie Culver, and Ashwin Naidu at UA study gene flow)
  - Need indicators for Mexico – not just roads, but other impacts. INEGI may have that data for Mexico – specialists at statistical analysis/GIS
- Actions
  - Assess the compilation of corridor models – send to Coordinating Team, and identify potential indicators/approaches to indicators
  - Data gathering/sharing
    - Draft potential connectivity indicators
    - Create a centralized database/repository of connectivity data
    - Need to identify a location to store data
    - The DLCC website is not currently a federal website, so the information stored on it is freely available. A potential risk of having freely available materials/information is that they could be used by developers or other threats to connectivity.

## September 2016 Partner Workshop

### Connectivity objectives

#### **Maintain/increase linkages for wildlife**

- Large mammals, neotropical migratory birds, migratory pollinators, invertebrates
- Increase connectivity by engaging private property to fill linkage gaps
- Maintain currently intact linkages

#### **Maintain connectivity of water and riparian ecosystems**

- Maintain riparian ecosystems as linkages
- Maintain/increase flow in streams and springs (through groundwater connection)

#### **Decrease habitat fragmentation**

- Maximize wildlife crossings across roadways and other linear features
- Minimize impacts from fragmenting features (e.g. linear features like roads and pipelines)

- Increase/restore connectivity of habitat
- Increase consideration of wildlife movement in “human corridors”

#### **Increase Human Connectivity Across Borders and Jurisdictions**

- Increase coordination at watersheds and for migratory species
- Maintain/increase human connections for cultural, familial, cross-border movement

#### **Increase and improve monitoring at landscape scale**

- Across jurisdictions
- Across National borders
- Increase sharing of wildlife monitoring data

#### **Increase knowledge of priority connectivity areas**

- Where linkages are intact
- Where we can restore linkages/increase permeability
- High-value sites most at risk
- Hi-value “live-in” linkages for incremental movement over generations

#### **Maintain Connected Network of Water Sources for Wildlife**

#### **Connectivity – science and information needs**

- Spatial location and extent of where new protected areas are needed.
- Spatial location and extent of intact threads of habitat through “pinch points.”
- Map of status of areas for connectivity: fully impaired – fully protected.
- Map of areas of connectivity that can be lived in for generations. Notes – need to identify scale.

# Madrean Conference 2018

## Small-Group Discussion: Wildlife and Connectivity

Friday, May 18, 2018

**Participants:** Cynthia Wallace, Carlos H. Alcala-Galuaca, Laiken Jordahl, Scott Wilbor, Randy Serraglio (facilitator), Dale Turner, Jose Manuel Perez Cantu, Gerardo Carreon, Kyle Thompson, Bryon Lichtenhan, Julia Sittig (notes)

### Strategies and Actions related to Connectivity

#### Strategy 1. Maintain permeability of border wall

- Action: Assess connectivity of the border wall
- Action: Prioritize for protecting from development (based on existing infrastructure and current wildlife needs)
  - We have more information about biodiversity than connectivity at the border. Where there are only vehicle barriers, animals can still cross. Building a human barrier to replace vehicle barriers has just as much impact as building human barriers on open land.
  - Identify micro-climates to prioritize important habitats - areas that may persist into the future because they are more resilient.
  - Action: Communicate places and/or design methods that could be encouraged where development is occurring
  - A map of where to keep vehicle barriers could lead to people making roads. Instead, distribute a map of areas that are of less concern for connectivity.
  - Telling Congress and policymakers where conservationists' "line in the sand" is something CBD has been considering - but it might send the wrong message.
  - Design/modify wall with gates/doors for wildlife.
    - At Cabeza Prieta NWR, AZGFD has worked with USBP to implement have an "open" period for Sonoran pronghorn.
  - Can advocate for the virtual wall - maintains connectivity while effectively monitoring human traffic
    - Since two antennas on the virtual wall have been placed in the San Bernadino Valley, human traffic has stopped.
- Action: Give water resources a bigger role in connectivity analysis
  - Robert Hunt is tracking increased border activity - Juan Carlos Bravo can share the info.

#### Strategy 2. Communicate the need to elevate connectivity in decision making.

- Action: Sonora and Arizona have a bi-national commission on various topics including the environment. We can elevate our concerns on that commission.
  - The Coalition has a meeting in June - Naturalia, BLM, state agencies, University of Sonora, AZGFD, some NGOs.
  - Issues at this commission are elevated to the NAFTA level.
- Action: See if Elia Tapia could connect through the trans-boundary aquifer effort.
- Defenders of Wildlife and CBD are writing a letter being written about where sensitive areas are, and where less damaging areas would be to build the wall.
- The CBD has made connections with Border Patrol, and conversed about not widening roads, not blading rivers, and other easy asks. Trying to increase general environmental awareness. However, when Trump was elected, USBP became less willing to cooperate.



- USBP does not have to do environmental reviews or announce planned activities before they do it - makes cooperative planning difficult.

#### Strategy 2. Maintain permeability of corridors around highways

- This does not only include I-10 and Highway 2 - all highways
- Study individual culverts
  - The Wildland Network has a database of culverts and their characteristics
  - SIA could re-direct tracking volunteers to culverts

#### Strategy 3. Address Landscape Concerns for Connectivity

- Guide decision makers on protecting those areas (from recreation and other uses)

### **Strategies and Actions related to Wildlife**

#### Strategy 1: Collaborative bi-national wildlife camera mapping group

- Action: Create a shared database
- Action: Increase communications on what is happening
- Action: Find funding
- Action: Streamline monitoring
  - Monitoring of seasonal use of highway crossings:
    - Use database from Wildlands Network
    - Crossings on highway 2

#### Strategy 2: Inventory of which wildlife is where

- Action: Start with inventory of existing data, and make it compatible between groups when possible
- Learn more about prey availability - there seems to be less south of the border
- Land conditions
- Value of refugia to wildlife

### **Immediate Actions**

- Investigate how to engage with AZ-Sonora Bi-national Coalition on connectivity
- Begin the camera mapping group, and fund funding
- Inventory and coordinate data on refugia, land condition, prey availability, etc.