



# Wetland Ecosystem Services

Maximizing Water Availability through Creation of Artificial Wetlands


Greg Kernohan – Manager, Water Ecosystem Services

Presented to: Colorado Watershed Assembly

# Program Goal

Deliver innovative solutions to water resource issues through high quality wetland conservation strategies that establish a lasting legacy of abundant clean water for waterfowl, wildlife, and people.





# Program Objectives

- Utilize wetlands to recharge aquifers and improve water quality in ways that leverage water markets through augmentation and pollution trading

Increase Habitat for Waterfowl

Generate Income from Water Resources

Increase Awareness by Diversifying Partnerships

# Program Outcomes

- Ducks Unlimited addresses mission goal for waterfowl habitat and generate revenue
- Water providers receive river augmentation credits
- Landowner receives water, revenue, capital asset appreciation



# South Platte Water Gap

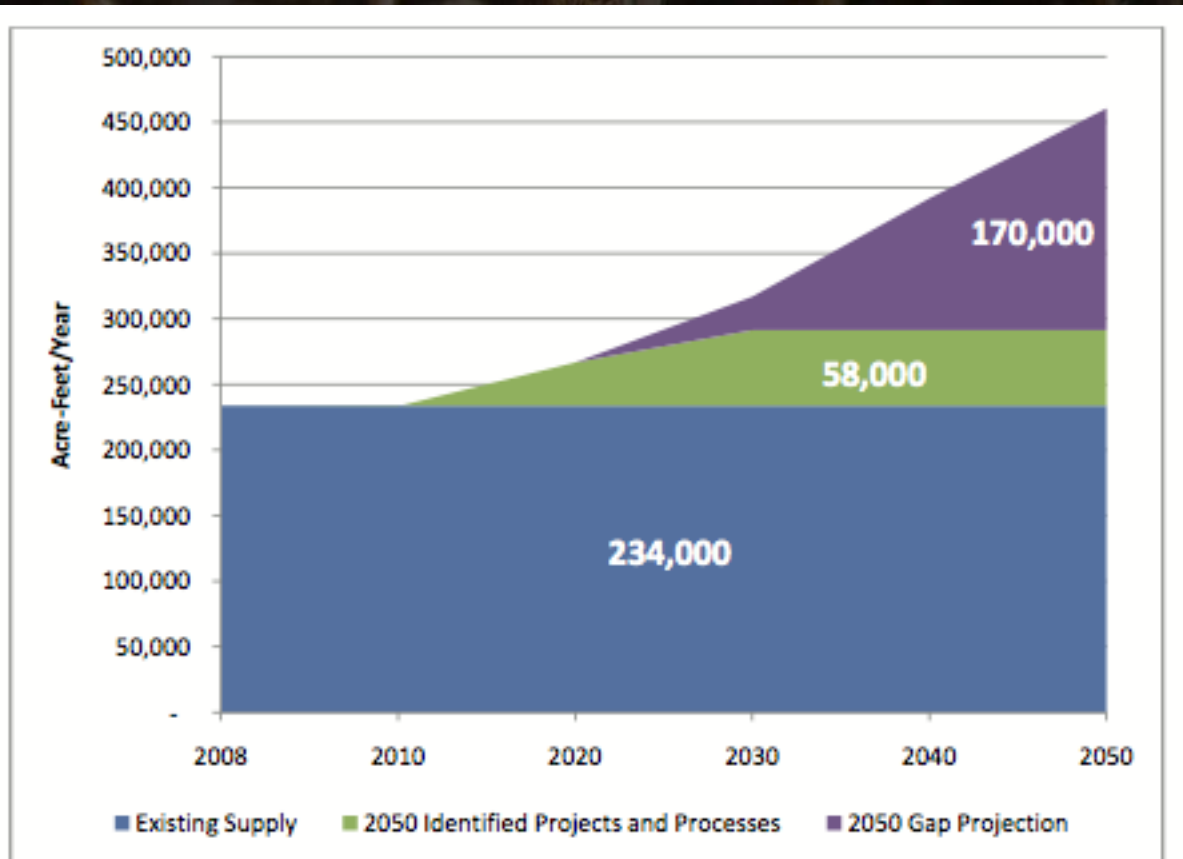
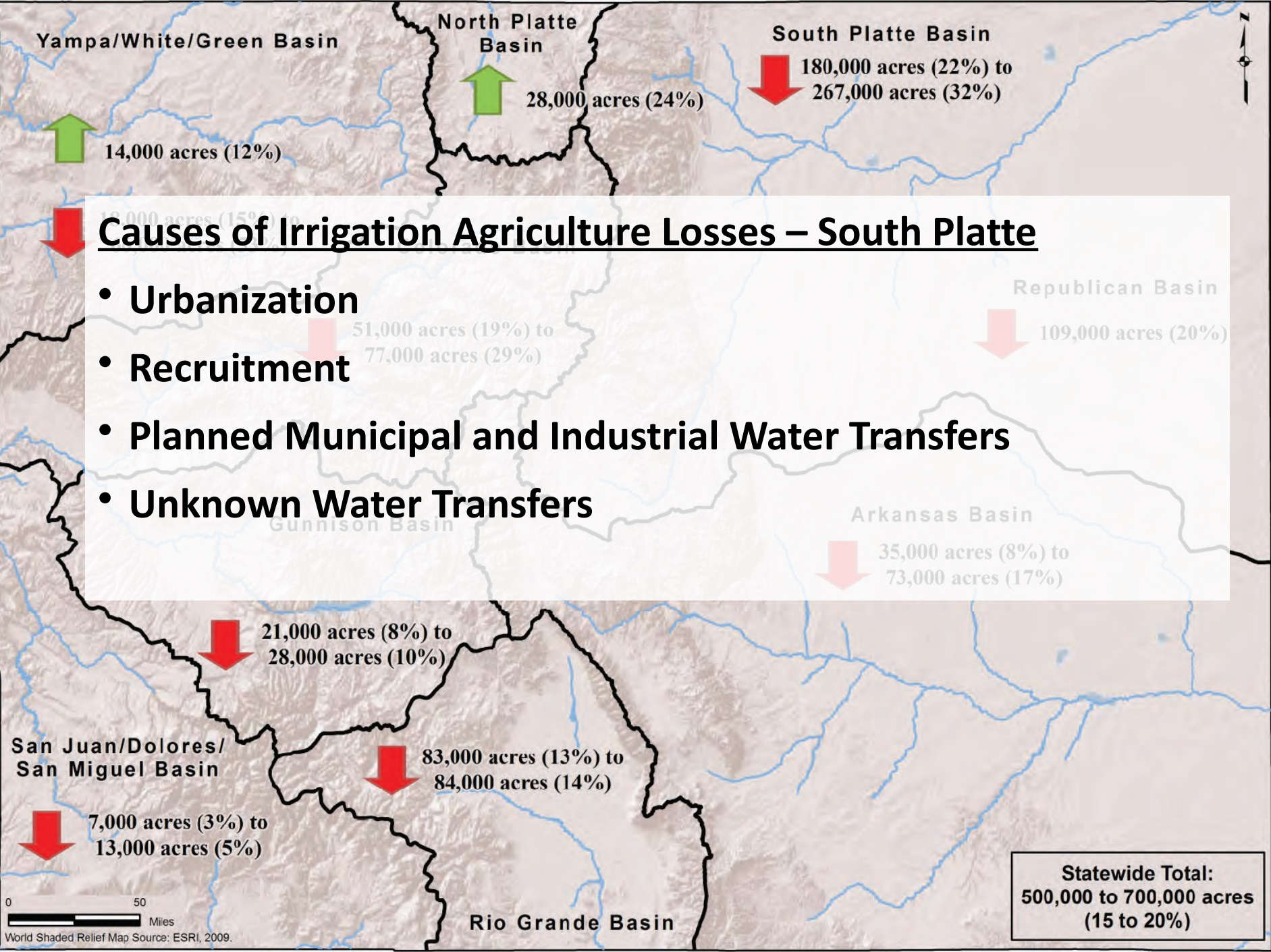


Figure 5-9. South Platte Basin M&I and SSI Gap Summary High Scenario (IPPs at 40% Success Rate)



Yampa/White/Green Basin

North Platte Basin

South Platte Basin



14,000 acres (12%)



28,000 acres (24%)



180,000 acres (22%) to 267,000 acres (32%)

## Causes of Irrigation Agriculture Losses – South Platte

- Urbanization
- Recruitment
- Planned Municipal and Industrial Water Transfers
- Unknown Water Transfers

Republican Basin



109,000 acres (20%)

Gunnison Basin

Arkansas Basin



35,000 acres (8%) to 73,000 acres (17%)



21,000 acres (8%) to 28,000 acres (10%)

San Juan/Dolores/San Miguel Basin



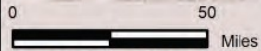
83,000 acres (13%) to 84,000 acres (14%)



7,000 acres (3%) to 13,000 acres (5%)

Rio Grande Basin

**Statewide Total:**  
500,000 to 700,000 acres  
(15 to 20%)



World Shaded Relief Map Source: ESRI, 2009.



**How much water will we save for wetlands  
and wildlife?**

**We have a narrow window of opportunity –  
0-5 years?**

The background of the slide features a sunset sky with several ducks in flight, silhouetted against the orange and yellow light. The ducks are scattered across the upper left portion of the frame.

# Ducks Unlimited

## River Augmentation by Aquifer Recharge

- Retiming of water
- Takes water to wetlands far from the river
- Water infiltrates alluvial aquifer
- Returns naturally to river underground
- Creates water credits
- Traded, Sold, Leased for several benefits

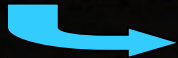
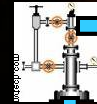


# At High River Stages: Winter/Spring



River

Wetland  
recharge  
basin

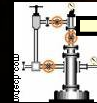


# At Low River Stages: Summer/Fall

View of the dry Platte River in the summer of 2002.



Wetland  
recharge  
basin



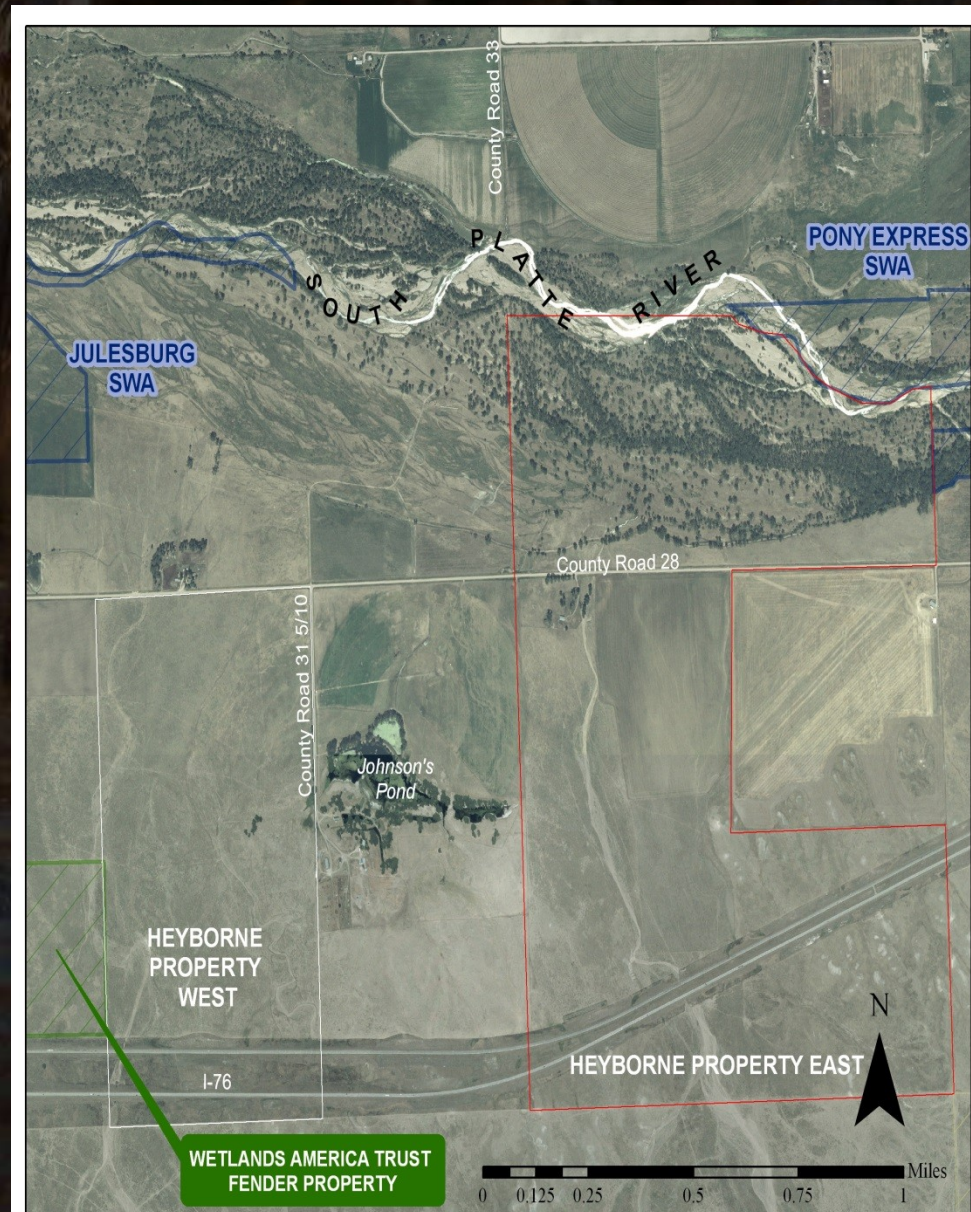
River



# South Platte River Ranch

## Property Description

- Riparian Corridor
- Warm-water sloughs
- Dryland Crops
- Native Prairie
- NO WATER RIGHTS!



# South Platte River Ranch

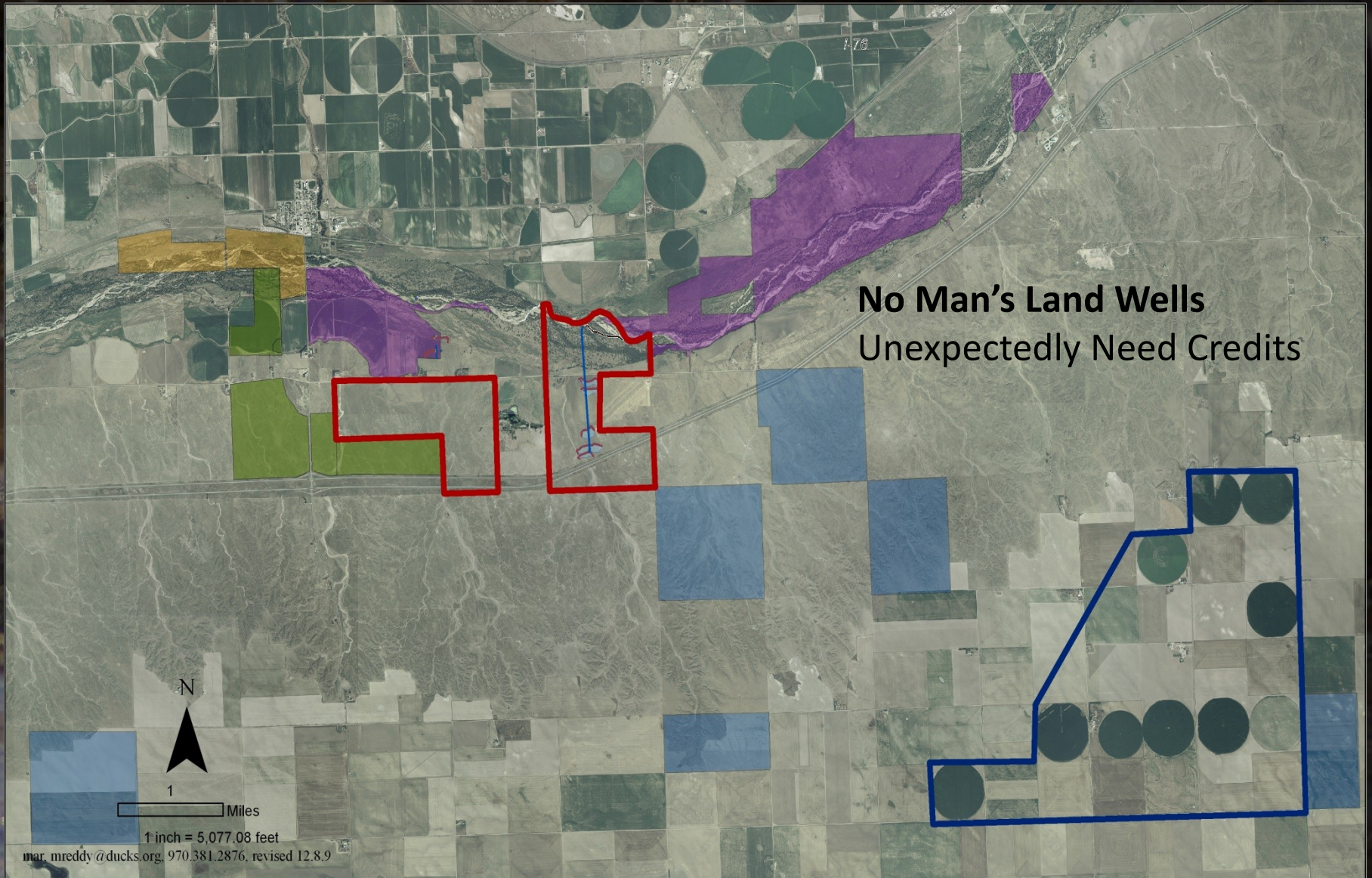
## Project Summary

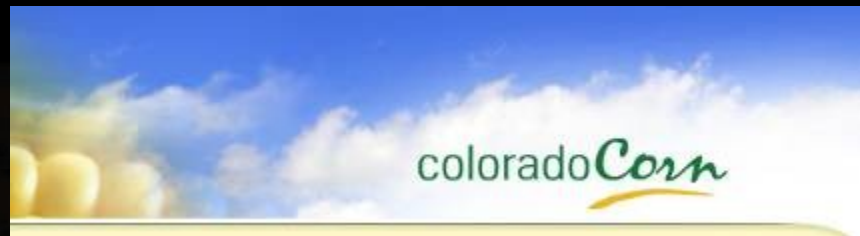
- NEW WATER RIGHTS
- 40 Acres of Wetlands
- 1.5 Miles Pipeline
- 3,000 GPM Pump
- 70 acre-feet minimum river flows





# South Platte River Ranch





# DU Role in Water Ecosystem Services





# South Platte River Ranch

	Contribution	Contracted	Actual
SCTF	18%	\$80,000	\$80,000
WSRA	33%	\$148,692	\$148,692
NAWCA	13%	\$0	\$53,001
SPWRAP	20%	\$100,000	\$84,929
SPLRG	0%	\$55,518	\$0
Landowner	3%	\$20,000	\$15,000
DU	13%	\$3,922	\$54,471
TOTAL		\$408,132	\$446,164

# Duck Use Days

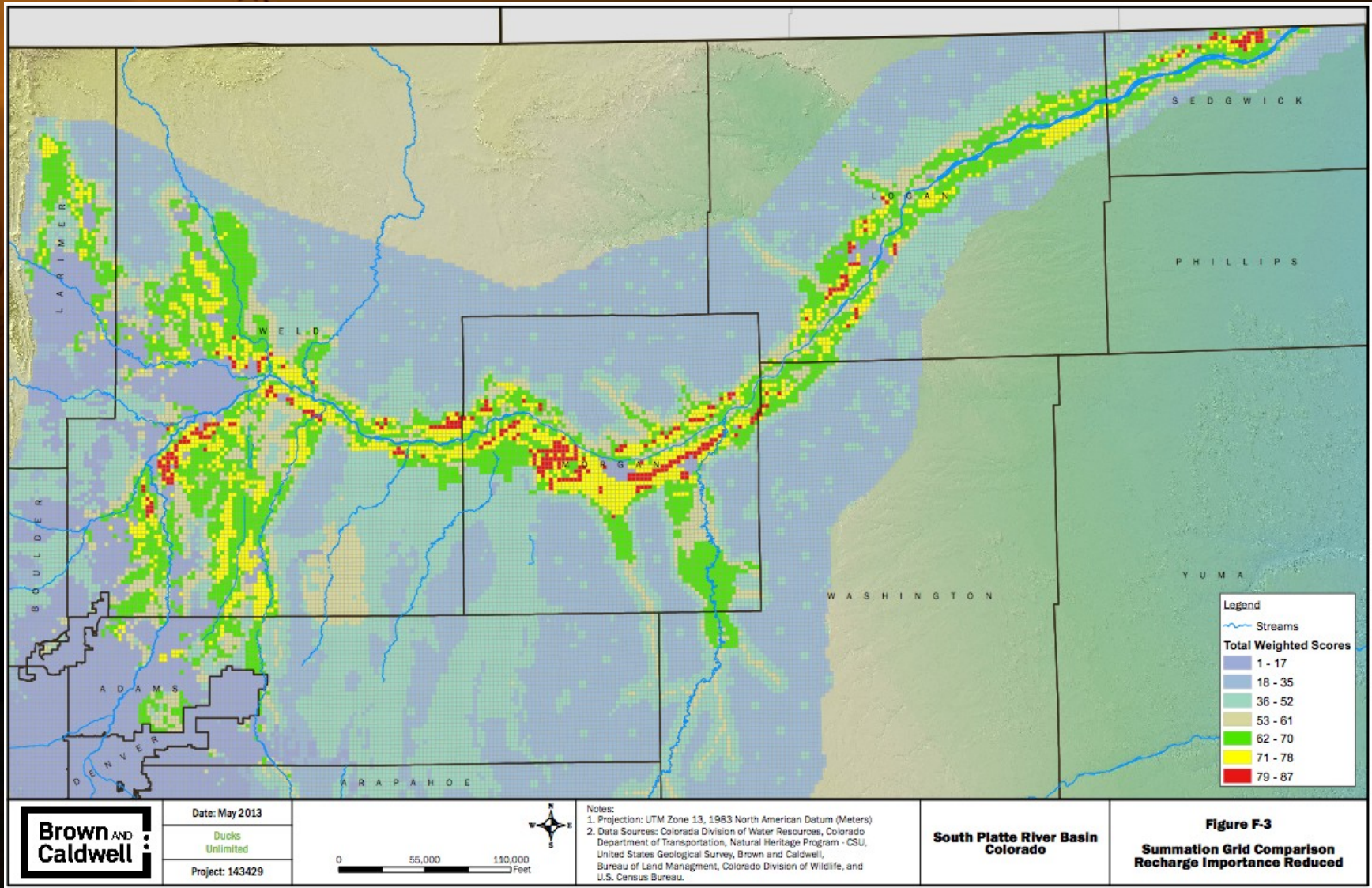
## DUDE'S

Duck Use Day Equivalence  
(DUDE)

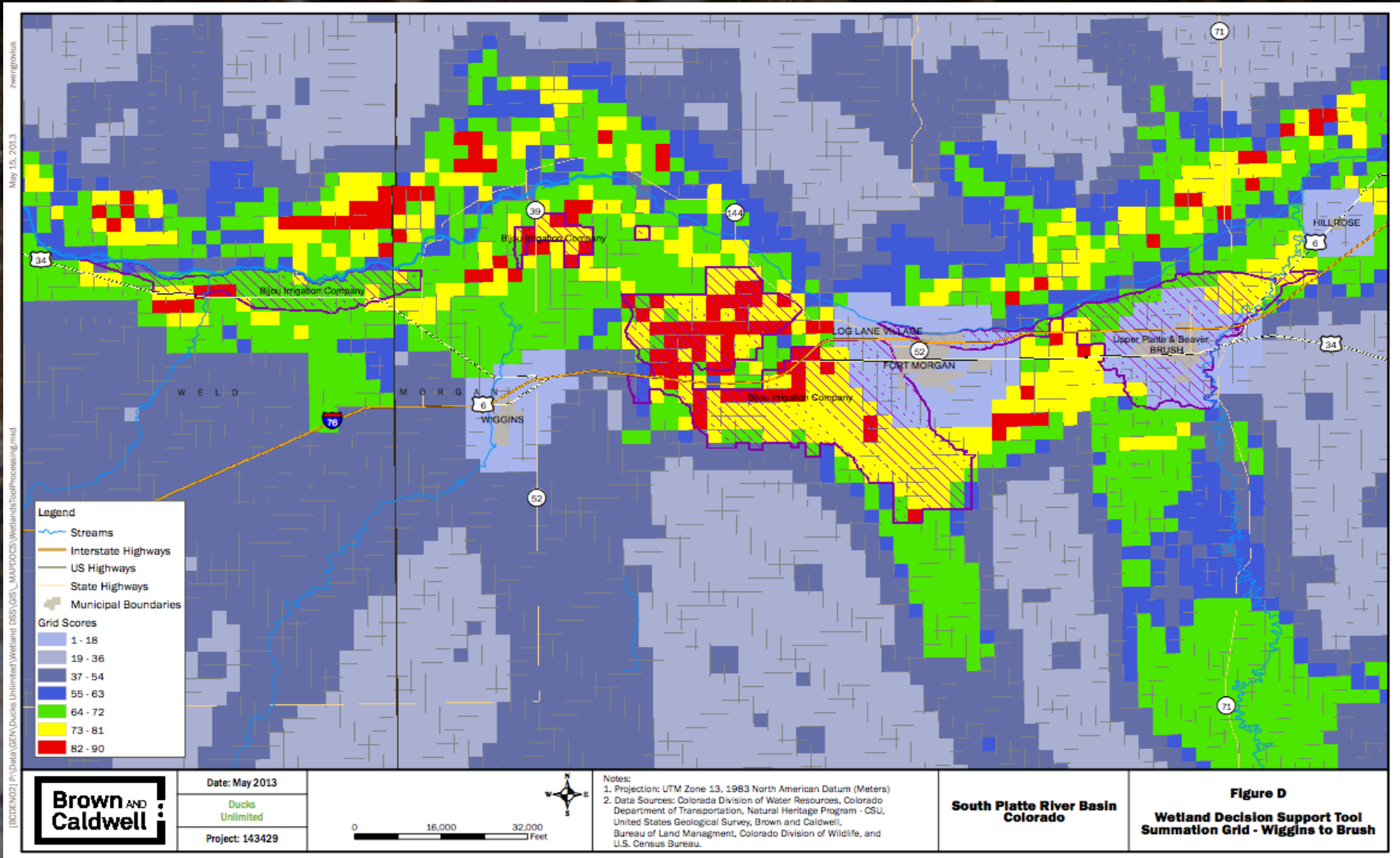


Site	DUDES	
Site 1	229,792	Total
	1.03%	Fall Goals
	.31%	Spring Goals
Site 2	154,976	Total
	.69%	Fall
	.21%	Spring
Site 3	40,080	Total
	.18%	Fall
	.05%	Spring
<b>TOTAL</b>	<b>424,848</b>	<b>TOTAL</b>
	<b>1.9%</b>	<b>FALL</b>

# DU's Recharge Location Study



# Golden Triangle Recharge Locations





# FLEX Market

- Agreement to change the use of senior water right to include multiple uses
- Platform to facilitate voluntary leases, trades between market members
- Two components:
  - FLEX Market Agreement
  - FLEX Delivery Agreements
- Example: Ag User, M&I User, E/C User
- Intent: Create environment conducive to maintenance of irrigated agriculture



Photo Credit: Wusel007



Photo Credit: Jeffrey Beall



Farmers Independent Ditch Co. (FIDCO) Diversion Dam

Photo Credit: CCWCD

# FLEX STUDY: Results

- Broad Support for Multiple Use Concept
- M&I Uses
  - Drought Recovery
  - Filling Holes while acquiring permanent water supply
  - Long Term Partnerships



Photo Credit: Dick Rodaester



Photo Credit : Ethan Emery, Angling University

- E/C Uses
  - In stream flow (CWCB)
  - Habitat restoration and development
  - Recreation
- Ag Uses
  - “Water as cash crop”
  - Risk mitigation

# FLEX STUDY: Results

- 6 Keys to FLEX Agreement
  - Critical elements of alternative transfer agreement
- Model FLEX Agreement
  - Establishes market, platform for transactions between parties



Photo Credit: Dick Rodaester



Photo Credit : Ethan Emery, Angling University

- Model Terms and Conditions
  - Example of FLEX water court adjudication terms
  - Developed in cooperation with attorneys/engineers group
  - Two models
    - Pay As You Go
    - Return Flow Accounting



# Stacking Wetland Eco Markets



# Questions

