

Using Wetland Inventory and Assessment Data Collection and Use in Colorado

NWQMC National Monitoring Conference

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EPA's Four Core Elements in Colorado

Wetland Regulation /
Section 404

Army Corps of
Engineers / EPA /
Colo Dept of Transp

Water Quality Standards
for Wetlands / Section 401
Colo Dept of Public Health
and Environment

Wetland Restoration /
Conservation
Colo Parks & Wildlife /
USFWS / Land Trusts /
Local Gov'ts

Inventory, Monitoring & Assessment
Colorado Natural Heritage Program /
Colorado State University

- Wetland mapping / wetland profiles
- Targeted inventories of high quality / biologically significant wetlands
- Basinwide wetland condition assessments
- Wetland tools and resources (field guide, website, field methods, databases)

Level 1-2-3 Wetland Assessment Methods

Level 1

- National Wetland Inventory (NWI)
digital wetland mapping
- Statewide Wetlands Landscape Integrity Model (LIM)

Level 2

- Ecological Integrity Assessment (EIA)
quasi-rapid assessment
- Functional Assessment of Colorado Wetlands (FACWet)
- Targeted inventories of high quality and biologically significant wetlands

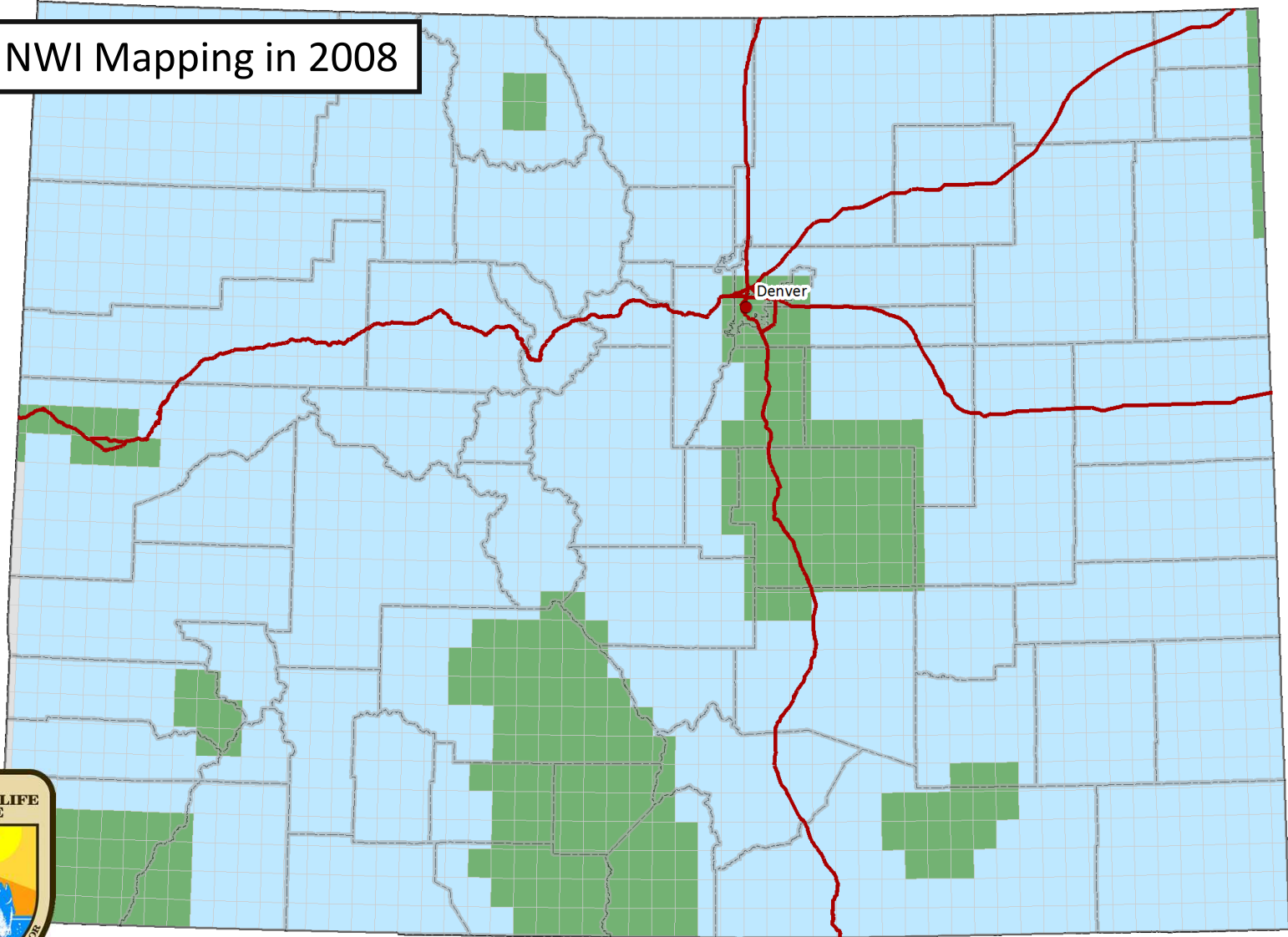
Level 3

- Floristic Quality Assessment (FQA)
- Vegetation Index of Biotic Condition (VIBI)
selected wetland types



Level 1: Digital NWI Data in Colorado

Digital NWI Mapping in 2008



■ Digital Data ■ Submitted ■ Planned for 2012 ■ Scanned Images

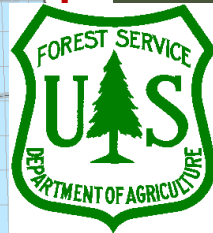
Level 1: Digital NWI Data in Colorado

Digital NWI Mapping in 2011

- 458 quads digitized or newly delineated
- 190 quads planned for 2012 (recently completed)

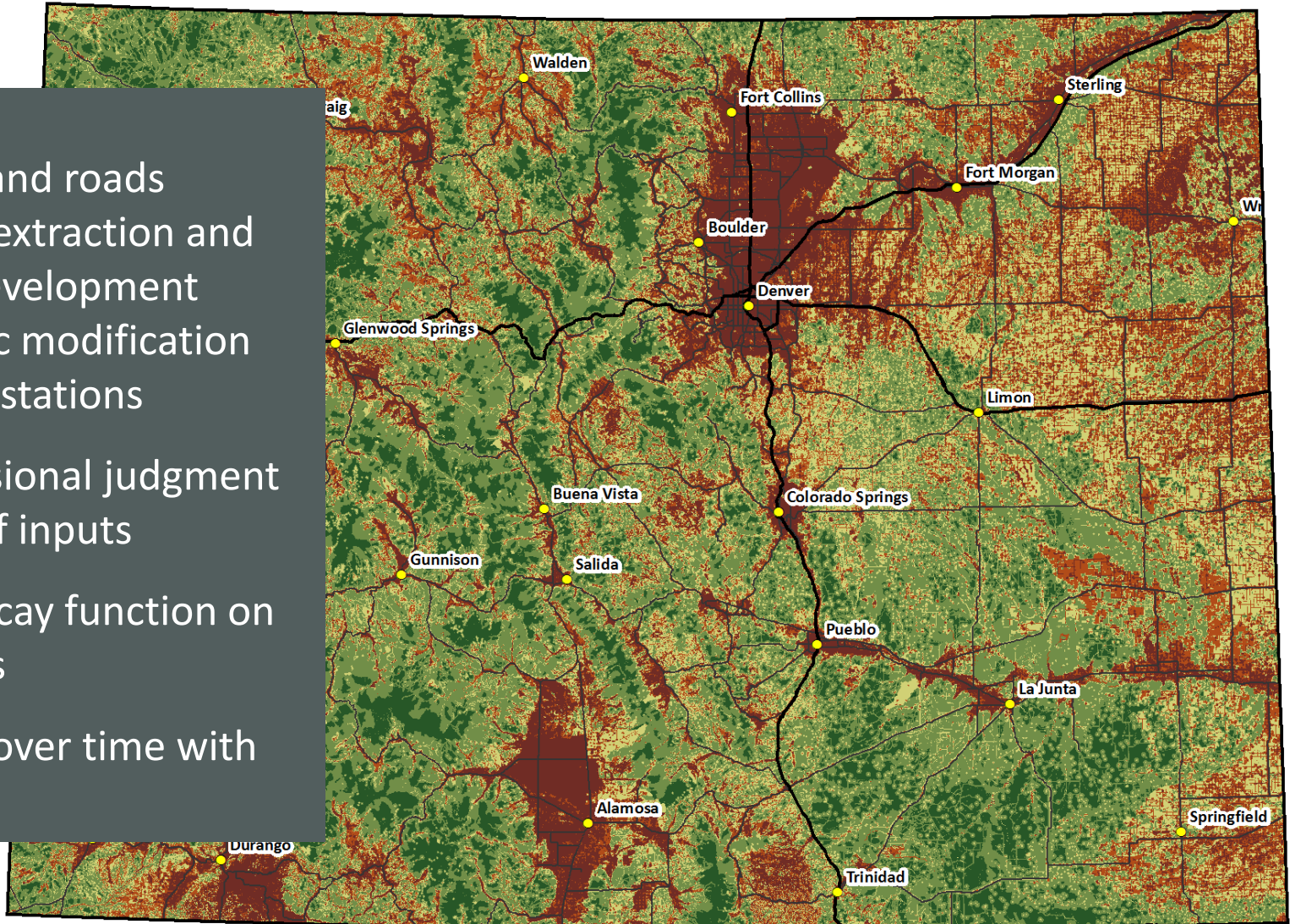
Arkansas River Basin - Recent WPDG Proposal

Digital Data Submitted Planned for 2012 Scanned Images



Level 1: 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



■ No Discernable Stress ■ Low Stress ■ Moderate Stress ■ High Stress ■ Severe Stress

Level 2: Ecological Integrity Assessment (EIA)

ECOLOGICAL CATEGORIES	KEY ECOLOGICAL ATTRIBUTES	INDICATORS & METRICS
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

Level 3: Floristic Quality Assessment (FQA)

Coefficient of Conservatism (C-Value)

- 0** = non-native, introduced species
- 1-3** = native but more commonly found in non-natural areas
- 4-6** = equally found in natural and non-natural areas
- 7-9** = obligate to natural areas but can sustain some habitat degradation
- 10** = obligate to high-quality natural areas (relatively unaltered from pre-European settlement conditions)

Colorado C-values assigned to entire flora by a panel of experts



Helianthus annuus
C-value = 1



Carex utriculata
C-value = 5



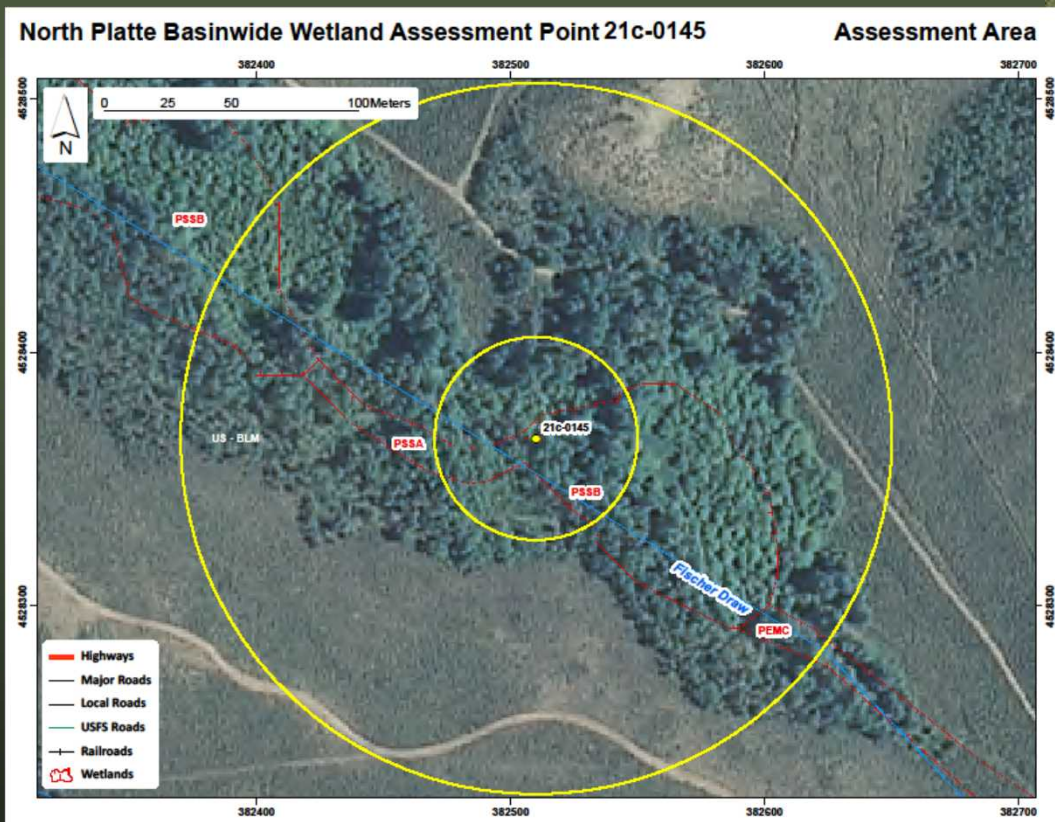
Cypripedium parviflorum
C-value = 9

Level 3: Vegetation Index of Biotic Integrity

Metrics	Riparian Shrubland VIBI	Fen VIBI	Wet Meadow VIBI
Mean C (native)	X	X	
cw FQI			X
% Intolerant species	X	X	
Intolerant species richness			X
% Tolerant species	X	X	
% Non-native species	X	X	
Total cover native species		X	X
Invasive species richness	X		
Total cover perennial species			X
% Native perennial species	X		
Native perennial species richness			X
% Native forb species			X
% Hydrophytes	X		
Total cover hydrophytes		X	X
Mean wetland indicator	X		
<i>Carex</i> species richness	X		
Relative cover <i>Poaceae</i>			X
Total cover bryophytes		X	
Total cover litter		X	
Total cover bare ground		X	X

Level 2 & 3: Field Methods (EIA, FQA, VIBI)

- For every target, survey 0.5 hectare (~1.2 acres) around the point
- Classify the wetland area by multiple classification systems
- Identify land uses within the wetland and surrounding area
- Photographs of the site



Level 2 & 3: Field Methods (EIA, FQA, VIBI)

- Detailed plant species lists and plant cover data collected
- Described the soil profile in 2-3 soil pits
- Identified water sources and modifications to natural hydrology
- Recorded metrics pertaining to wildlife habitat and disturbance



Uses of Wetland Data in Colorado

Reason / Partners

Project / Example

Wetland Restoration /
Conservation

**Colo Parks & Wildlife / USFWS /
Land Trusts / Local Gov'ts**



River Basin Scale Wetland Profile,
Condition Assessment, and
Habitat Evaluations:
North Platte Example

Wetland Regulation / Section 404
**Army Corps of Engineers / EPA /
Colo Dept of Transp**



Developing the Watershed
Approach to Wetland Mitigation:
Front Range Example

Water Quality Standards
for Wetlands / Section 401
**Colo Dept of Public Health and
Environment**

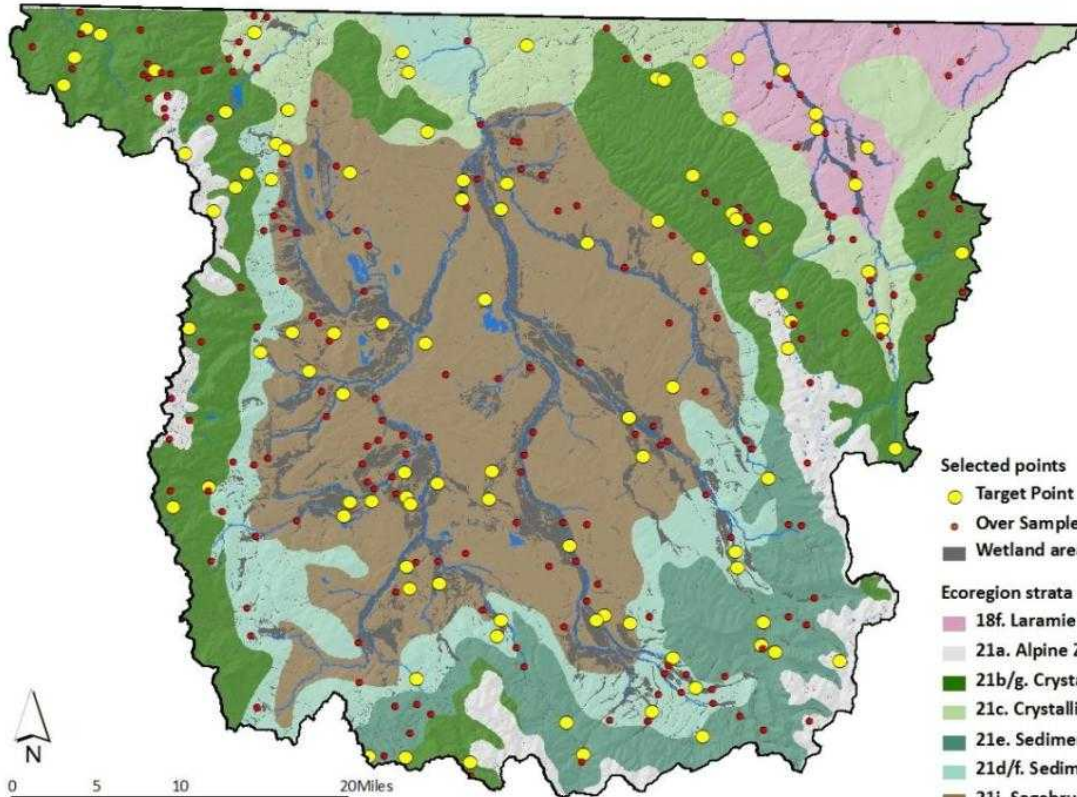


2012 Integrated Water Quality
Monitoring and Assessment Report
Wetlands Section

Wetland Restoration & Conservation

Colorado Parks and Wildlife

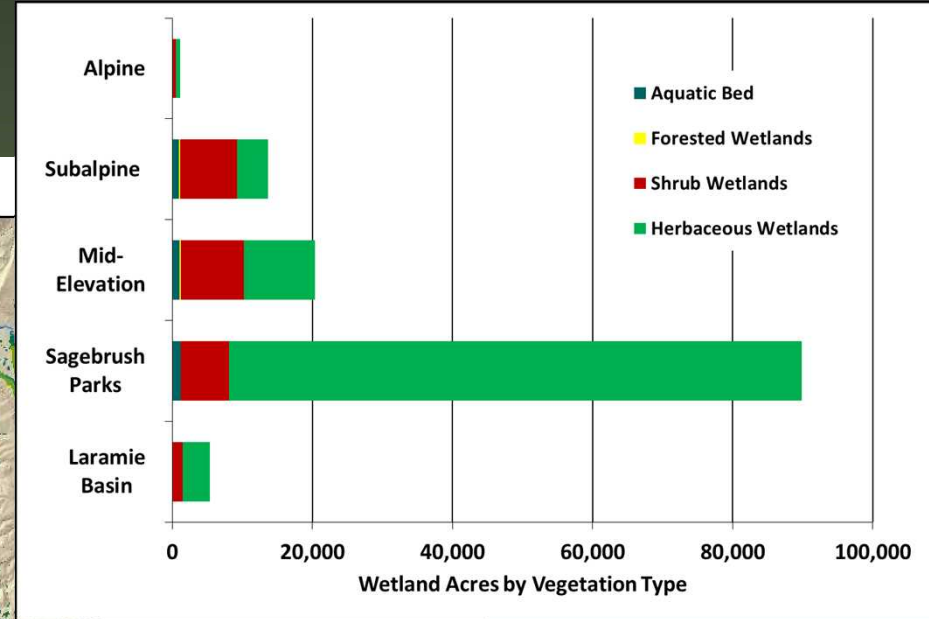
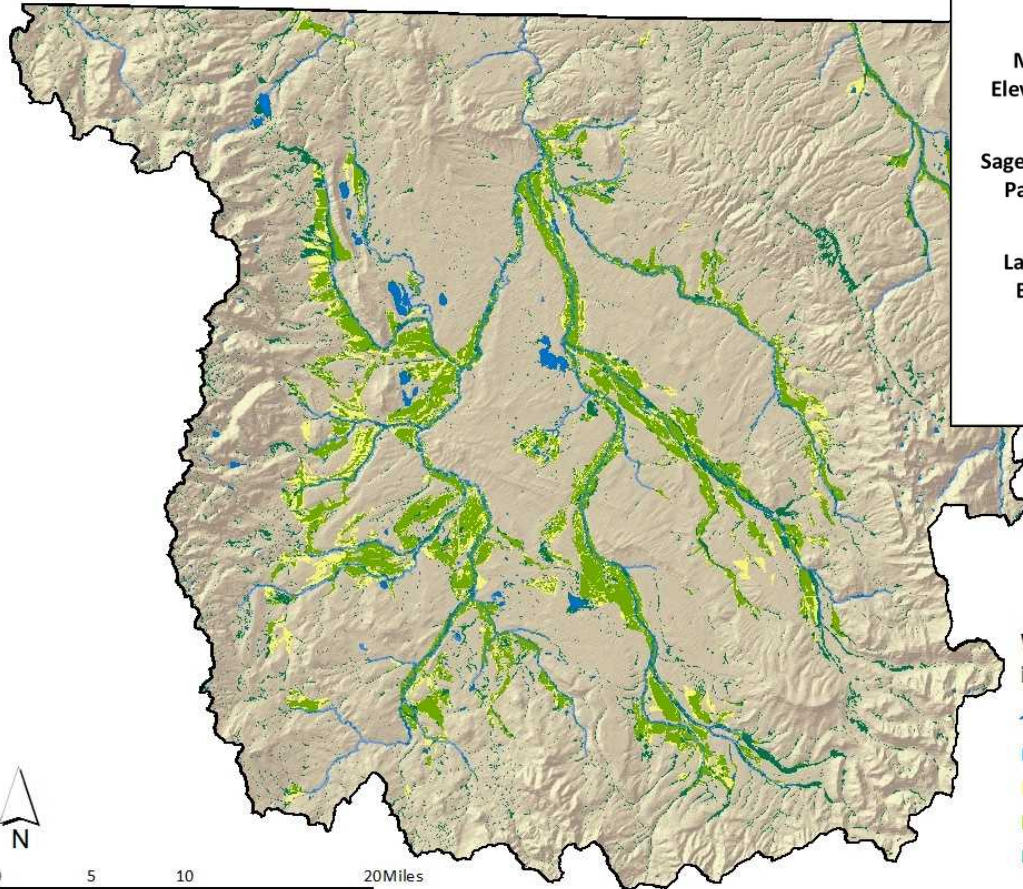
- Wetlands Wildlife Conservation Program
- ~\$1.5 million in wetland restoration grants
- Use data to prioritize grant funding
- River basin scale wetland condition assessments



Wetland Restoration & Conservation

Colorado Parks and Wildlife

- Extent and distribution of wetland resource
- Quantity of wildlife habitat



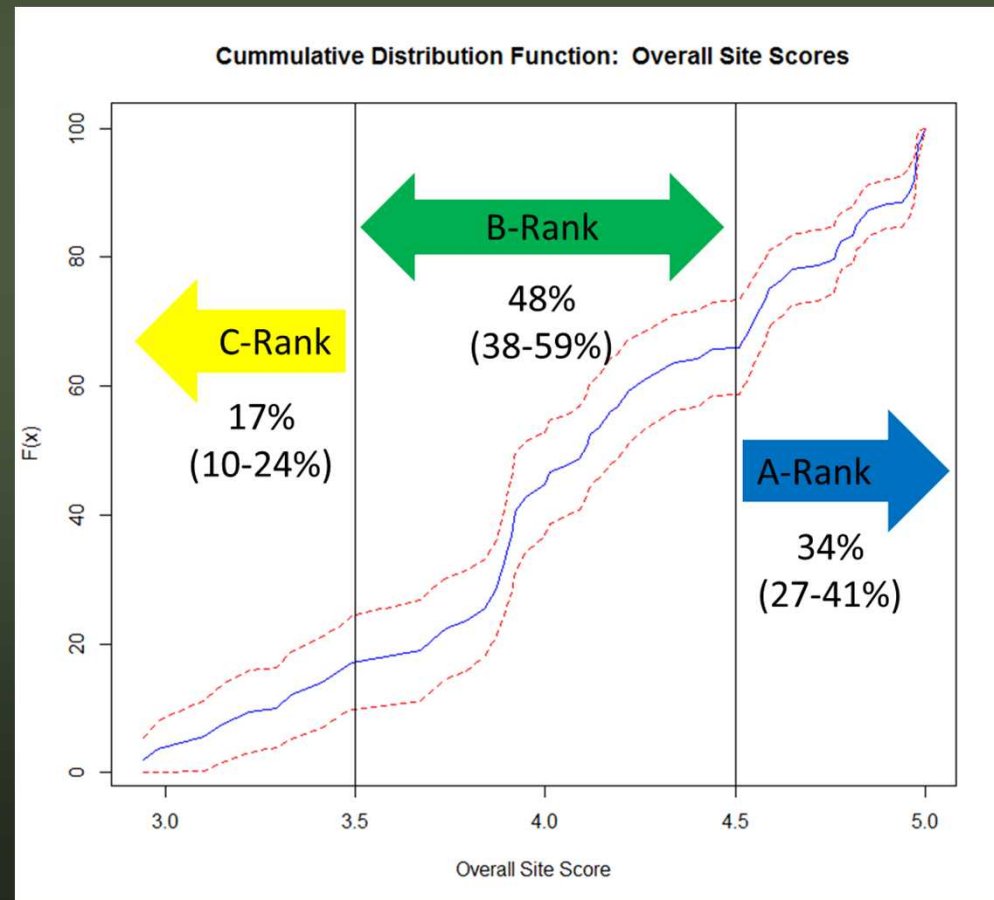
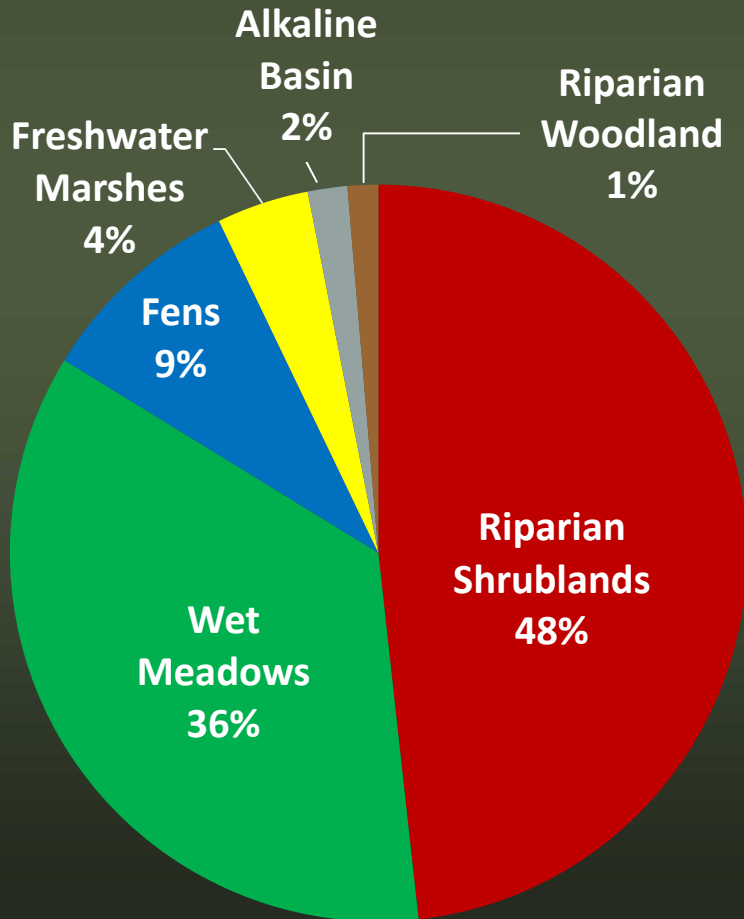
Wetlands and Irrigated Lands in the North Platte River Basin

- ~ Major rivers
- ~ Lakes and reservoirs
- ~ Irrigated lands not mapped as wetlands
- ~ Irrigated lands mapped as wetlands
- ~ Non-irrigated wetlands

Wetland Restoration & Conservation

Colorado Parks and Wildlife

- Estimate of wetland types (more specific than Cowardin)
- Estimate of general wetland condition
- Future studies will include more metrics specific to wildlife habitat



Wetland Regulation / Section 404

U.S. Army Corps, U.S. EPA,
Colo. Dept. of Transportation

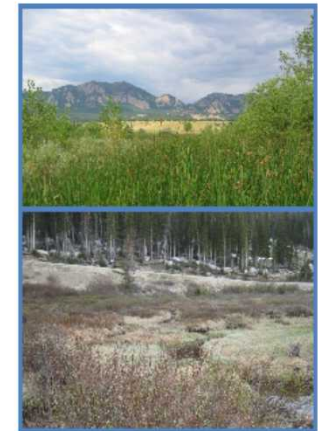
- FACWet Level 2 method developed with CDOT funding
- Mandatory for 404 permit application
- Evaluate condition of proposed impact site
- Permits to impact high condition sites raise red flags and face higher scrutiny



Colorado Department of Transportation's FUNCTIONAL ASSESSMENT OF COLORADO WETLANDS (FACWet) METHOD

USER MANUAL – Version 2.0

January 2011



Colorado
State
University

EcoMetrics
Sustained Ecosystems for a Sustainable Future

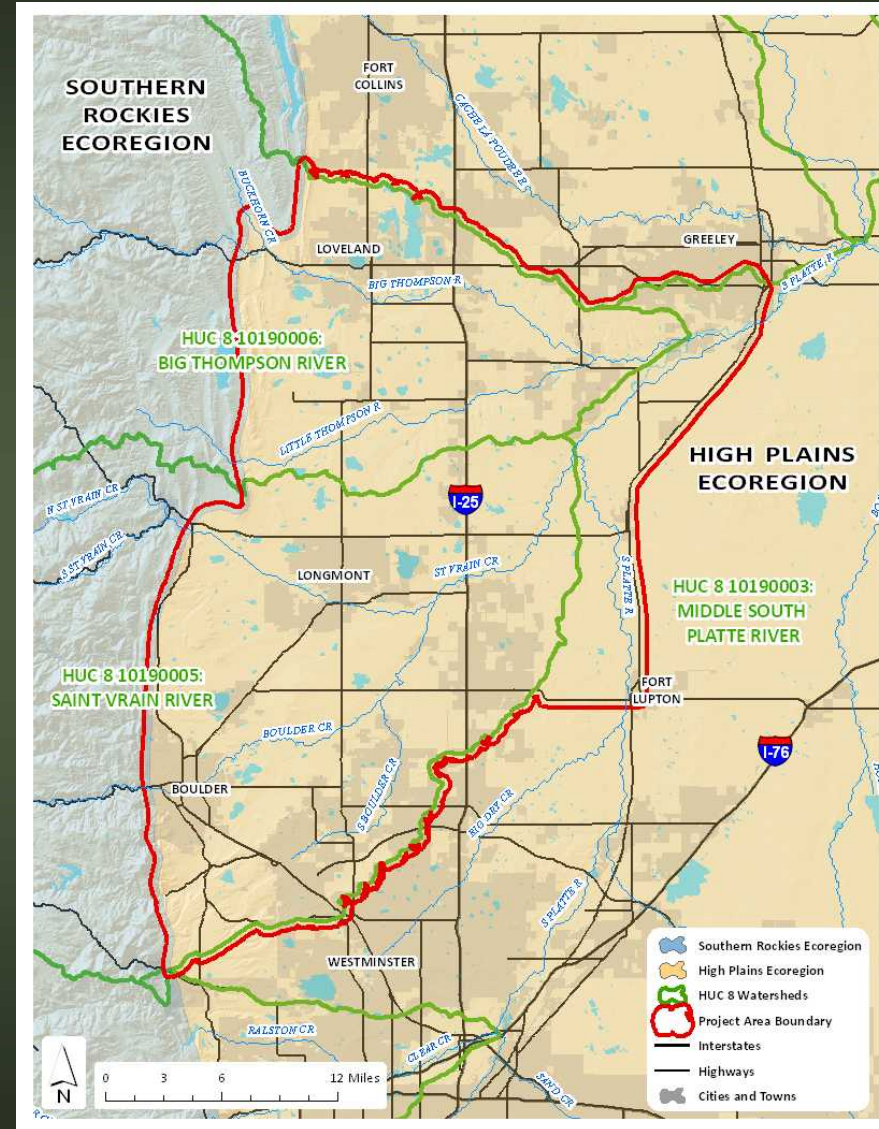
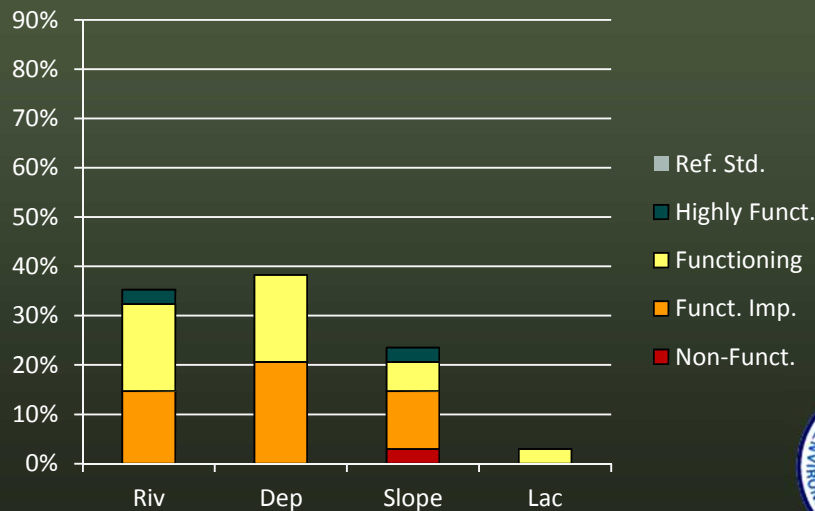
Brad Johnson
Department of Biology
Colorado State University

Mark Beardsley and Jessica Doran
EcoMetrics, LLC

Wetland Regulation / Section 404

U.S. Army Corps, U.S. EPA,
 Colo. Dept. of Transportation

- Watershed approach to mitigation
- Pilot project in urban Front Range
- Analysis of current and historic wetland extent based on NWI mapping
- Demonstrate how condition (EIA, FQA) and functional (FACWet) assessments can aid planning and goal setting



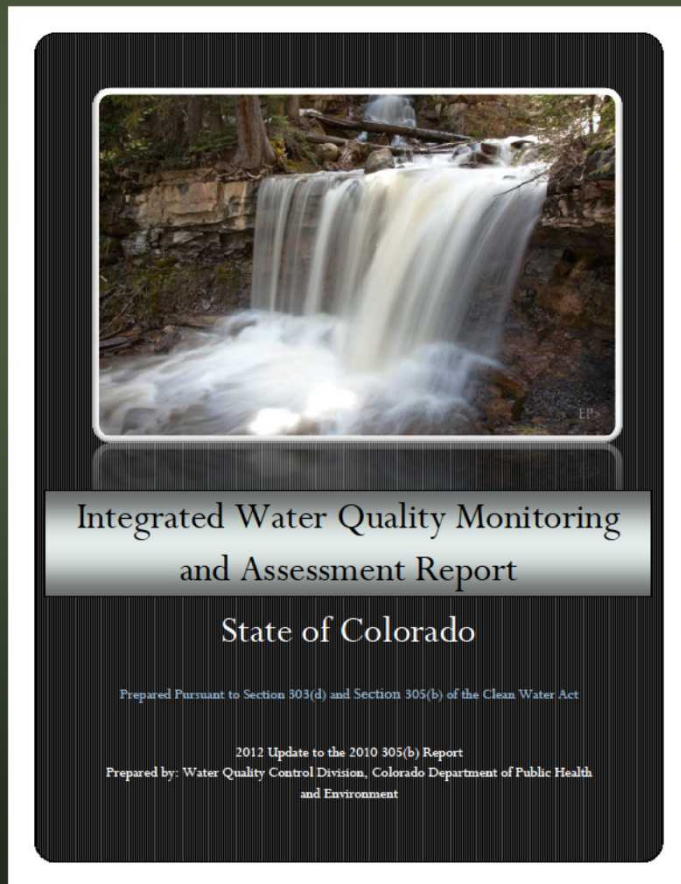
Wetland Regulation / Section 404

Assessment Results	High Risk Concerns
1. Impact Site Description	
<ul style="list-style-type: none"> Amount of area 	Large Area
<ul style="list-style-type: none"> Aquatic resource type 	Rare Type
<ul style="list-style-type: none"> Special Status Resource 	Documented Special Resource
2. Impact Site Condition	
<ul style="list-style-type: none"> Good, fair, poor 	Good Condition
3. Mitigation Category	
<ul style="list-style-type: none"> Restoration, Enhancement, Preservation, Establishment 	Establishment or Preservation
4. Mitigation Consistency with Watershed Profile	
<ul style="list-style-type: none"> In-kind, improve profile In-kind and sustain profile Out-of-kind, improve profile Out-of-kind, not improve profile 	Out-of-kind, Not Improve Profile
5. & 6. Mitigation Site Suitability (Remote and field review)	
<ul style="list-style-type: none"> Ecologically Suitable, Poor Suitability, Suitability is Uncertain 	Unsuitable or uncertain suitability
7. Review of Performance Standards	
<ul style="list-style-type: none"> Mitigation project involves use of a mitigation bank or site that has met performance standards. Mitigation project will use an existing set of performance standards. Mitigation project involves a wetland type that is difficult to replace, and there are no performance standards 	Use of a difficult to replace wetland type for mitigation, not involving a mitigation bank and with no performance standards

Water Quality Standards for Wetlands

Colo. Dept. of Public Health and Environment

- Narrative water quality standards for wetlands, but never applied
- New Wetlands Section in the Integrated Water Quality Monitoring and Assessment Report (303d and 305b)



What's Changed from the 2010 305(b) Report Update?

- New Wetlands Section**
 - The WQCD contracted with the Colorado National Heritage Program to compile a section covering Colorado's wetlands.
- Hg Listings**
 - 303(d) listings for fish tissue mercury are no longer linked to the issuance of an FCA. New assessment methods have been adopted for both 303(d) listing waterbodies as well as for issuing FCAs.
- MMI Tool and Bioassessments**
 - First time use of the WQCC's approved Multimetric Index (MMI) tool.
- Basin Summaries**
 - Reporting by basin is now summarized by WQCC standards basins, rather than hydrologic basins.
- Greater Accuracy in Waterbody Sizes**
 - Great improvements in National Hydrography Dataset (NHD) / Geographical Information System (GIS) layers have improved the accuracy of waterbody sizes for Colorado.

Integrated Water Quality Monitoring and Assessment Report, Executive Summary |

Fish Fact: Astor is derived from the Spanish word "first", as it was the first dam on the South Platte River near the river's origin and first in storage capacity at the time of its construction. Built in 1909, the Astor Dam is an earth-filled dam. Green Lake lies submerged within the Astor Reservoir.

1

Acknowledgements



- EPA: Jill Minter, Rich Sumner, Tony Olson, Dick Clark
- CNHP: Laurie Gilligan, Erick Carlson, Gabrielle Smith, Denise Culver, Joe Stevens, Karin Decker, Ellen Heath, field techs
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- CSU: Brad Johnson, Jennifer Hoeting, Erin Schliep
- NWI: Kevin Bon, Bruce Droster, Jane Harner
- CPW: Brian Sullivan, Jon Kindler, Grant Wilcox
- CDOT: Rebecca Pierce
- US ACE: Matt Montgomery, Tim Carey
- Local partners in the Rio Grande and North Platte
- Many others helped built the foundations!

Questions?

