

Wetland Condition Assessment on Colorado Private Lands

Congress for Wildlife and Livelihoods on Private and Communal Lands
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Colorado's Wetlands

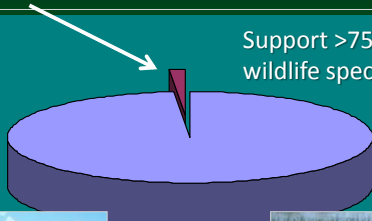
- Colorado landscape is highly diverse
- Wetland resources equally diverse
- Provide numerous services:
 - Filtering nutrient and sediment
 - Storm water retention
 - Maintenance of stream baseflow
 - Recreational and aesthetic value



Wetland Wildlife Habitat

Wetlands and Riparian Areas = ~2%

Support >75% of all wildlife species



CPW Wetland Wildlife Conservation Program

Statement of Purpose:

To conserve wetland and riparian habitats and their ecological functions for the benefit of wildlife.

History and Overview:

- Voluntary, incentive based program
- Supports wetland protection, restoration and enhancement on both public and private land through annual competitive grants
- Began in 1997 with \$4.4M grant from state lottery
- Continues with additional lottery and CPW funding
- Annual grants ~\$1.0M, augmented by NAWCA, etc.



CPW Wetland Program Goals & Target Species

Program Goals:

- Improve the status of declining or at-risk species
- Improve the distribution and abundance of ducks and opportunities for waterfowl hunting

Target Wetland-Dependent Species:

- At-Risk Species: 12 birds, 5 fish, 3 mammals, 5 herps
- Waterfowl: 8 duck spp.

Funding Priorities:

- In the past, projects selected by opportunity.
- Current goal to use M&A data to guide project selection and funding priorities.



Overview of Monitoring and Assessment

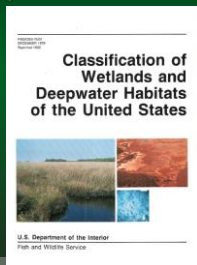
Strategic Directions:

1. Expand digital wetland mapping
 - Convert existing paper maps to digital data
 - Create new, updated maps for priority areas
2. Develop condition assessment protocols
 - Ecological Condition
 - Habitat Quality
3. Assess wetland condition through random sampling
 - Systematic assessments of each major river basin across the state (n = 10)

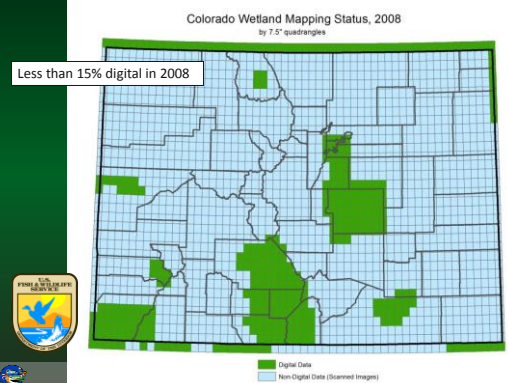


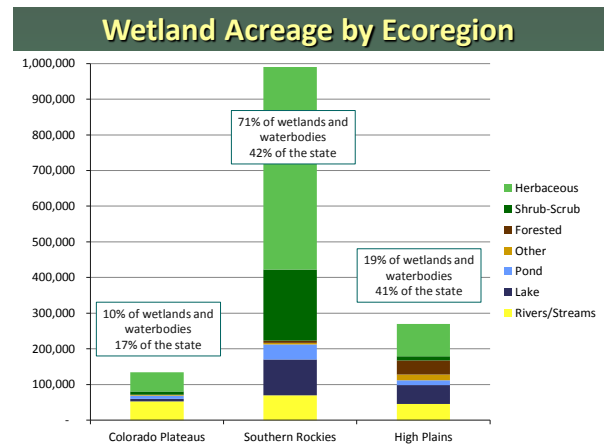
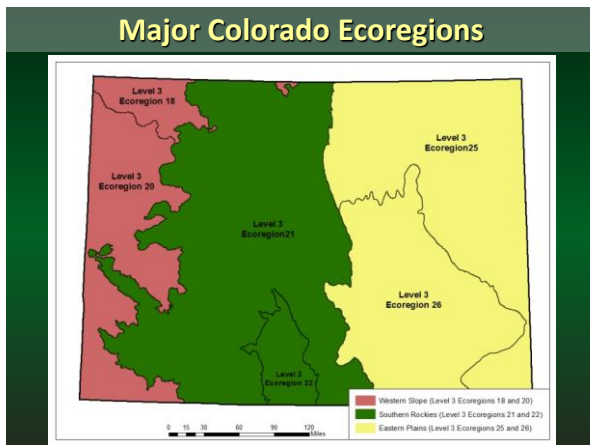
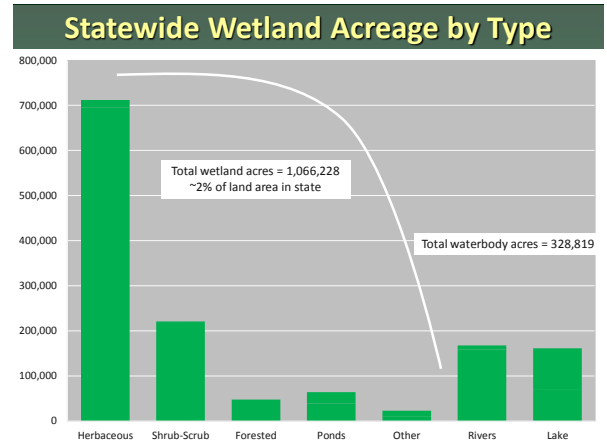
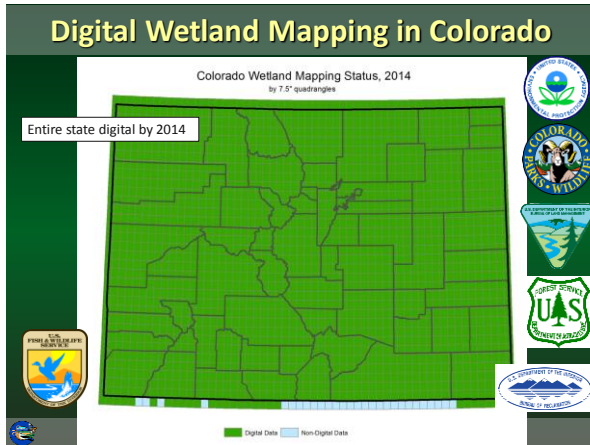
Digital Wetland Mapping in Colorado

- U.S. Fish and Wildlife Service, National Wetland Inventory
- All of Colorado mapped in 1970s and 80s on paper
- Until 2008, very little available digitally
- Out of date mapping in urban areas and on the plains

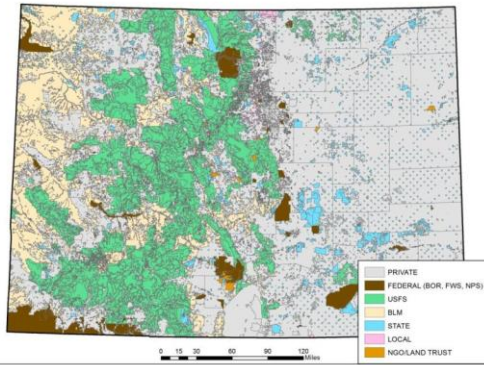


Digital Wetland Mapping in Colorado

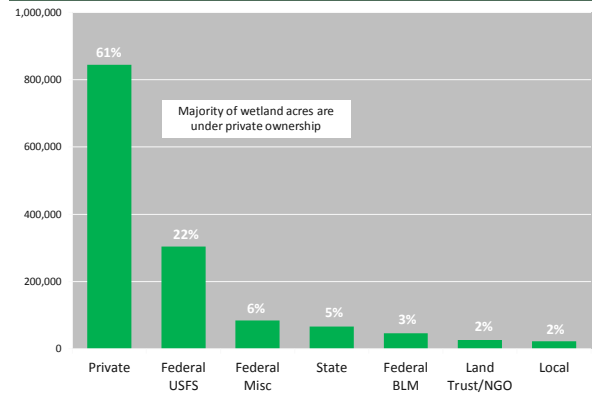




Colorado Land Ownership



Wetland Acreage by Owner



Wetland Assessment Methods

Ecological Condition

- L1: Wetlands Landscape Integrity Model (LIM)
- L2: Ecological Integrity Assessment (EIA)
 - Qualitative measures of landscape context, vegetation, hydrology, soils
- L3: Quantitative data on vegetation and soils

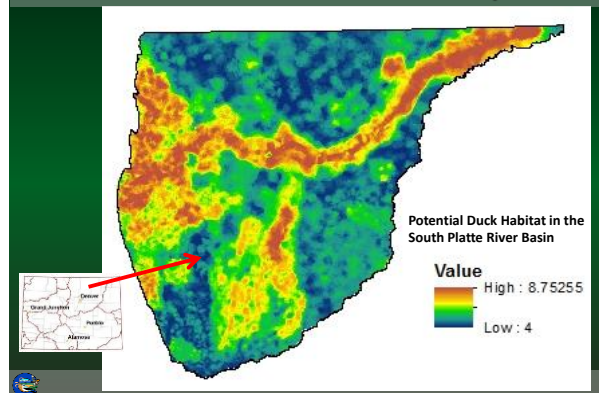


Wildlife Habitat Quality

- L1: Thunderstorm Maps of Likely Habitat
- L2: Habitat Quality Indices



Habitat L1: Thunderstorm Maps



Habitat L2: Habitat Quality Indices

17 Habitat Indices for Priority Species

- **Dabbling Ducks**
 - Diurnal habitat in emergent wetlands, plays sloughs, impoundments
 - Nocturnal habitat in emergent wetlands, plays sloughs, impoundments
 - Diurnal habitat in wet meadows (natural or irrigation-influenced)
 - Sandbars
- **American Bittern**
 - All habitat
- **Greater Sandhill Crane**
 - Roosting habitat
 - Feeding habitat
- **Piping Plover**
 - Sandbars
- **Long-billed Curlew**
 - Playas
 - Wet meadows
- **Short-eared Owl**
 - All habitat
- **Frogs**
 - Breeding ponds
 - Wintering habitat
 - Wet meadows
- **Red-sided Garter Snake**
 - All habitat
- **Fish**
 - Open water
- **River Otter**
 - All habitat



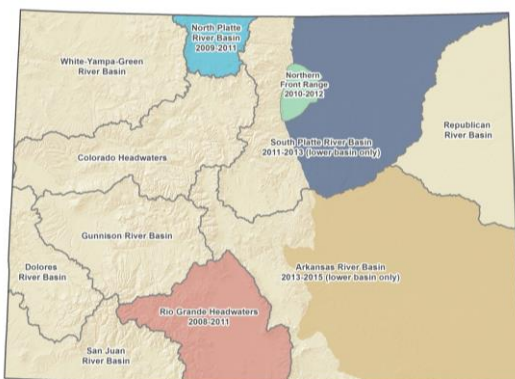
Habitat L2: Habitat Quality Indices

Example of American Bittern Index

Habitat Variable	Qualitative/ Quantitative Habitat Value		
	HIGH	MEDIUM	LOW
Dominant Vegetation	Robust wetland species (cattail, bulrush, etc.)	Other tall emergents	Short or no emergents
Dominant Vegetation Height	Tall (> 1 m)	Medium (20-100 cm)	Short (<20 cm)
Percent Emergent Cover	60-80%	30-60% or >80%	0-30%
Percent Cover Water	70-100%	50-70%	0-50%
Residual (Litter) Cover	40-60%	20-40% or >60%	0-20%
Interspersion (associated diagrams)	Some interspersion of water and vegetation		
Size	> 10 ha	5-10 ha	< 5 ha
Landscape context	> 200 m buffer from disturbance		

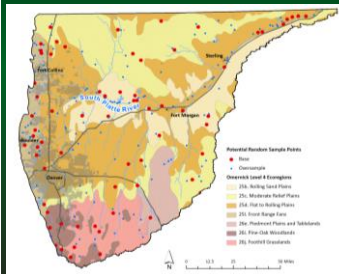


River Basin Scale Wetland Assessments



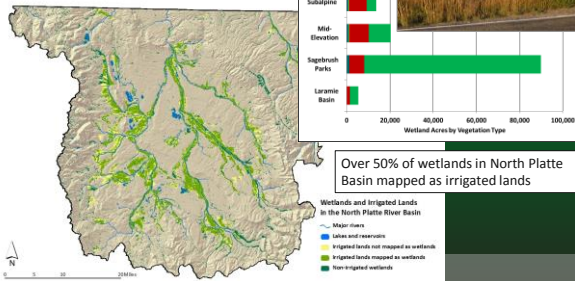
Application to Wetland Wildlife Habitat

- Target points randomly distributed across each basin
- Allow for estimates of condition across each basin
- Reveal trends in wetland condition and habitat quality
- Results used to prioritize grant funding



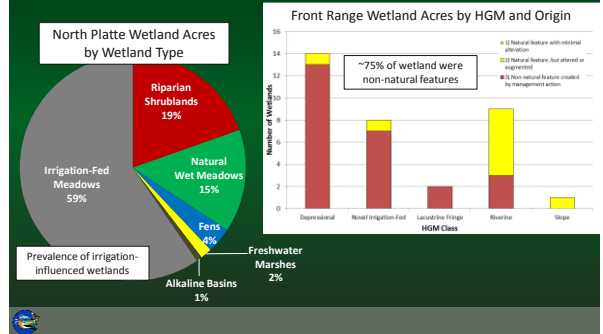
Basinwide Assessment Results

- Extent and distribution of wetland resources
- Paired with auxiliary data sources to reveal important trends



Basinwide Assessment Results

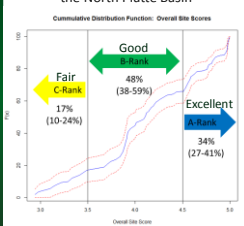
- Estimate of wetland types by various classification systems



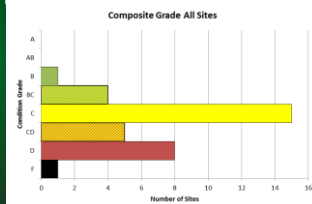
Basinwide Assessment Results

- Estimate of general wetland condition

Condition of Non-Irrigated Wetlands in the North Platte Basin

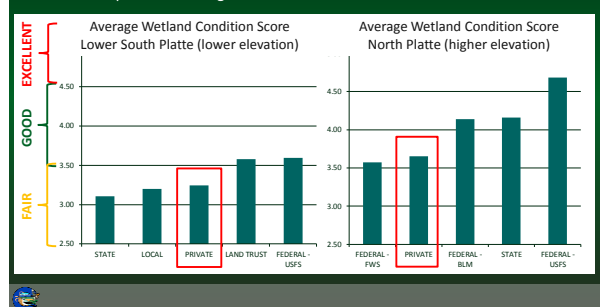


Condition of Front Range Wetlands



Results from Private Lands

- Condition of privately owned wetlands is generally fair to good
- Not dramatically different than surrounding public lands
- Could be improved with targeted restoration or enhancement efforts



Take Home Messages

1. More than half of wetland acres in Colorado are on private lands, including many acres created or influenced by water management.
2. Whether natural or created, all wetlands have the potential to provide important services, including wildlife habitat.
3. Condition of privately owned wetlands could be improved by targeted restoration efforts.
4. Working with landowners essential to protect wildlife habitat.



Acknowledgements

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- NWI: Kevin Bon, Bruce Droster, Jane Harner, Rusty Griffith
- MTNHP: Karen Newlon, Cat McIntyre, Meghan Burns, Linda Vance
- Local partners on the ground
- Many others helped built the foundations!



Questions?



Condition L1: Landscape Integrity Model

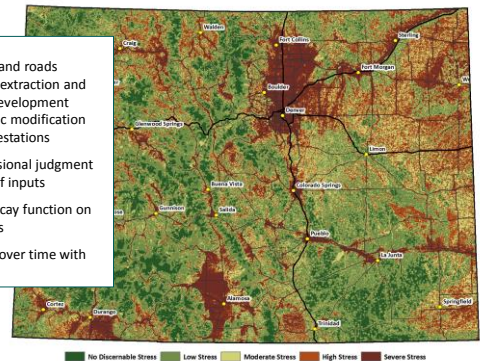
• GIS Inputs:

- land use and roads
- resource extraction and energy development
- hydrologic modification
- weed infestations

• Best professional judgment weighting of inputs

• Distance decay function on many inputs

• Calibration over time with field data



Condition L2: Ecological Integrity Assessment (EIA)

ECOLOGICAL CATEGORIES	KEY ECOLOGICAL ATTRIBUTES	INDICATORS & METRICS (mix of quantitative and qualitative)
Landscape Context	Landscape Composition	landscape fragmentation (all wetlands) riparian corridor continuity (riverine wetlands)
	Buffer Index	buffer extent, buffer width, buffer condition
Biotic Condition	Community Composition	native plant cover, noxious weed cover, aggressive native cover, mean C
	Community Structure	woody species regeneration, litter accumulation, structural complexity
Hydrologic Condition	Hydrological Regime	water source, hydrologic connectivity, alteration to hydroperiod (all wetlands) bank stability, beaver activity (riverine wetlands)
Physiochemical Condition	Chemical /Physical Processes	soil surface disturbance, water quality



Condition L3: Quantitative Data Collection

- Vegetation data collected in five 10-m² plots
- Soil profile descriptions for 2-4 soil pits

