Landscape Conservation Cooperatives (LCCs) Integrate Basin-Wide Challenges from Grassland Birds to Pallid Sturgeon... and Shrimp

LCC Contacts: Gwen White & Glen Salmon, U.S. Fish and Wildlife Service
SDM Facilitator: Max Post van der Burg, USGS
Mapping Resources: Michael Schwartz, The Conservation Fund and dozens of other agencies & organizations in the 7 LCCs of the Mississippi River Basin
Funded by the multi-LCC Network Project #2013-17

Challenges upland in the prairie ...
High corn ethanol commodity prices are great for farmers. Not so great for grassland birds, pollinators & monarchs.
From 2008-12, we plowed under 7.2 million grassland acres. These are the highest rates of loss since the Dust Bowl.

Is this another Silent Spring?

...and downriver in the floodplains & Delta

As farmers retire over the next 20 years, about 400 million acres will change hands. [all national cropland = 442 million acres]
**Stationarity is Dead.**
When Illinois is East Texas...
How will Agriculture & Wildlife Adapt?

"Upstream is where you grew up, where you came from. Downstream is what you leave behind, your legacy."

-- Carol Armstrong, Los Angeles Mayor's office

**What if we had a Mutually Reinforcing Plan of Action?**
Where is the highest value for aligning specific conservation actions of multiple programs?

Map high priority agricultural conservation core areas and corridors in subwatersheds at the intersection of:
- Species and habitat distribution
- Nutrient export
- Social capacity for implementation
- Connectivity for climate adaptation
22 LCCs --
7 span the Mississippi Basin

1. Plains & Prairie Potholes LCC
   Rick Nelson, Mike Olson
2. Upper Midwest & Great Lakes LCC
   John Rogner, Brad Potter
3. Eastern Tallgrass Prairie & Big Rivers LCC - Glen Salmon, Gwen White
4. Great Plains LCC – Nicole Ateharr, James Broska
5. Gulf Coastal Plains & Ozarks LCC – Greg Watthen, John Tirpak
6. Appalachian LCC – Jean Brennan
7. Gulf Coast Prairie LCC – Bill Bartush, Cynthia Edwards

Collective Impact
Collective Impact is more rigorous and specific than collaboration among organizations. There are five conditions:

1) Common Agenda: Shared vision for change including a common understanding of the problem and a joint approach to solving it through agreed upon actions.

2) Shared Measurement: Collect data and measure results consistently to align actions and hold each other accountable.

3) Mutually Reinforcing & Aligned Activities: Participants use THEIR skills and stay true to THEIR missions acting in concert (“facing the same direction”) to achieve common objectives.

4) Continuous Communication: Consistent and open communication to build trust, assure mutual objectives, and common motivation.

5) Backbone Organization: Separate organization(s) with staff and skills to serve as the backbone for the entire initiative and coordinate participating organizations and agencies.

Exploring interest in the conservation community
29 Presentations over 21 Months:

- Feb 26 - 28 - Dec 13/14 2013 - Better Choices for Agriculture Workshop, Columbus, IL
- Mar 14 - 15 - 16 - 17/18 2013 - Mississippi Valley Water Quality Partnership Workshop, Chicago, IL
- Apr 11 - 12 - 13/14 2013 - Mississippi Valley Watershed Management Conference, Bellevue, NE
- May 15 - 16 - 17 - 18/19 2013 - Mississippi Valley Watershed Management Conference, Chicago, IL
- Jul 15 - 16 - 17/18 2013 - Mississippi Valley Watershed Management Conference, Nashville, TN
- Aug 19 - 20 - 21/22 2013 - Mississippi Valley Watershed Management Conference, Kansas City, MO
- Sep 16 - 17 - 18/19 2013 - Mississippi Valley Watershed Management Conference, Chicago, IL
- Nov 20 - 21 - 22/23 2013 - Mississippi Valley Watershed Management Conference, Columbus, OH
- Feb 2 - 3 - 4/5 2014 - Mississippi Valley Watershed Management Conference, Des Moines, IA
- Mar 5 - 6 - 7/8 2014 - Mississippi Valley Watershed Management Conference, Chicago, IL
- Apr 9 - 10 - 11/12 2014 - Mississippi Valley Watershed Management Conference, Nashville, TN
- Jun 21 - 22 - 23/24 2014 - Mississippi Valley Watershed Management Conference, Chicago, IL
- Aug 30 - 31 - 2/3 2014 - Mississippi Valley Watershed Management Conference, Kansas City, MO
- Sep 24 - 25 - 26/27 2014 - Mississippi Valley Watershed Management Conference, Nashville, TN
- Oct 28 - 29 - 30/31 2014 - Mississippi Valley Watershed Management Conference, Des Moines, IA
- Dec 5 - 6 - 7/8 2014 - Mississippi Valley Watershed Management Conference, Des Moines, IA
**Convening the Community**

**Meetings in person**
1. Gulf Coastal Plains & Ozarks LCC invites the coordinator of the Eastern Tallgrass Prairie & Big Rivers LCC to work together on hypoxia
2. Multi-LCC Network Funding for Structured Decision Making project (2014)
   - Feb - Scope, Midwest Fish and Wildlife Conference, Kansas City (26 participants)
   - June - Rapid Prototyping, FWS Region 3 Office, Minneapolis (18 participants)
   - August - Stakeholder Workshop to draft framework, Memphis (50 participants)

**Meetings online**
- 19 webex/conference calls with informal “team” facilitated by Max Post van der Burg (USGS) & Michael Schwartz (The Conservation Fund)
- Online webinar & input form to refine the framework through emails with 230 community members (43 responses), Nov 2014
- Online work groups to share files and events

**Who participated in the workshops?**

**Universities:**
- Kansas State University
- Mississippi State University
- Ohio State University
- Louisiana University Marine Consortium
- University of Illinois
- University of Minnesota
- University of Wisconsin-Milwaukee

**NGOs:**
- Agricultural Watermark Institute
- Mississippi River Network
- Duda Unlimited
- Ecological Consulting
- Center for Aquatic Fish Habitat Partnership
- Gulf Hypoxia Task Force
- KIing Consulting
- 7 Landscape Conservation Cooperatives
- Lower Mississippi River Coordinating Council
- Midwest Conservation Business Alliance
- Mississippi Interim Cooperative Resource Association
- Mississippi Valley Conservancy
- Natural Land Institute
- Oen Heg National Laboratory
- Ohio River Basin Fish Habitat Partnership
- Pesticide Manufacturers Association
- The Conservation Fund
- The Nature Conservancy
- Wildlife Management Institute

**State agencies:**
- Indiana DNR
- Iowa Dept of Agriculture
- Minnesota Pollution Control Agency
- Missouri Dept of Conservation
- Nebraska Game & Parks Commission
- Tennessee Wildlife Resource Agency

**Federal agencies:**
- Army Corps of Engineers
- Dept of Energy
- Dept of Transportation
- EPP (SWOCC, Hypoxia Task Force)
- Fish & Wildlife Service (FL, Partners, LA, NCT)
- US Geological Survey (NWQA, H7T)
- National Park Service
- NRG (HT7)
- South Central Climate Science Center
- USDA Forest Service Agency
- USDA National Institute of Food & Agriculture
- USGS NAWIT (LA, IN, TN, MMR)

50 person limit in Memphis.

Over 230 in the contact list and counting...

**What is the process of Structured Decision Making (SDM)?**

- Trigger (Problem, Mandates, Laws, Policies, preferences)
- Objectives
- Set goals, priorities, and outcomes
- Alternatives (Decision and implementation strategies)
- Consequences (Outcomes, implications, and lessons learned)
- Modeling Tools (Preference scales, decision weights, and risk analysis)
Step 1. What problem are we solving?

*How and where to best design and implement conservation delivery (habitats & focal species) throughout the Mississippi River Basin in a way that benefits terrestrial and aquatic wildlife populations, while simultaneously reducing the contribution of nutrients to Gulf hypoxia and balancing agricultural interests.*

Where would we focus combined actions?

*Interactive online spatial analysis & optimization tools*

pink = initial water quality priority zone based on SPARROW & update land use
blue = example bird focus areas (Audubon, Ducks Unlimited, etc)

Step 2. What are our Objectives (blue) and Performance Measures (red)?

- Increase or maintain productivity (ecosystem services)
- Increase Wildlife Benefits
- Increase Agricultural Productivity
- Decrease Gulf Hypoxia
- Decrease Implementation costs
- Watershed nutrient load
- Local nutrient load
- Groundwater
- Surface water
- N & P load
- Acre
- Ave $/acre
- Soil health
- Water quantity
- Species (abundance, life history or occupancy)
- Wetland
- Forest
- Agriculture
- Oil & Gas
- Other
Step 3. Which conservation practices provide multiple benefits?

![Diagram showing performance measures and species benefits](image)

Example: American Golden-Plover

Drainage Water Management for Drought Mitigation & Wetland Habitat

![Diagram of drainage water management](image)
Which relationships are key leverage points for achieving Objectives (red) with these Actions (green) in each of 4 Ecological Systems? Example Influence Diagram: Modified Headwaters - Hydrology

Next Step 4. Which Actions are most cost-effective for achieving Objectives?

- Often requires:
  - Building conceptual models (what we know now)
  - Addressing uncertainty (feasibility & future research)

Online input to rate impact & cost of Actions on each Objective:

<table>
<thead>
<tr>
<th>Alternative Actions</th>
<th>Terrestrial Wildlife</th>
<th>Aquatic Wildlife</th>
<th>Agricultural productivity</th>
<th>Implementation costs</th>
<th>Gulf Hypoxia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition &amp; restoration</td>
<td>$8,000/acre?</td>
<td>High N capture?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tiled buffer</td>
<td>$100/acre?</td>
<td>Low N capture?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRP in block</td>
<td>$200/acre?</td>
<td>Med N capture?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cover crops</td>
<td>$80/acre?</td>
<td>Low N capture?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Online Input to Prioritize Actions from the community of practitioners

Actions by Ecosystem:

For modified headwaters in row crop fields options, please rate the following conservation actions on their effectiveness of helping wildlife, water quality, and agricultural productivity and how much they would cost.

<table>
<thead>
<tr>
<th>Action</th>
<th>Effectiveness</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage management</td>
<td>1</td>
<td>Low/Med</td>
</tr>
<tr>
<td>Buffer</td>
<td>2</td>
<td>Low/Med</td>
</tr>
<tr>
<td>Alternative crops</td>
<td>3</td>
<td>Low/Med</td>
</tr>
<tr>
<td>Soils</td>
<td>4</td>
<td>Low/Med</td>
</tr>
<tr>
<td>Drainage water management</td>
<td>5</td>
<td>Low/Med</td>
</tr>
</tbody>
</table>
Where could we focus combined actions?
Interactive online spatial analysis & optimization tools
Conservation Blueprint Version 1.0 in 8-12 months

Scenario Planning for future conditions
What drives adoption of conservation practices?
Payments, Markets, Land Value, Climate Change...
Agriculture can change quickly.

Next Step 5. What are the Trade-offs?
Optimization Models weigh the options.

*Social Values* – metrics indicating capacity to adopt practices
• How does climate change affect landowner preferences?
• What about crop pricing in international markets?
• How does land ownership affect conservation?
• How do agency mandates and resources constrain options?

*Science Needs* – uncertainty and future research
• What areas of uncertainty affect success the most?
• Which relationships require more research?
### Identify Barriers & Opportunities for implementation in each Farming Production System

- **Farming Systems**
  - Corn & Soybeans
  - Grazing Lands
  - Floodplain Forest
  - Rice
  - Cotton

  - Cover crops
  - Tillage
  - Crop advisors
  - Soil health
  - Drainage
  - Crop rotation
  - Nutrient management
  - Water quality
  - Manure handling
  - Manure handling

  - CAFOs
  - Markets
  - Grain
  - Beef
  - Partners
  - Conservation
  - Flood insurance policy
  - Ownership
  - Authorization
  - Certification
  - Drainage
  - Value of nutrient cycling
  - Ecosystem services
  - Land ownership
  - Market
  - Regulatory
  - Technical assistance
  - Invasive species
  - Tax base
  - High value crops
  - Non-compliance
  - Program awareness
  - Operation capacity
  - Price/size of data
  - High price/size
  - Technical assistance
  - Implementation

### Determine gaps in scientific knowledge for each of 4 Ecological Systems

- **Focal Ecological Systems**
  - Headwaters / Working Lands
  - Plains & Prairies
  - Riparian Forest
  - Floodplain / Mainstem

  - Impacts on agriculture
  - Integrated Pest Mgt
  - Water quality
  - Hydrology
  - Carbon sequestration
  - Terrestrial
  - Stream bank stabilization

  - Irrigation water mgmt
  - Perennial bioenergy
  - Buffer
  - Treatment wetlands
  - Manure handling
  - Soil health

  - Water quality
  - Timber stand improvement
  - Reforestation
  - Acquisition
  - Invasive species
  - Large river diversion

### What do we need to know about climate change?

**Impacts on wildlife**
- Species vulnerability – range shifts, timing of pollination?
- River and prairie system hydrology & temperature?
- How to design landscape corridors for future climate conditions?
- What to use for performance metrics (end points of success)?

**Impacts on land use**
- Agricultural production systems (choice of crops & livestock)?
- Water resource demands & infrastructure?
- Renewable energy demands & opportunities?
- Ecosystem services from wildlife conservation (pollination, soils)?
How is this framework being used?
Exploring state of science & research needs.

How is this framework being used?
Designing practices to provide multiple benefits.

How is this framework being used?
Where to place & configure practices at various scales?
Collaborative Power of Multiple LCCs pulling conservation agencies together in a Collective Impact approach

Conservation agencies can piece together a landscape that works for wildlife, water quality and people.

Contacts:
Staff of 7 LCCs in the MRB
www.tallgrassprairielcc.org

What we want from NAS Review

• Improve coordination with existing and potential partners through review of LCC in relation to other similar programs
• Improve processes of program evaluation, making the best use of current science
  – Help us determine how to gauge LCC progress to-date

What we want from NAS Review

• Make the most efficient use of scarce resources through effective collaboration with partners and setting priorities using the best science and information available
• What else can be done to improve the program?