Resource managers at many levels have successfully responded to major challenges in the past.
But increasing biological and social complexity ....
Compounded by institutional complexity ....

... means some problems are too big to solve alone.

Dave Mehlman, The Nature Conservancy
“Despite the legal mandates, massive expenditures, and the burgeoning industry of aquatic and riparian restoration, riverine ecosystems continue to deteriorate as a result of human influences” (Karr & Chu, 1999).

**Restoration issues:**

- lack of a guiding vision or ecological endpoint to guide efforts
- over-focus on creating habitat for single species without enough knowledge of the natural systems
- lack of routine monitoring and assessment at a timescale that allows for project outcomes to develop
- problem of setting goals for an isolated locations without linking entire watersheds or regions
- complexity of natural resource management, agencies, laws, regulations, and mandates

**Implicit goal of using the best science available**
"Organization of people around a **common, needed conservation idea** is the most important good out of this entire process...because it is a shift of paradigms."  
(Desert LCC NGO partner in Mexico)

What can we do to build success?

**Collective Impact: Changing paradigms**
“…Interior bureaus and agencies **must work together**, and with other federal, state, tribal and local governments, and private landowner partners, **to develop landscape-level strategies** for understanding and responding to climate change impacts.” (2009: Secretarial Order 3289)

Need **dedicated infrastructure** to address conservation & restoration issues

Landscape Conservation Cooperatives (LCC) Network Map
Landscapes capable of sustaining natural and cultural resources for current and future generations.

Need dedicated infrastructure to address conservation & restoration issues
Infrastructure

Partnership Community
- Entities with resource management interests in the Desert LCC
- Communicate interests and needs to the LCC
- Contribute resources (staff) for LCC
- Use LCC products in decision-making
- Share information & resources

Steering Committee
Provides direction

Staff
- Coordinator (BOR)
- Science Coordinator (FWS)
  Provide support & coordination

Working Groups
- Science
- Local Governments
- Data & GIS
- Administrative
- Tribal
- International
- 5 Critical Management Question Teams

Management Questions

Information & Products
Steering Committee Representation

Restoration issues:
- complexity of natural resource management, agencies, laws, regulations, and mandates
I don’t get excited every often, and this is one of the most exciting things I’ve been a part of in a long time. To have the opportunity to share information across boundaries, brainstorm at different scales and across resources, learn from other experts in the room – I’m very grateful that this has finally happened.” (Desert LCC Workshop Participant)

**Restoration issues:**
- problem of setting goals for an isolated locations without linking entire watersheds or regions
Find a **shared vision & focus**

Resilient landscapes capable of responding to environmental challenges and supporting natural and cultural values for current and future generations.

**Restoration issues:**
- lack of a guiding vision or ecological endpoint to guide efforts
Emphasize communication between groups that develop science, discuss science, and those who use it

“\textit{The Desert LCC can define itself as the interest, enthusiasm, and connection to people that becomes vital in answering hard questions about resource management decisions.}” (Desert LCC federal partner)
Developing and applying scientific information, monitoring and evaluating through data collection and disseminating your findings and educating the public, land owners and stewards in a **transparent** way. **Collaboration and good will are the best tools that we have.**

(Desert LCC State partner)

Provide a **repeatable, meaningful process**

- “Input” vs. “Collaboration”
- Define expectations & success
- Talk about decision space
Produce & integrate **needed science**

**Restoration issues:**

- over-focus on creating habitat for single species without enough knowledge of the natural systems

Implicit goal of using the best science available

---

Fire-smart Southwestern Riparian Landscape Management for Restoration of Native Biodiversity and the Impacts of Tamarisk Beetles

---

desertlcc.org/projects
"To increase the impact of scientific information, there should be a focus on usability, not just availability of information. This means moving to “value-added” products, where findings are provided in a format that allows for policy applications.” (Jacobs, 2001)
Landscape Conservation Design

Meet human and ecological needs – these aren’t always competing values

Produce a suite of **collaborative actions** that respond to large stressors

◦ Help prioritize conservation of species and places that are important across a broad landscape

◦ Includes conservation of lands that provide services for urban and rural communities

Communicate conservation values & provide science to meet management goals

http://usbr.maps.arcgis.com/apps/MapJournal/index.html?appid=9897e5c423c542a09e3887cd8b5f207e
Shared Goals & Holistic Approach

Madrean Transboundary Watersheds Vision
An interconnected system of mountains, grasslands and waters support a vibrant diversity of local and migrant species that enrich human communities across three nations.

Biodiversity
Transboundary watersheds are a haven for a vast diversity of species from, bears to beavers, to the smallest hummingbird.

Connectivity
Intact linkages connect unique life zones of Sky Island ecosystems from valley bottoms to mountain tops, enabling persistence of migratory wildlife and allowing for future shift of species and ecosystems.

Socio-Ecological Services
Healthy watersheds and functioning ecosystems deliver highly valued services to human communities and essential benefits to wildlife.
Identifying meaningful measurables

**Socio-Ecological Services**
Healthy watersheds and functioning ecosystems deliver highly valued services to human communities and essential benefits to wildlife.

<table>
<thead>
<tr>
<th>Goal</th>
<th>Indicator Species/Assemblage/Process</th>
<th>Target</th>
</tr>
</thead>
</table>
| Socio-Ecological Services | • Food production  
• Flood and erosion protection  
• Water purification  
• Carbon storage  
• Recreation and tourism  
• Cultural value protection | (should be specific, measurable, and achievable)                                      |
Identifying high priority stressors

Agree on priority stressors that we can manage for:

- Increased groundwater pumping
- Decrease in water availability to the ecosystem
- Changes in groundwater recharge
- Increasing fire frequency, size, and/or severity outside of historical range of variability
- Reduced habitat connectivity
- Increased spread of invasive plant species
- Increased competition with native species due to climate change
- Conditions exceeding species adaptive capacity (Climate change: drought, temperature extremes)
Desired Future Conditions & Scenarios

Build on existing plans, data, and knowledge

- BLM Rapid Ecoregional Assessments
- FWS Desert Tortoise Recovery Plan
- Pima County Sonoran Desert Conservation Plan
- Western Regional Partnership
- State Wildlife Action Plans
- CONANP Protected Areas
- And more…….

Scenario Planning

- Mixed method approach
- Science-driven to address uncertainty
- Partner-driven to incorporate values
Work with managers, scientists, and partners to identify, develop and integrate science into resource management strategies.

“You are working hard at getting information moving quickly between the researchers and the managers. This takes time to have a measurable impact, but it is happening. The pathways you are building will be very important conduits of information for managers.”

-Desert LCC Academic Partner
### Strategies

**Sub-Goal:** Resilient and functional stream ecosystems that support native aquatic and riparian biodiversity, natural ecosystem and cultural processes and services, and sustainable use.

**Strategic Action:** Work in tributaries to major rivers to create in-wash recharge by slowing water:
- Place structures in channels and implement induced meandering to slow water
- Increase vegetation in channels to slow water
- Slow water in the uplands around tributaries

**Partners:** Lead: Sky Island Restoration Cooperative?
Actively involved: USFWS Partners for Fish and Wildlife; USGS; BLM Arizona; TNC Arizona; USFWS refuges; Sky Island Alliance; Cuenca Los Ojos; Borderlands Restoration; BOR; Tucson Audubon; Watershed Management Group

**Next Steps:**
- Identify strategic locations to implement
- Develop best practices for choosing locations
- Follow-up work session on impacts and methods for implementing strategy (where, how, why, how monitor)
Landscape-scale Monitoring Team

Identify species and ecological processes that are sensitive to large-scale stressors

Provide guidance on monitoring designs and protocols to detect changes to these processes and species at landscape scales

Restoration issues:
- Lack of routine monitoring and assessment at a timescale that allows for project outcomes to develop
Focus on people by facilitating dialogue and information exchange across boundaries to learn, address change, and refine outcomes

http://dlcc.databasin.org
Thank You!

Genevieve Johnson, Coordinator  gjohnson@usbr.gov

Matt Grabau, Science Coordinator  matthew_grabau@fws.gov