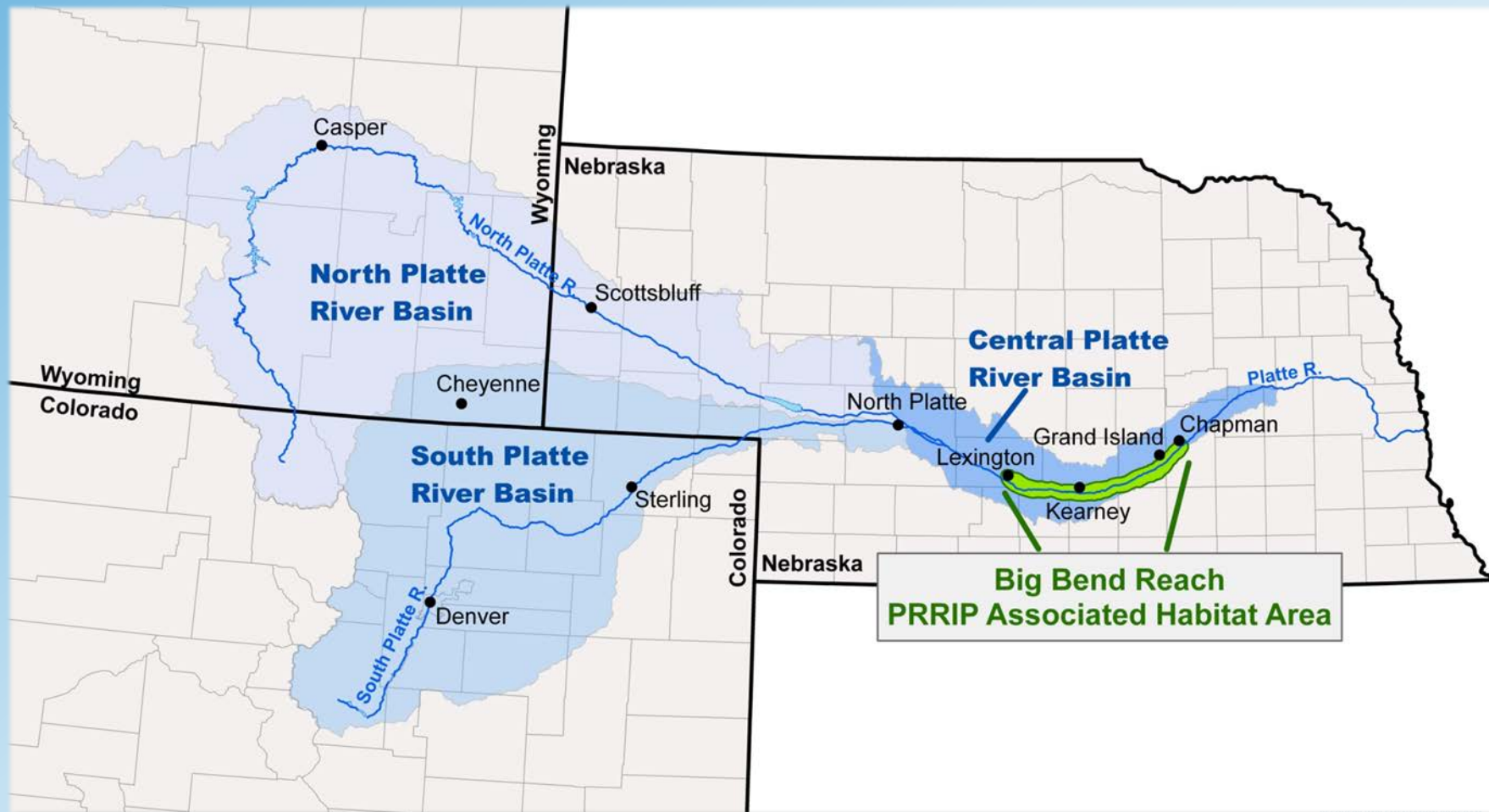




Platte River Recovery Implementation Program - Effective Compliance with the ESA

Jerry F. Kenny, Ph.D., P.E. - Executive Director

Platte River Basin

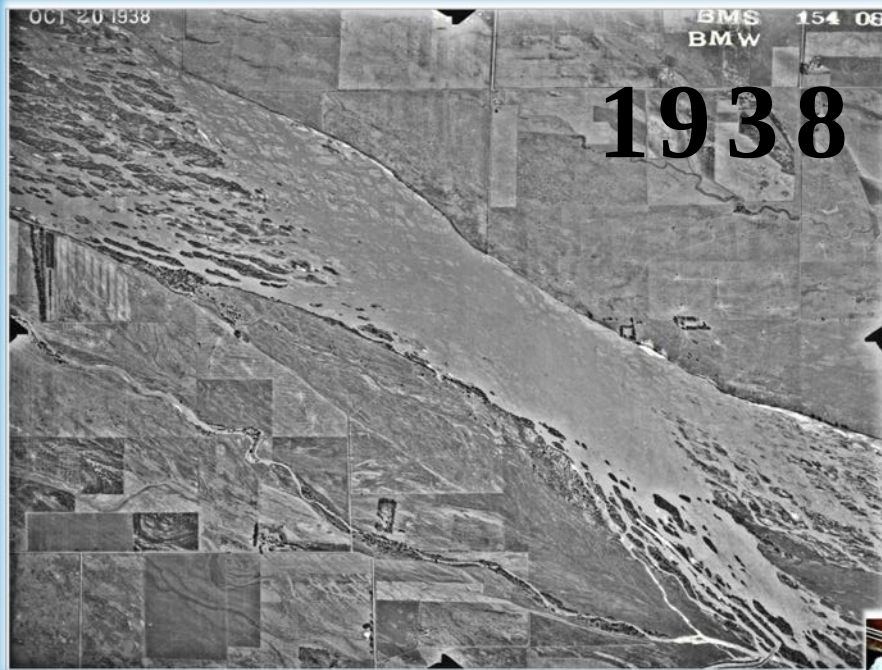


Target Species on the Platte River



ESA coverage for water users





**Extent of Vegetation
Expansion
&
Loss of Braided Nature
of Platte River**



Collaborative Program

Costs split:

\$317M in 2005 dollars,
50/50 between States
&
Federal Government

Governance Structure:

Everyone at the table
with a voice and a vote
&
Move forward by
consensus

Independent Implementation:

- Executive Director's
Office
(Honest Broker)
- Financial Management
Entity
- Land Interest Holding
Entity

Process Integrity:
Independent Science
Advisory Committee
&
Peer Reviews



Program Components

Adaptive Management



Land

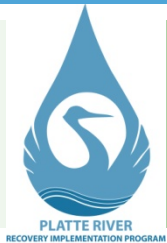
Water



Program Mission

- Land Plan
 - Acquire, protect, and restore 10,000 acres of habitat for the three avian species
- Water Plan
 - Reduce deficits to FWS Target Flows by average annual of 130,000 to 150,000 AFY
- Adaptive Management Plan
 - Do the science necessary to make sure the land and water resources are providing benefit to the species





Land Plan

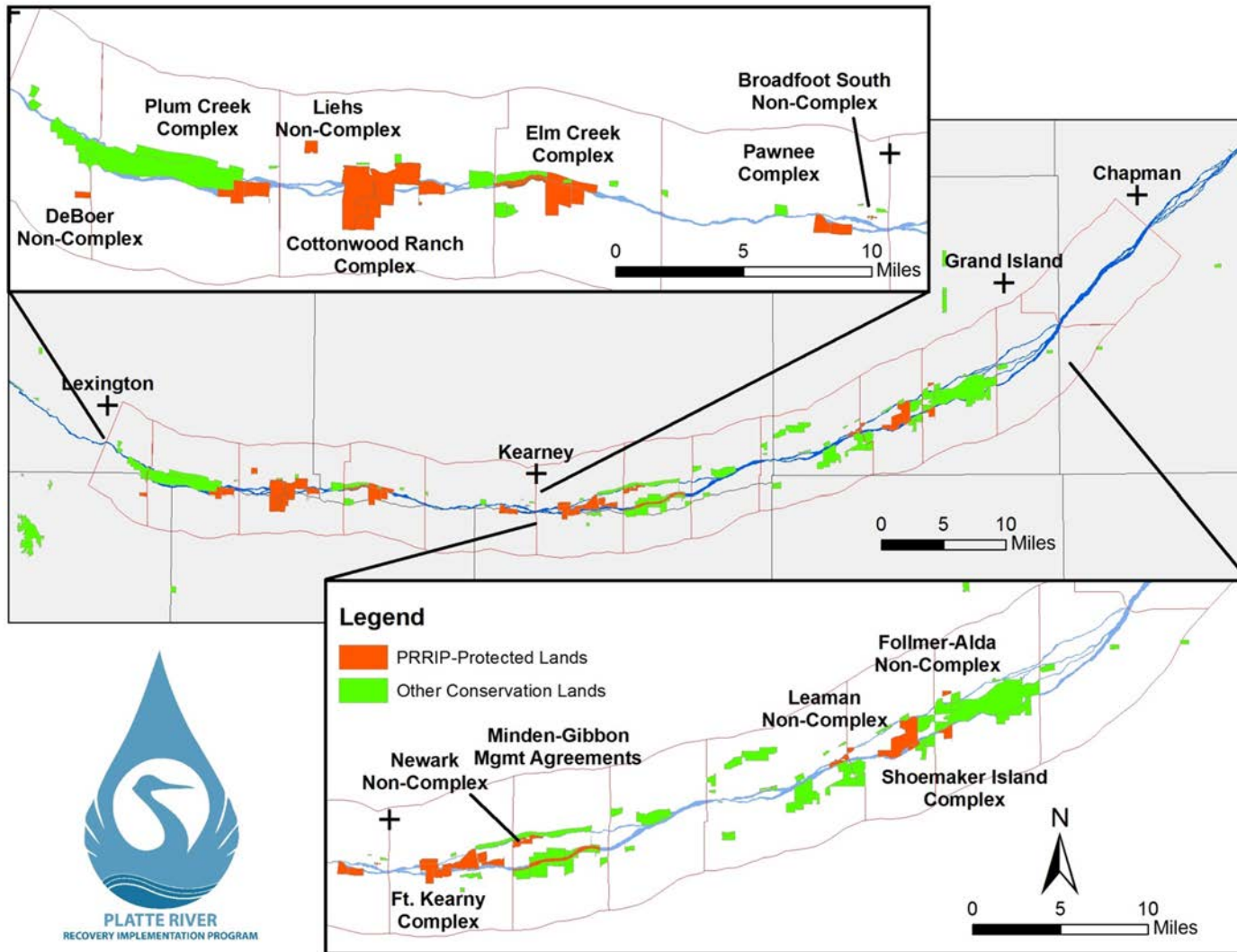
Acquisition, protection, and restoration of
10,000 acres of habitat for the three avian
species – 12,000 acres protected

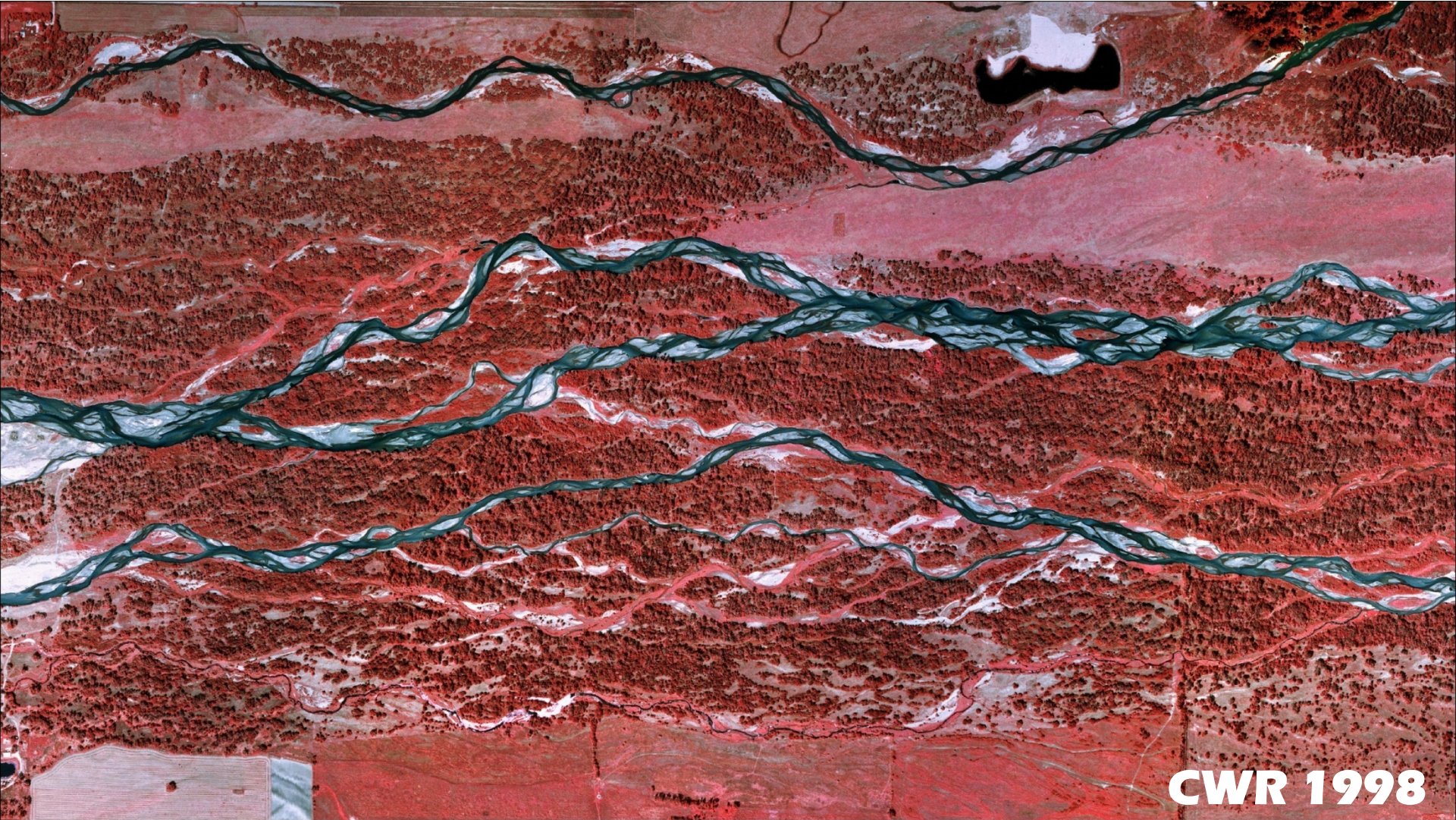
Land Plan – Guiding Principles

- ❑ Willing seller/willing buyer
- ❑ Pay property taxes
- ❑ Good Neighbor Policy
- ❑ Public Access for Recreation

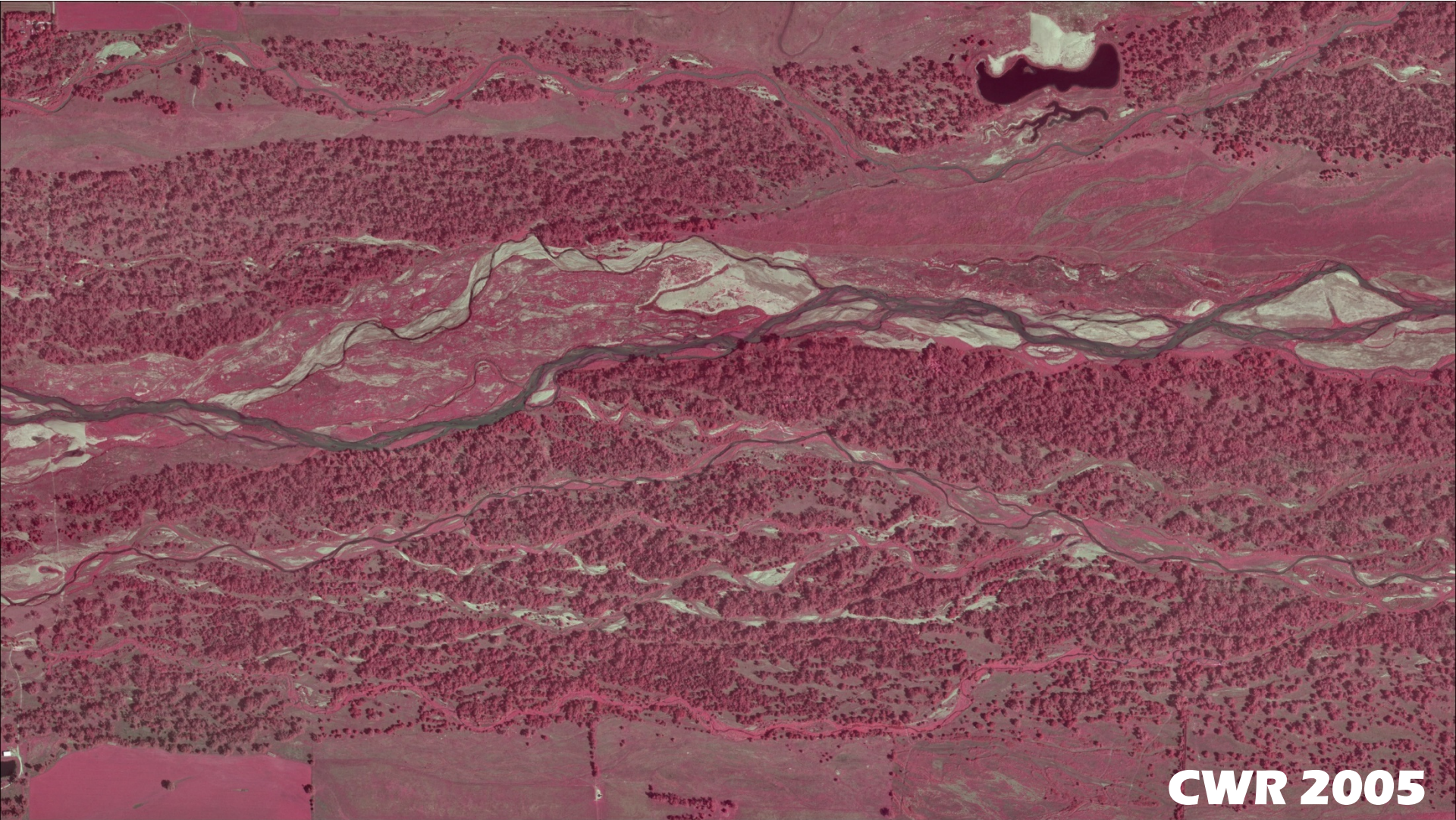


Conservation Lands

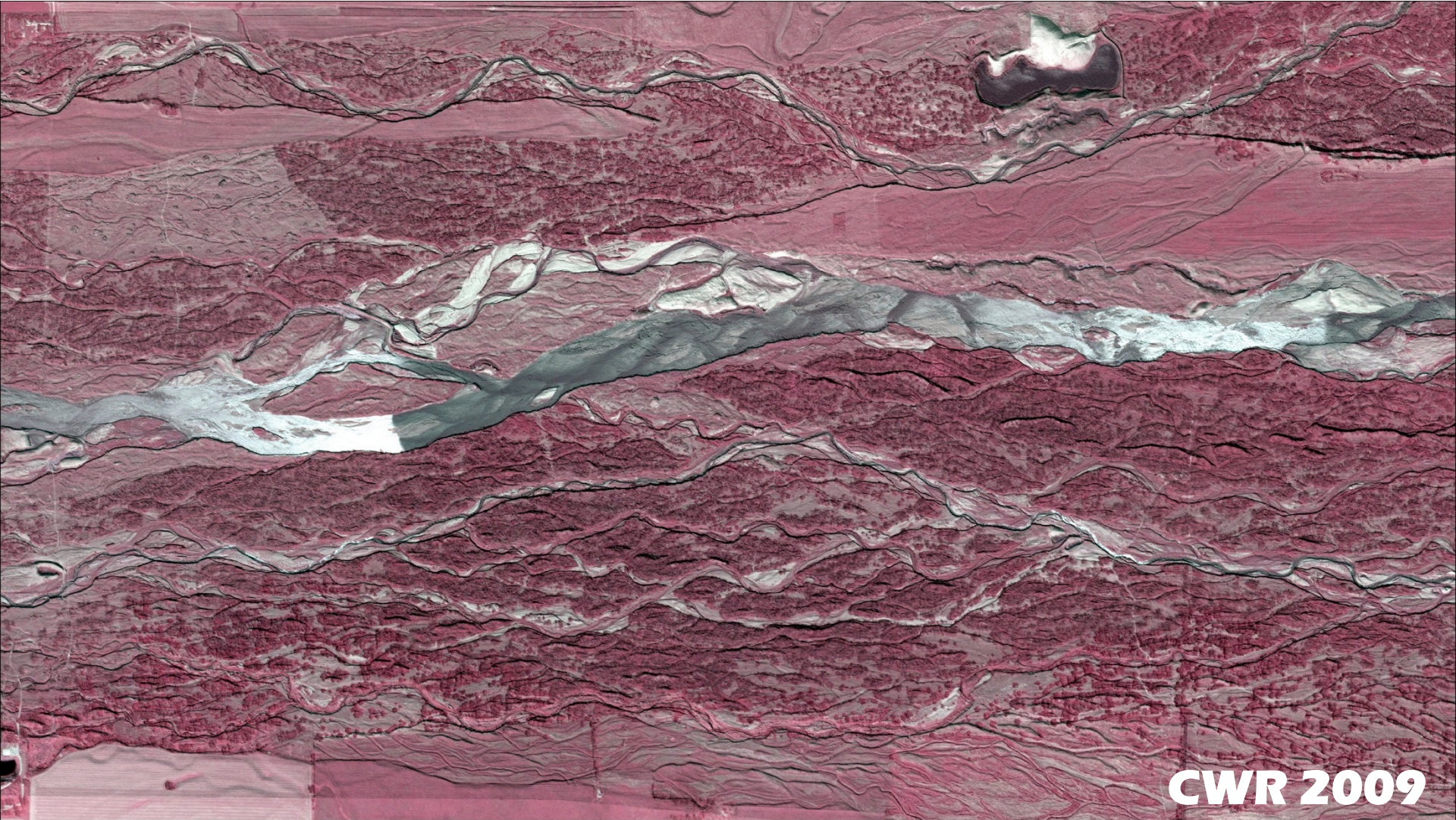




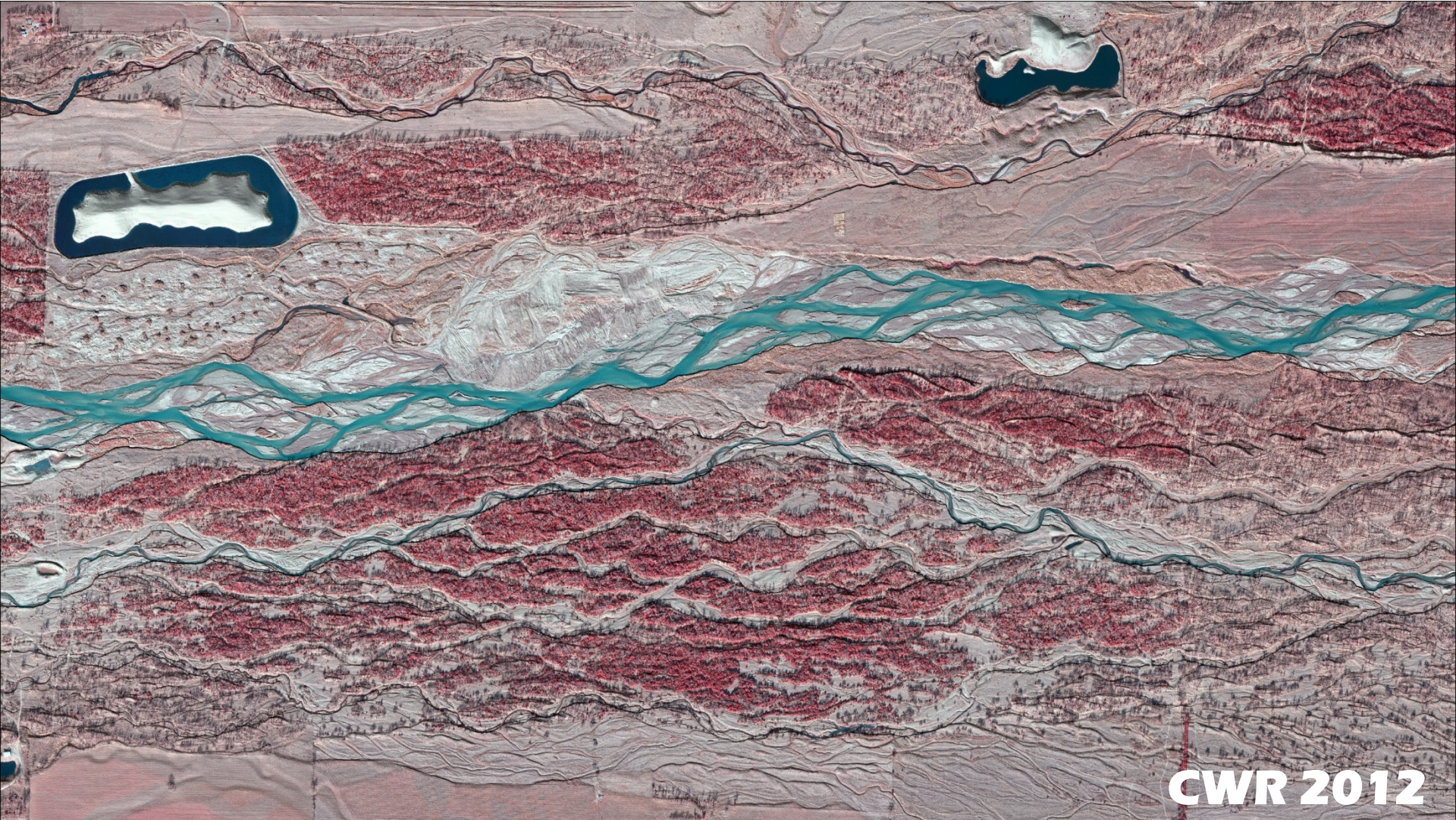
CWR 1998



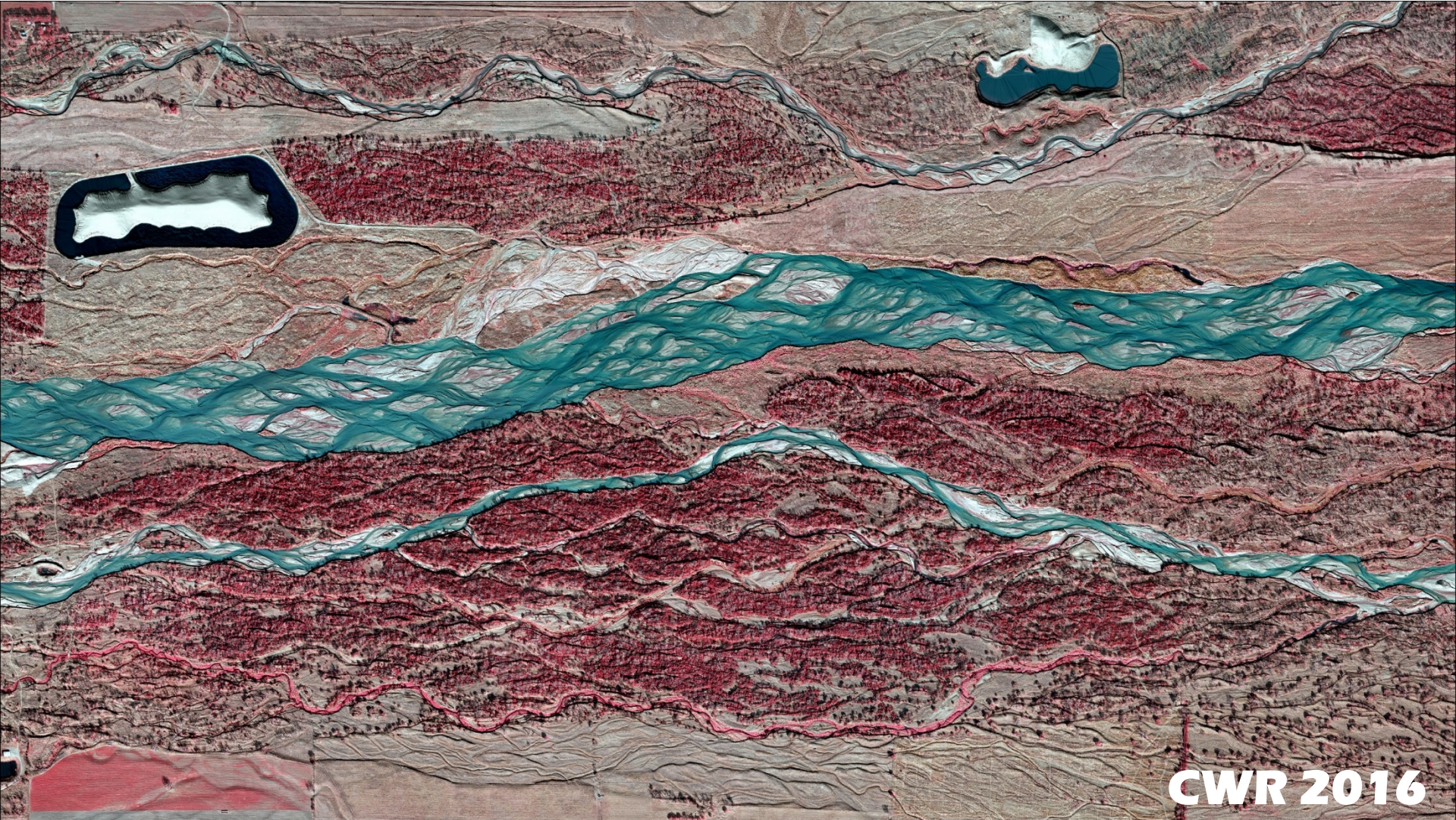
CWR 2005



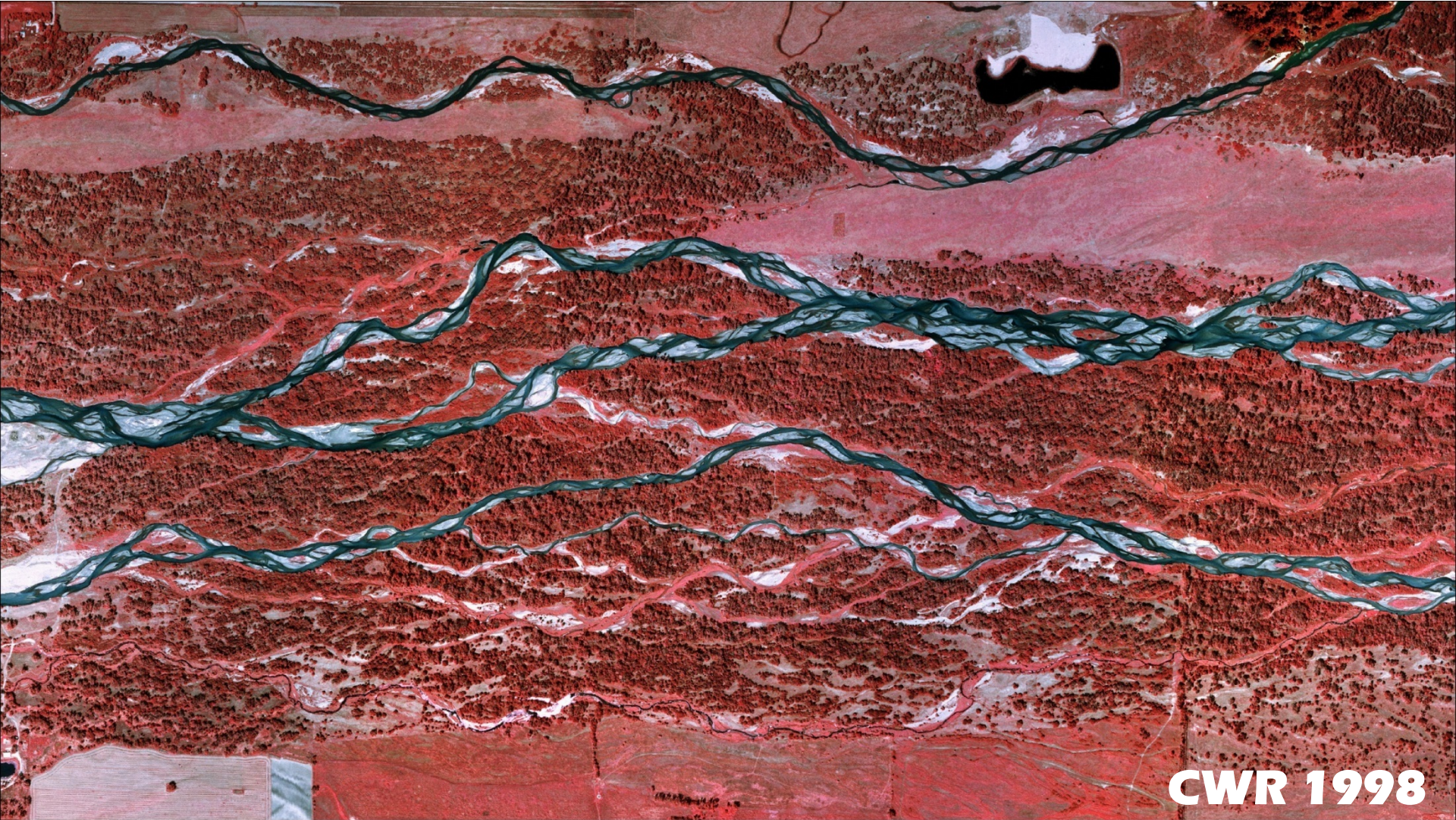
CWR 2009



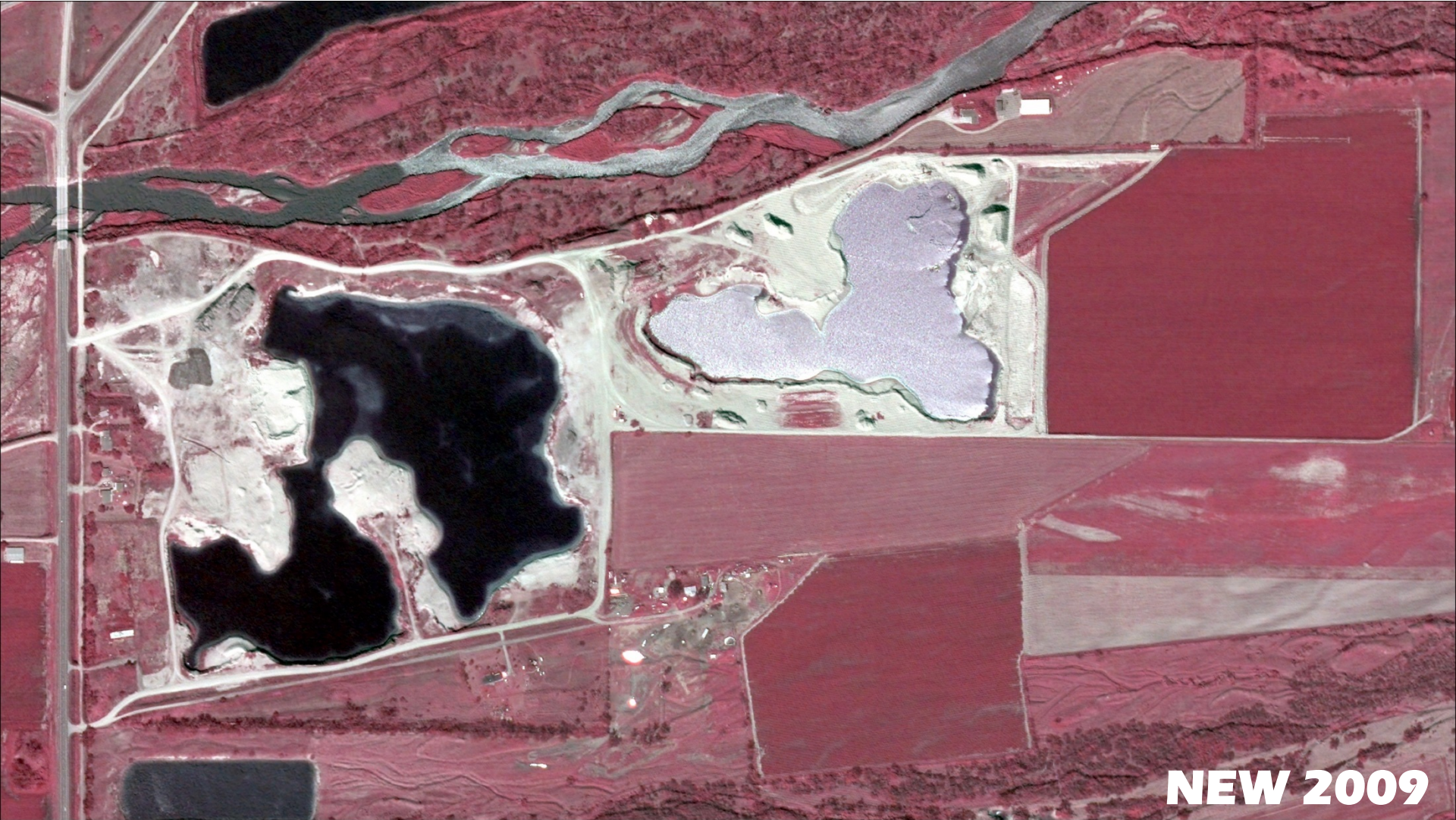
CWR 2012



CWR 2016



CWR 1998



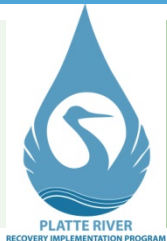
NEW 2009



NEW 2012



NEW 2016

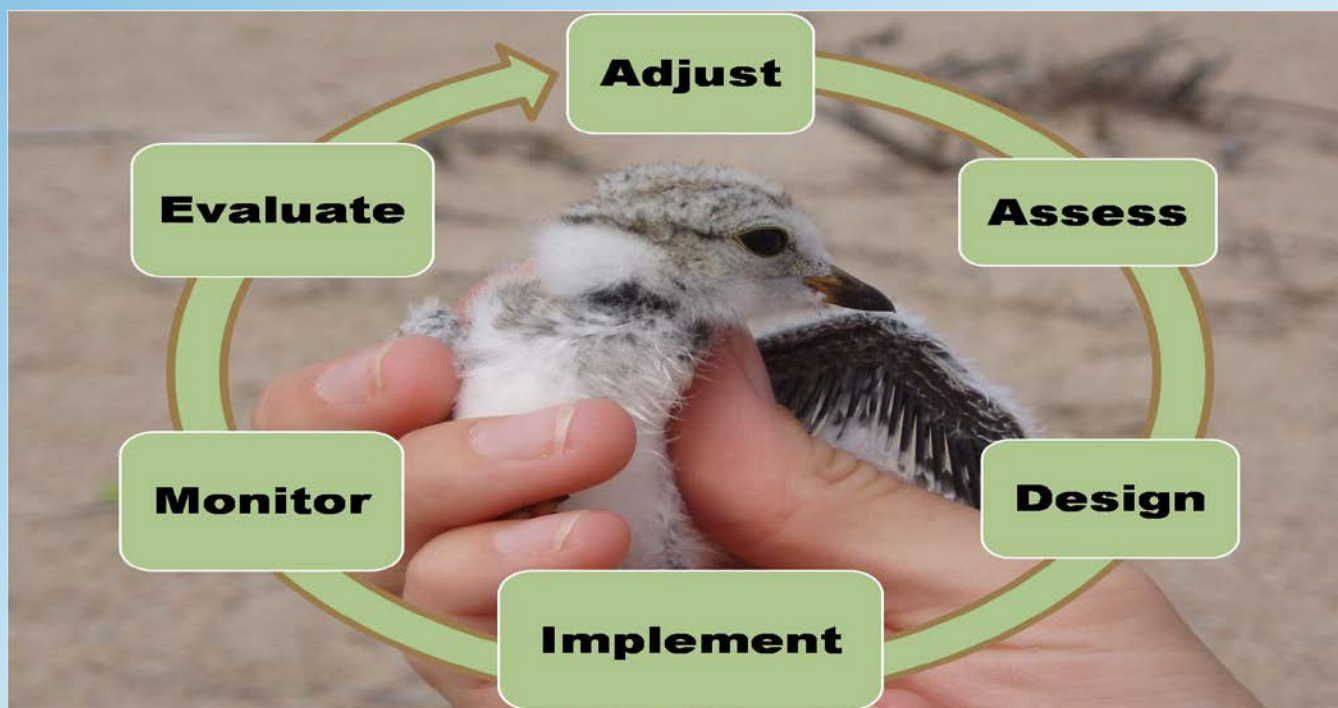


Adaptive Management Plan

- Improve production of least tern and piping plover from the central Platte River.
- Improve survival of whooping cranes during migration.
- Avoid adverse impact from Program actions on pallid sturgeon populations.
- Within overall objectives 1-3, provide benefits to non-target listed species and non-listed species of concern and reduce likelihood of future listings

Key Features of Adaptive Management Plan

- AM allows you to move forward in the face of uncertainty
 - ▣ Systematic, rigorous process to test hypotheses & apply information learned to improve management of land and water for benefit of species
 - ▣ Need to Know v. Nice to Know- (tied to management actions)







Feb. 2010



Feb. 2013

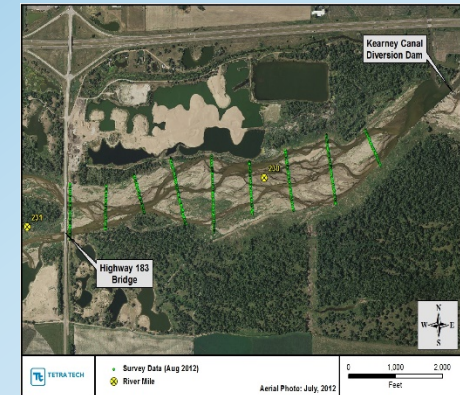
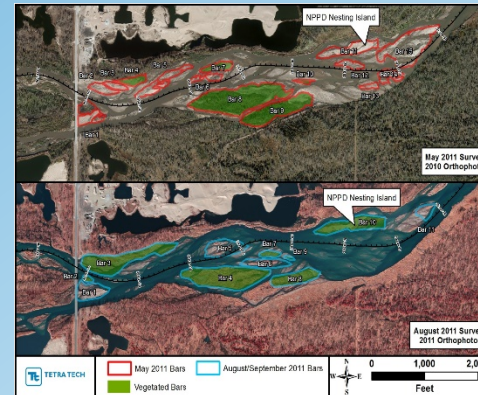
Flow



This aerial photograph captures a river system in a semi-arid landscape. A large, irregularly shaped oxbow lake is situated in the upper left, containing a significant amount of light-colored sediment. The main river channel, located in the lower half of the image, is braided, with multiple sub-channels and numerous sandbars. The surrounding terrain is a mix of dry, brownish vegetation and bare, light-colored soil. In the top left corner, there are rectangular agricultural fields. A blue arrow-shaped graphic with the word 'Flow' is positioned in the lower left, pointing towards the right, indicating the downstream direction of the river.

Monitoring Data

Effort	Frequency	Description
Least Tern and Piping Plover Use and Productivity Monitoring	Annual	Document species use, habitat variables and productivity in the AHR.
Least Tern and Piping Plover Habitat Availability Analysis	Annual	Document occurrence and amount of habitat in AHR meeting minimum species habitat suitability criteria.
Discharge Measurements	Real-time	Real-time Platte River discharge monitoring at six locations in the AHR. Stream gaging conducted in cooperation with the USGS and Nebraska Department of Natural Resources
June Color-Infrared Imagery	Annual	Document in-channel and off-channel habitat conditions during least tern and piping plover nest initiation period.
November Color-Infrared Imagery and Light Detection and Ranging	Annual	Document channel morphology and topography under leaf-off and low discharge conditions.
System-Scale Geomorphology and Vegetation Monitoring	Annual	Monitor sediment transport, channel morphology and in-channel vegetation throughout the AHR. Data include bed and suspended sediment load measurements, repeat channel transect surveys, bed and bank material sampling, and vegetation monitoring.
HEC-GeoRAS Hydraulic Model of AHR	As Necessary	Segment-scale hydraulic model for evaluation of channel hydraulics and development of water surface profiles across a range of discharges.



PRRIP Big Questions = What we don’t know but want to learn

Broad Hypotheses¹

Priority Hypotheses²

Implementation – Program Management Actions and Habitat

1. Will implementation of SDHF³ produce suitable⁴ tern and plover riverine nesting habitat on an annual or near-annual basis?

PP-1a: Flows of 5,000 to 8,000 cfs magnitude in the habitat reach for a duration of three days at Overton on an annual or near-annual basis will build sandbars to an elevation suitable for least tern and piping plover habitat.

Flow #1

2. Will implementation of SDHF produce and/or maintain suitable whooping crane riverine roosting habitat on an annual or near-annual basis?

PP-1b: Flows of 5,000 to 8,000 cfs magnitude in the habitat reach for a duration of three days at Overton on an annual or near-annual basis will increase the average width of the vegetation-free channel.

Flow #3, Flow #5

3. Is sediment augmentation necessary for the creation and/or maintenance of suitable riverine tern, plover, and whooping crane habitat?

PP-2: Between Lexington and Chapman, eliminating the sediment imbalance of approximately 4000,000 tons annually in eroding reaches will reduce net erosion of the river bed, increase the sustainability of a braided river, contribute to channel widening, shift the river over time to a relatively stable condition, and reduce the potential for degradation in the north channel of Jeffrey Island resulting from headcuts.

Sediment #1

4. Are mechanical channel alterations (channel widening and flow consolidation) necessary for the creation and/or maintenance of suitable riverine tern, plover, and whooping crane habitat?

PP-3: Designed mechanical alterations of the channel at select locations can accelerate changes towards braided channel conditions and desired river habitat.

Mechanical #2



Critical Uncertainties

PRRIP Big Question	2014 Assessment	Basis for assessment
Implementation – Program Management Actions and Habitat		
1. Will implementation of SDHF produce suitable tern and plover riverine nesting habitat on an annual or near-annual basis?		Peer-reviewed Program synthesis concludes that SDHF will not produce suitable nesting sandbars.
2. Will implementation of SDHF produce and/or maintain suitable whooping crane riverine roosting habitat on an annual or near-annual basis?		Trending negative; Program synthesis chapters now in development will be discussed with the TAC and ISAC and peer reviewed in 2015; those synthesis chapters and published manuscripts related to the Program's vegetation and lateral erosion research will likely support a “two thumbs down” assessment in the 2015 State of the Platte Report.
3. Is sediment augmentation necessary for the creation and/or maintenance of suitable riverine tern, plover, and whooping crane habitat?		Trending positive; certainty about the sediment deficit; uncertainty about the role of that deficit in habitat creation and maintenance.
4. Are mechanical channel alterations (channel widening and flow consolidation) necessary for the creation and/or maintenance of suitable riverine tern, plover, and whooping crane habitat?		Trending positive; planform management manuscript now in development will be published and will likely support a “two thumbs up” assessment in the 2015 State of the Platte Report.
Effectiveness – Habitat and Target Species Response		
5. Do whooping cranes select suitable riverine roosting habitat in proportions equal to its availability?		A definitive assessment is expected by 2017 once peer review of data analyses (monitoring, telemetry, stopover study data, habitat availability assessments, IGERT research) is complete.
6. Does availability of suitable nesting habitat limit tern and plover use and reproductive success on the central Platte River?		Trending positive; three documents now in development will be peer reviewed and/or published and will likely support a “two thumbs up” assessment in the 2015 State of the Platte Report.
7. Are both suitable in-channel and off-channel nesting habitats required to maintain central Platte River tern and plover populations?		Trending negative; three documents now in development will be peer reviewed and/or published and will likely support a “two thumbs down” assessment in the 2015 State of the Platte Report.
8. Does forage availability limit tern and plover productivity on the central Platte River?		Trending negative; synthesis document related to tern forage (fish) will be peer reviewed that, in combination with the results of the Foraging Habits Study, will likely support a “two thumbs down” assessment in the 2015 State of the Platte Report.
9. Do Program flow management actions in the central Platte River avoid adverse impacts to pallid sturgeon in the lower Platte River?		Peer-reviewed Program stage change study concludes Program flow management actions will avoid adverse impacts.
Larger Scale Issues – Application of Learning		
10. Do Program management actions in the central Platte River contribute to least tern, piping plover, and whooping crane recovery?		By definition, implementation of the Program contributes to recovery of the target species. A definitive answer for this question can only be obtained by a broader analysis of the contribution of the central Platte to range-wide recovery.
11. What uncertainties exist at the end of the First Increment, and how might the Program address those uncertainties?		This question is a “parking lot” for uncertainties that could be addressed through adaptive management in an extended First Increment or new Second Increment.

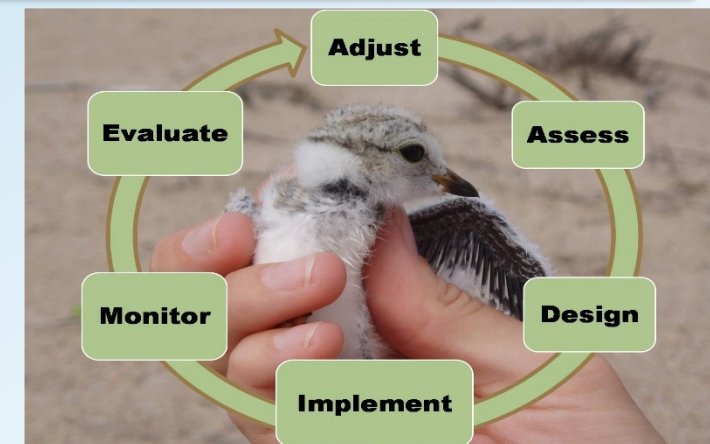
Table 2. 2014 Big Questions table.

Structured Decision Making Process lead to First Policy Level Adjustment in June 2016

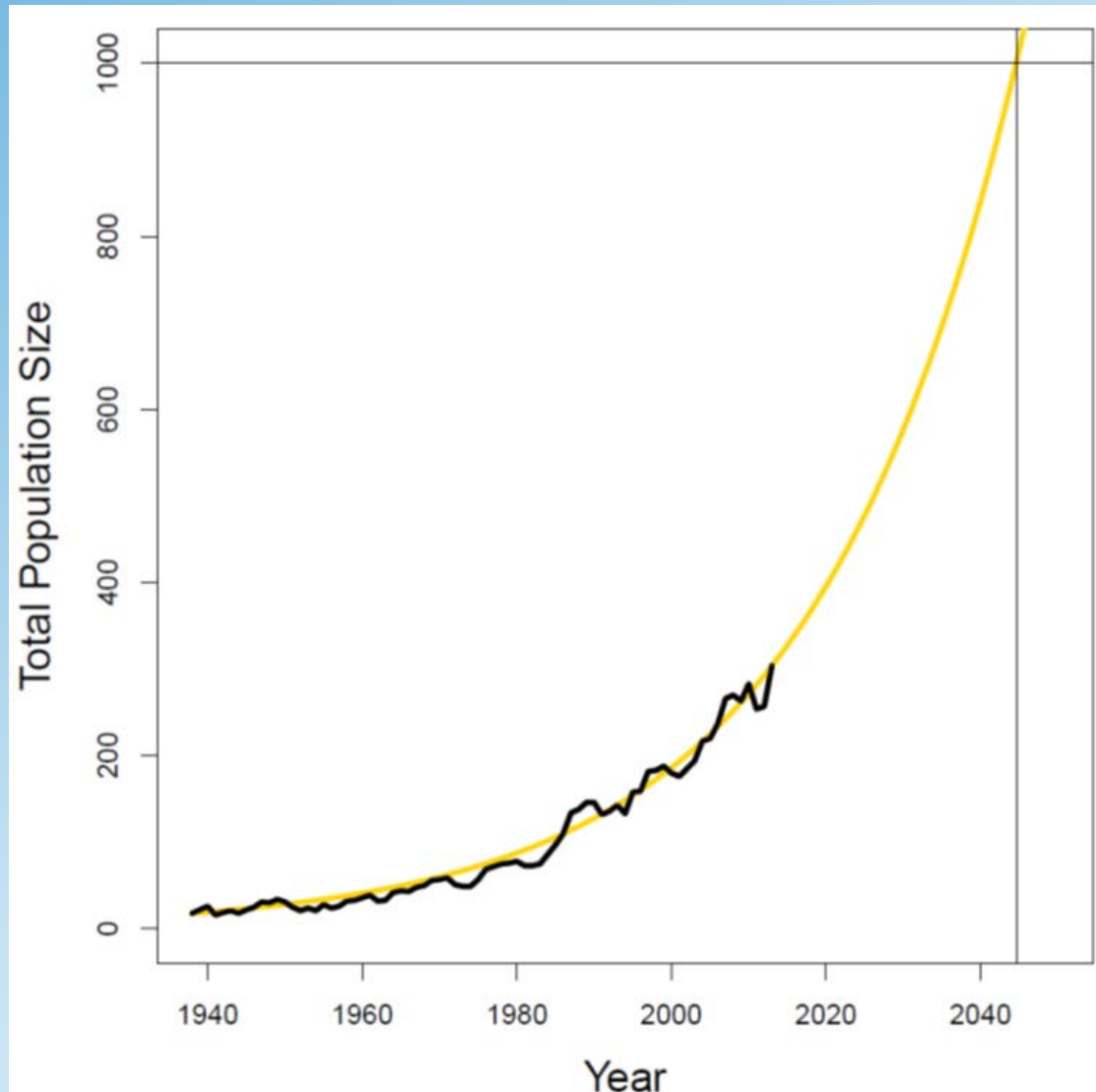


Objective	Performance Measure	Units	Dir	5°C	4°C	3°C	2°C	1°C	0°C	-1°C	-2°C	-3°C	-4°C
Piping Plovers													
Program Repro Success	Average Breeding Pair (BP)	W/year	H	22	34	28	29	25	37	48	45	50	43
	Average Fledge Ratio	W/year	H	1.00	1.27	1.37	1.34	1.34	1.40	1.40	1.30	1.37	1.40
	Total Fledglings over 50 yr	#	H	1,420	2,144	1,901	1,929	1,919	1,988	3,144	3,179	3,400	3,006
AIR Repro Success	Average Breeding Pair	W/year	H	30	47	36	37	37	56	66	57	68	51
	Average Fledge Ratio	W/year	H	1.33	1.80	1.37	1.36	1.36	1.40	1.40	1.30	1.37	1.40
Interior Least Terns													
Program Repro Success	Average Breeding Pair (BP)	W/year	H	97	141	104	106	105	132	175	156	176	175
	Average Fledge Ratio	W/year	H	1.07	1.06	1.09	1.09	1.09	1.10	1.10	1.09	1.09	1.10
	Total Fledglings over 50 yr	#	H	5,107	7,462	7,312	7,339	7,319	7,279	9,361	9,347	9,376	10,802
AIR Repro Success	Average Breeding Pair	W/year	H	140	192	176	177	176	174	203	204	204	196
	Average Fledge Ratio	W/year	H	1.00	1.07	1.09	1.09	1.09	1.10	1.10	1.09	1.09	1.10
Management Cost													
Short-term Management Cost Increment Cost (2017-2018)		1000s	L	\$130	\$1,200	\$1,081	\$1,081	\$1,081	\$1,056	\$1,042	\$1,028	\$1,028	\$44
Long-term Management Cost NPV (\$0.01)		1000s	L	\$3,391	\$2,255	\$2,271	\$2,343	\$2,343	\$2,271	\$2,271	\$2,271	\$2,271	\$2,271
Water Use - Wet Years	Proportion of Program water used	%	L	0%	0%	0%	8%	8%	0%	0%	0%	8%	0%
Water Use - Normal Years	Proportion of Program water used	%	L	0%	0%	0%	63%	44%	0%	0%	0%	63%	0%
Water Use - Dry Years	Proportion of Program water used	%	L	0%	0%	0%	77%	56%	0%	0%	0%	77%	0%
Augmented Volume	Avg. Volume Program water / yr	ac-ft/year	L	0	0	0	39,090	27,033	0	0	0	39,090	0
Whooping Crane													
Habitat Use	Habitat Suitability Scale	-3 to +3	H	0	-3	-2	-2	-2	1	1	2	2	1
Pallid Sturgeon													
Pallid Sturgeon Risk	Presence of critical water diversions	Yes/No	L	No	No	No	No	No	No	No	No	No	No
Sediment													
Contribution to Sediment S	Sediment Supply Scale	-2 to +2	H	0	-1	-2	-2	-2	0	0	2	2	0
Implementation Effort													
Implementation Costs/Risks	Implementation Scale	-4 to 0	H	0	-2	-3	-3	-3	0	-1	-3	-3	-1
Learning													
Learning Potential	Learning Potential Scale	0 to 3	H	1	1	1	1	1	0	0	1	1	0

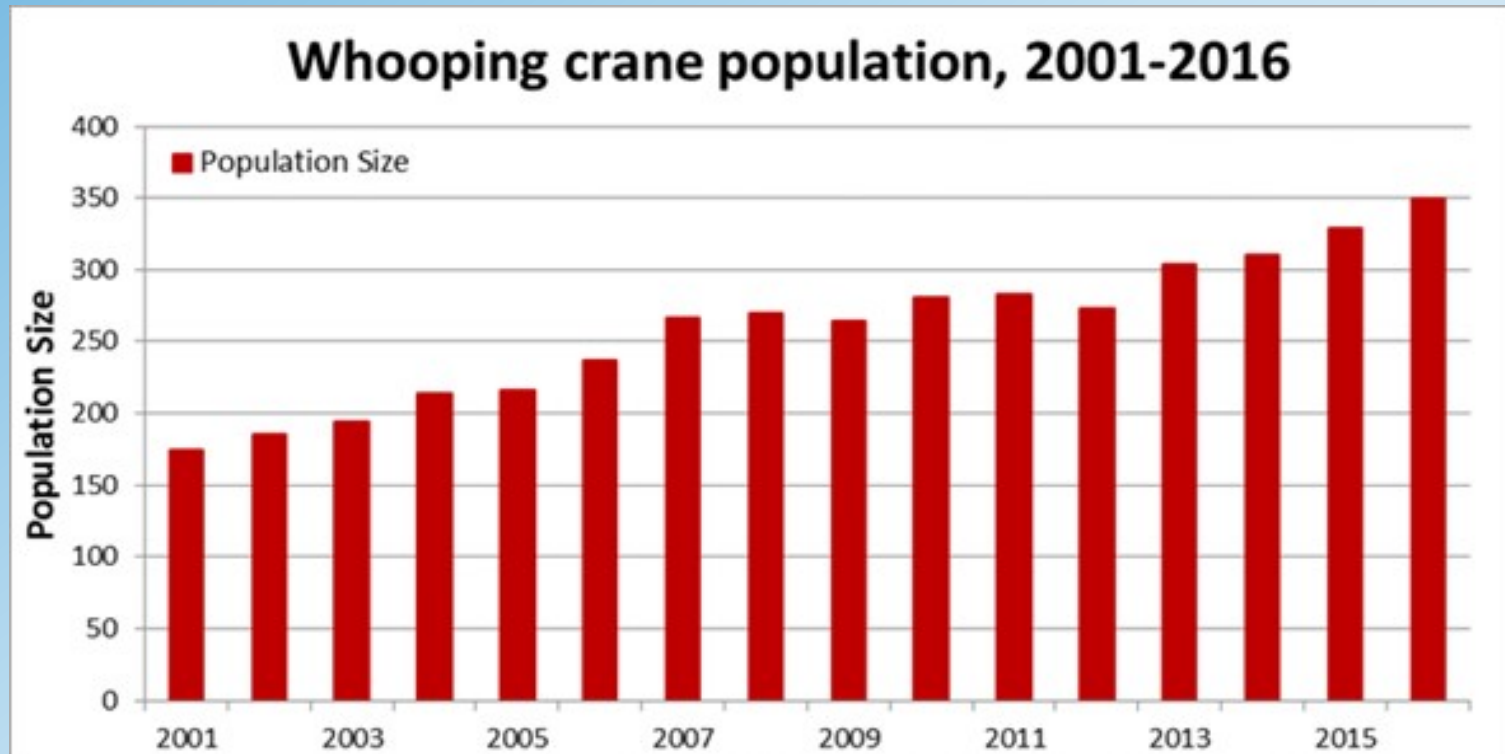
Legend
Better than selected
Worse than selected
Selected



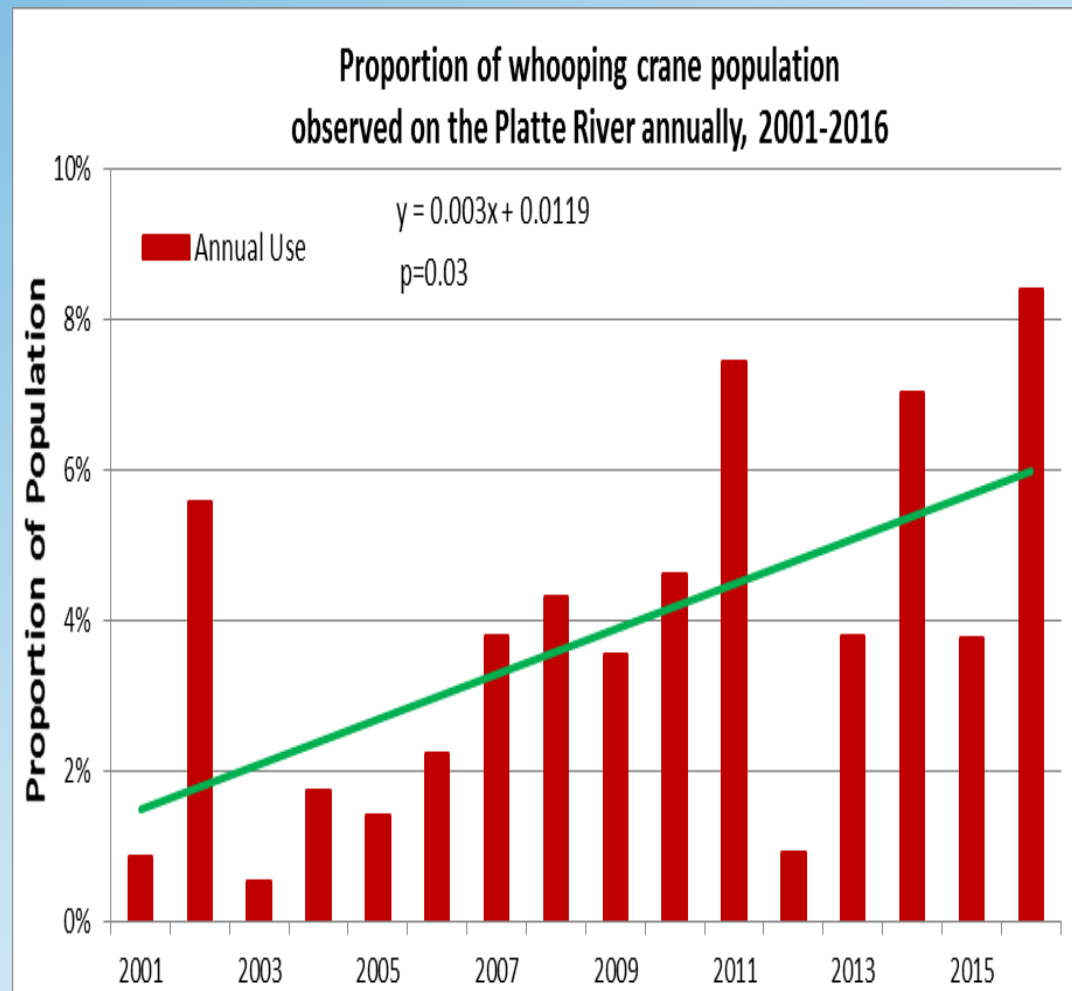
Whooping Crane Population – Migratory Flock



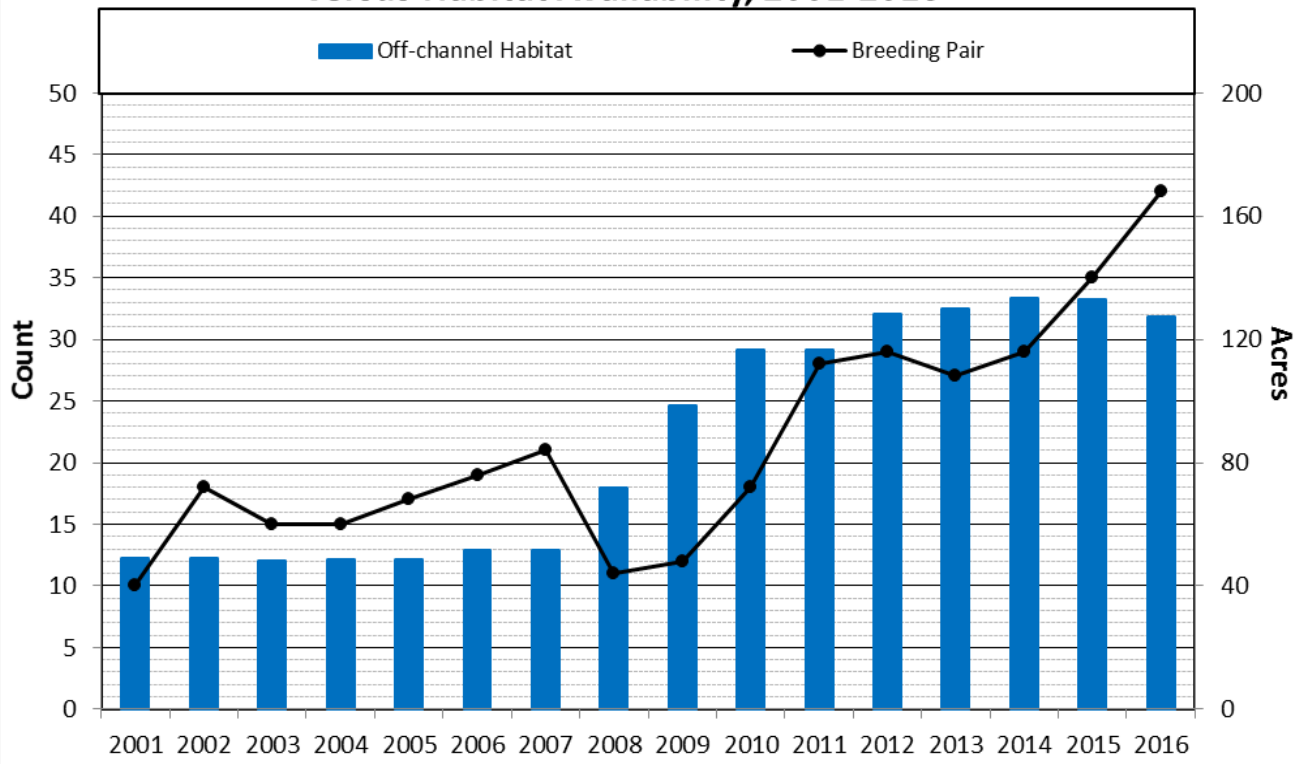
Whooping Crane Population - Migratory Flock

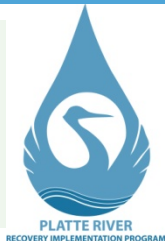


Whooping Crane Use of Platte River



**Piping Plover Breeding Pair Counts
Versus Habitat Availability, 2001-2016**





Water Plan

□ Reducing Deficits to FWS Target Flows by average annual of 130,000 to 150,000 AFY

- 3 Initial Projects – Tamarack I (CO), Pathfinder Modification (WY), Lake McConaughy EA(NE)
- New water conservation/supply projects

Target Flows



Three State's Contributions

- Nebraska – EA storage in Lake McConaughy and 10% of non-irrigation season natural in flow
- Wyoming – Pathfinder Reservoir Modification and a portion of the yield from recovered storage
- Colorado – Tamarack I retiming project
- Total score 80,000 Acre-Feet Annually on average
 - 50,000 to 70,000 AFY to be developed

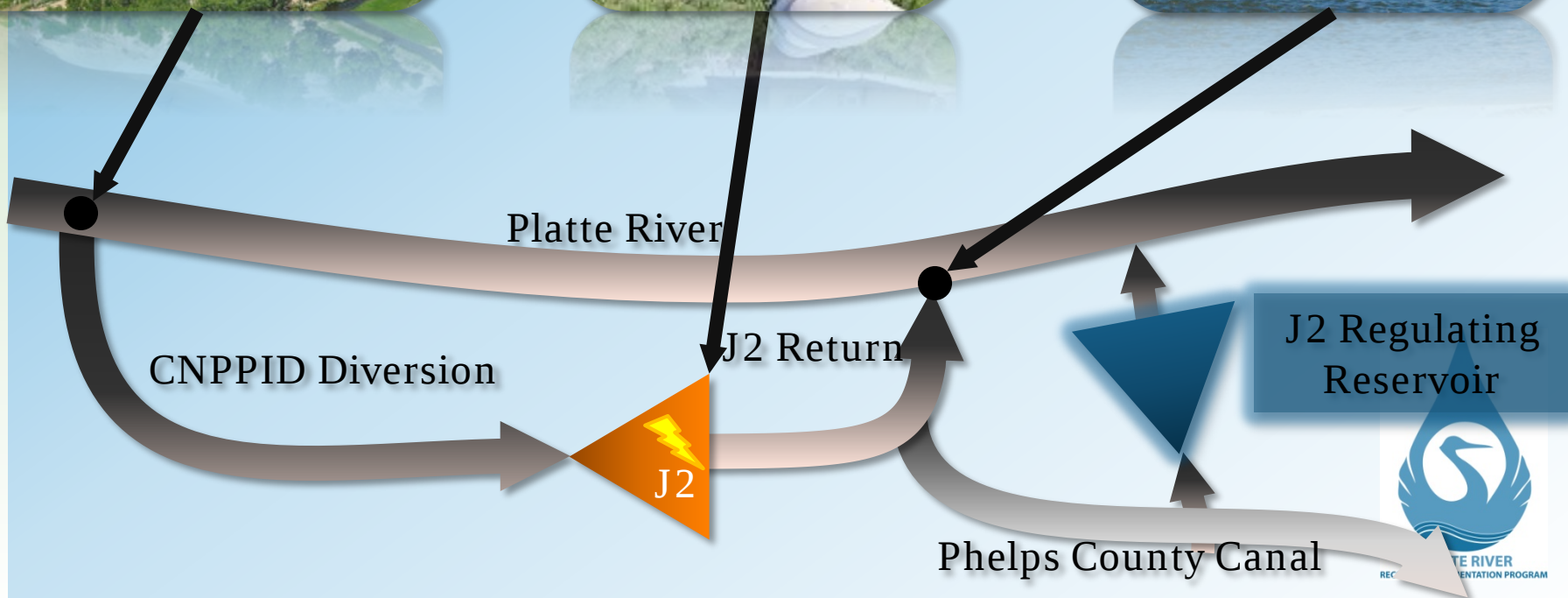


Program Water Acquisition

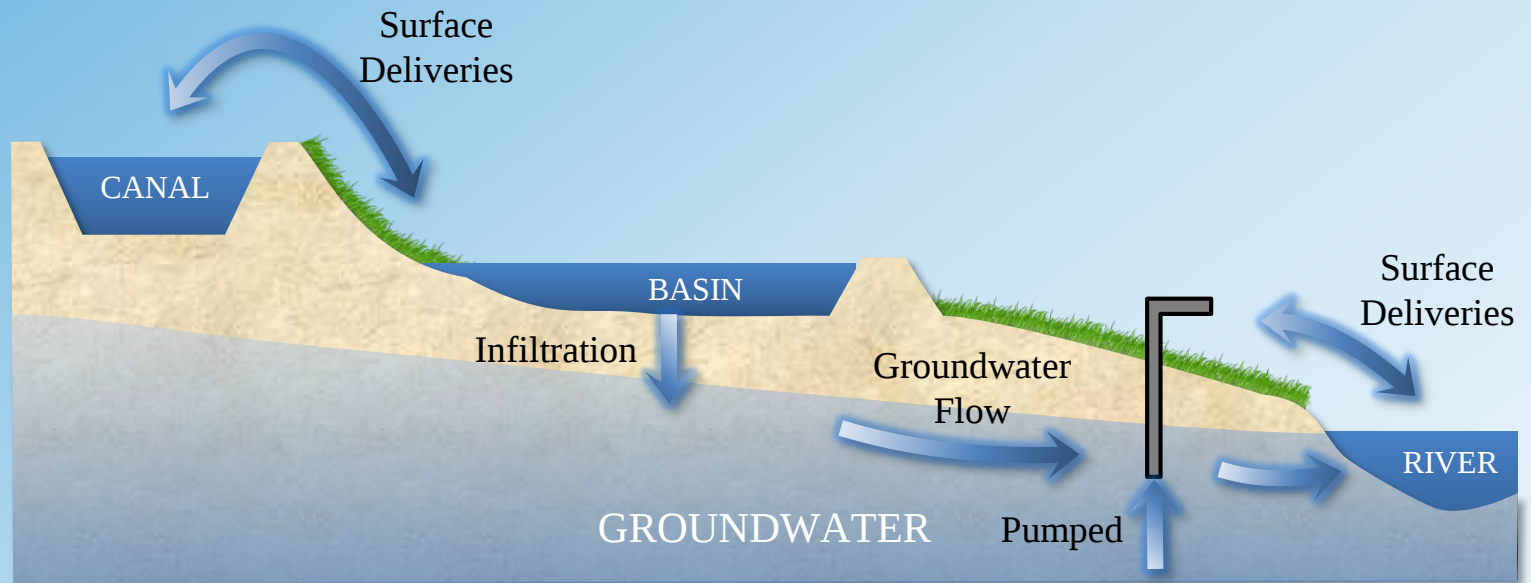
- Potential Sources
 - ▣ Retime excesses
 - ▣ Acquire by lease or purchase
 - ▣ Water Management Incentives
 - Reduce CU and increase return flow
- Water in hand – 10,000 AFY



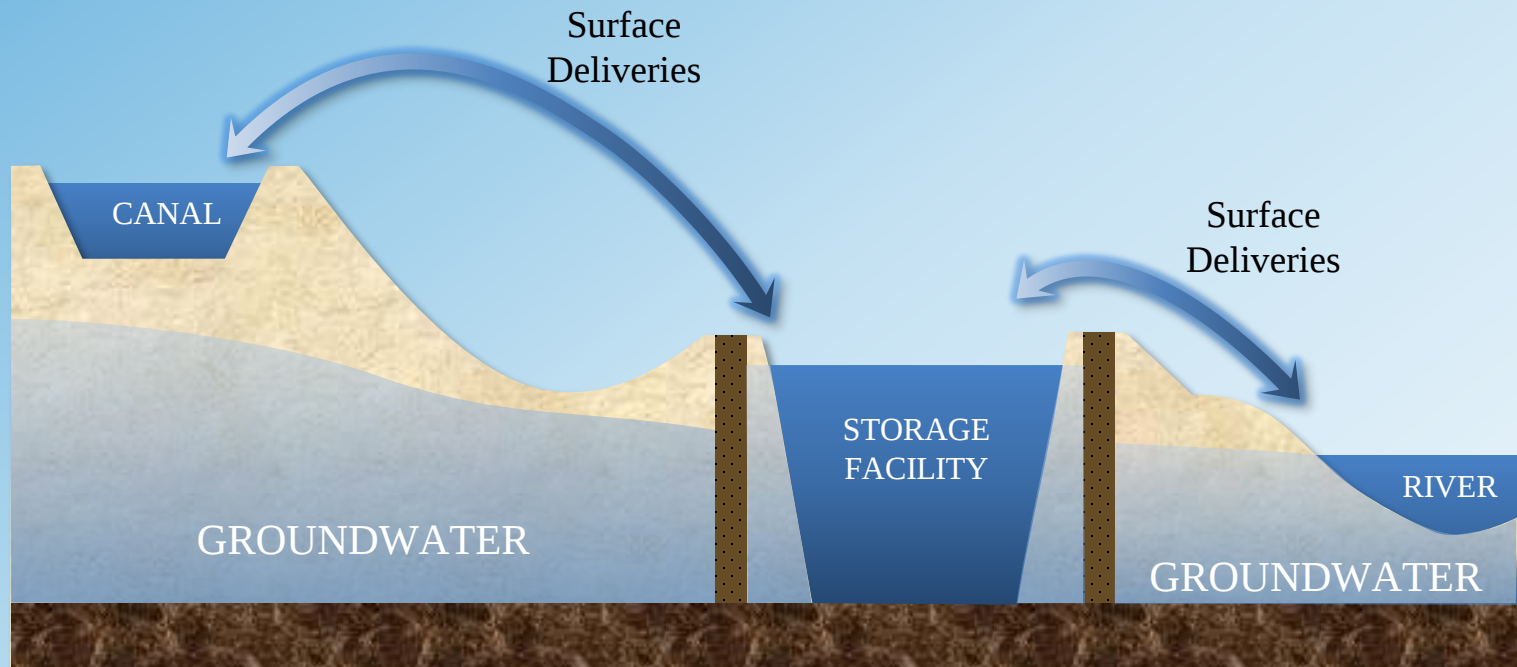
J2 Regulating Reservoir Concept



General Concept Broad Scale Recharge



General Concept Slurry Wall Storage



Water Sources

- Retiming – 25,000 to 30,000 AFY
 - ▣ Broad Scale Recharge
 - ▣ Slurry Wall Pit
- Leases – 10,000 to 12,500 AFY
 - ▣ Pathfinder Municipal (WY)
 - ▣ Central Platte NRD Canal/Ditch Companies
 - ▣ Central Nebraska Public Power and Irrigation District
 - ▣ Nebraska Public Power District
- Acquire and Retire – 2,500 AFY



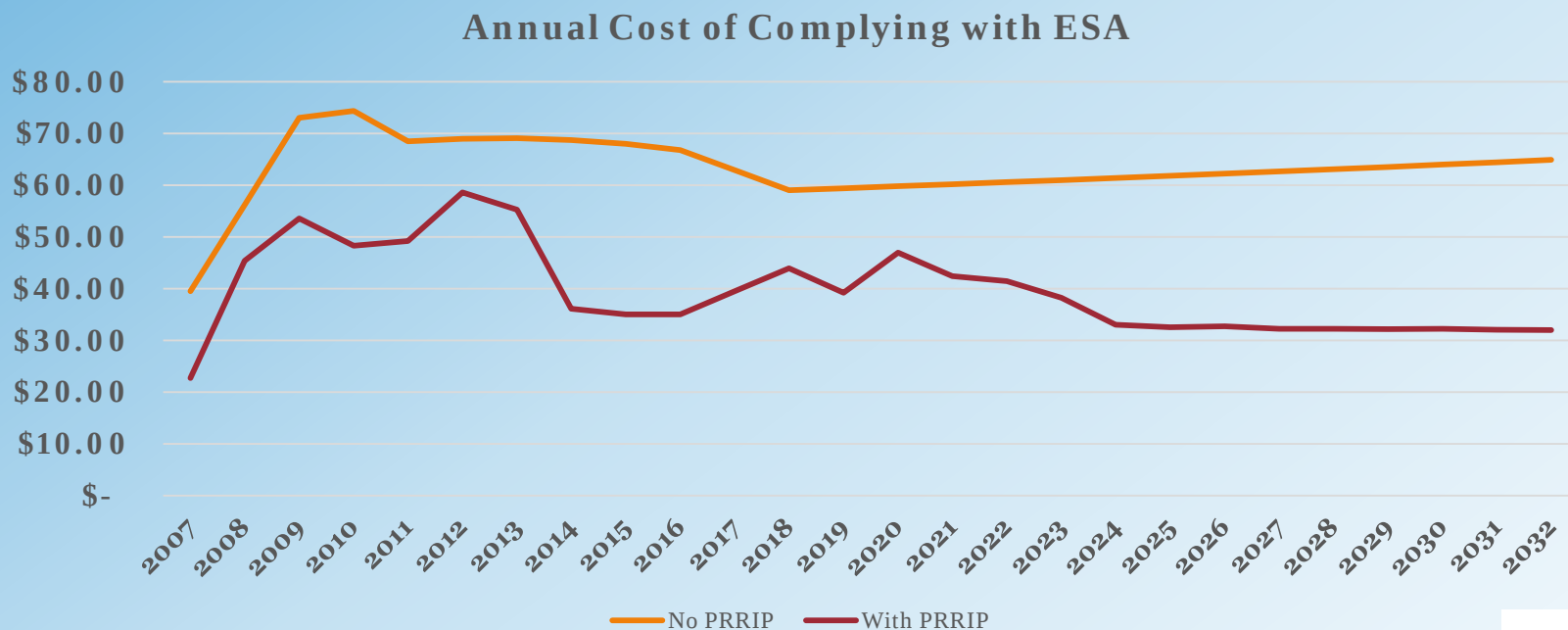
First Increment Extension

- Need to complete Water Plan and continue learning
 - Extension to 2032
 - Additional funds \$106 million
 - Goal adjustments
 - +1,500 habitat acres
 - 120,000 AFY water target
- Update Environmental Documents
- Obtain authorizations



Cost of ESA Compliance

(Millions of Dollars Annually)





www.platteriverprogram.org

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