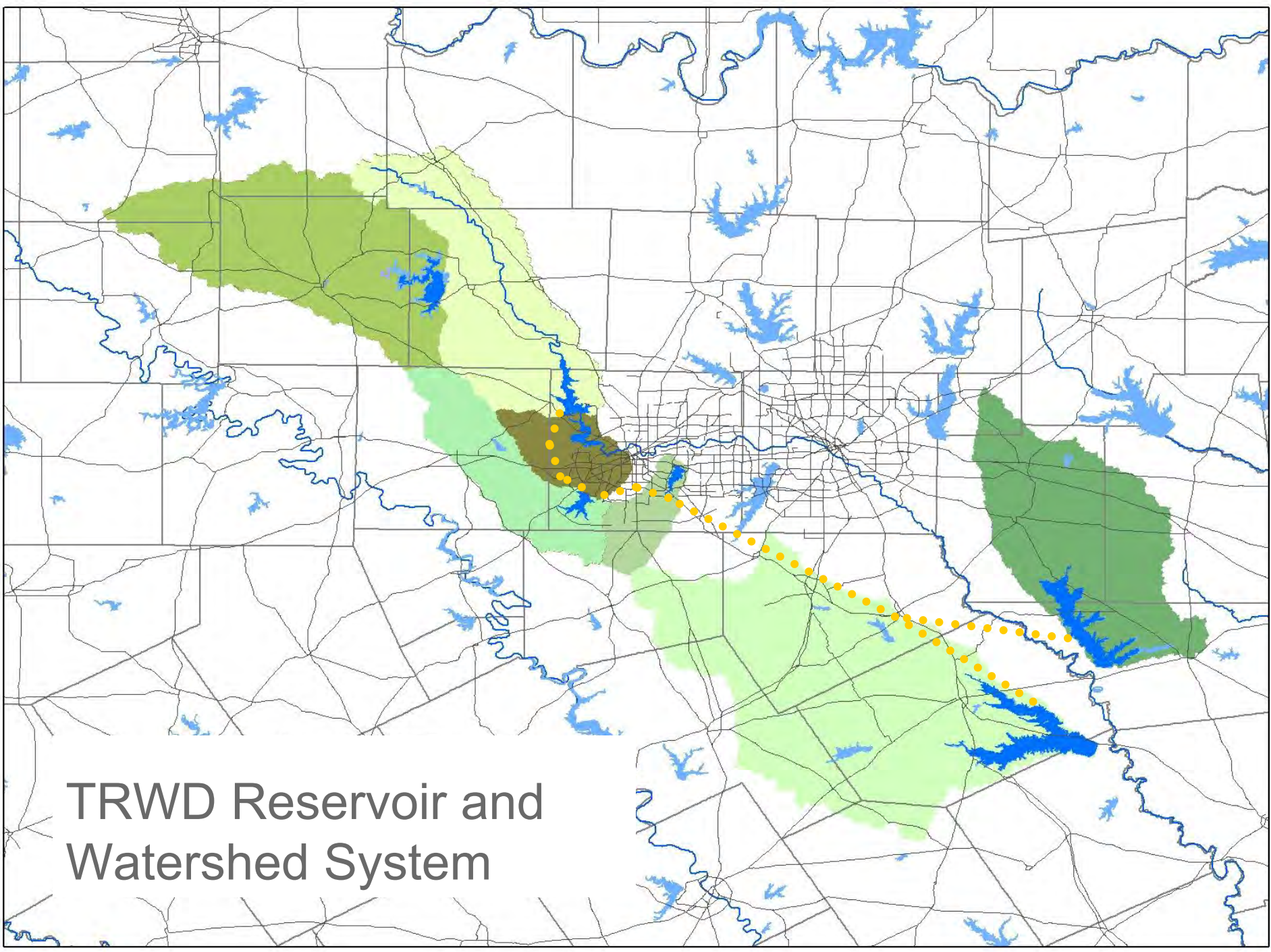


George W. Shannon Wetland at Richland-Chambers





TRWD Reservoir and
Watershed System

1990 Long-Range Plan concluded that the District should pursue the option to divert water from the Trinity into its reservoirs



Richland-Chambers Water Quality Considerations

Nutrients

- Compounds which stimulate and sustain the growth and development of aquatic plants and algae

Chlorophyll-a

- Green pigment found in plants and algae
- Used as an indirect measurement of the amount of photosynthesizing plants (algae and phytoplankton) in a water body

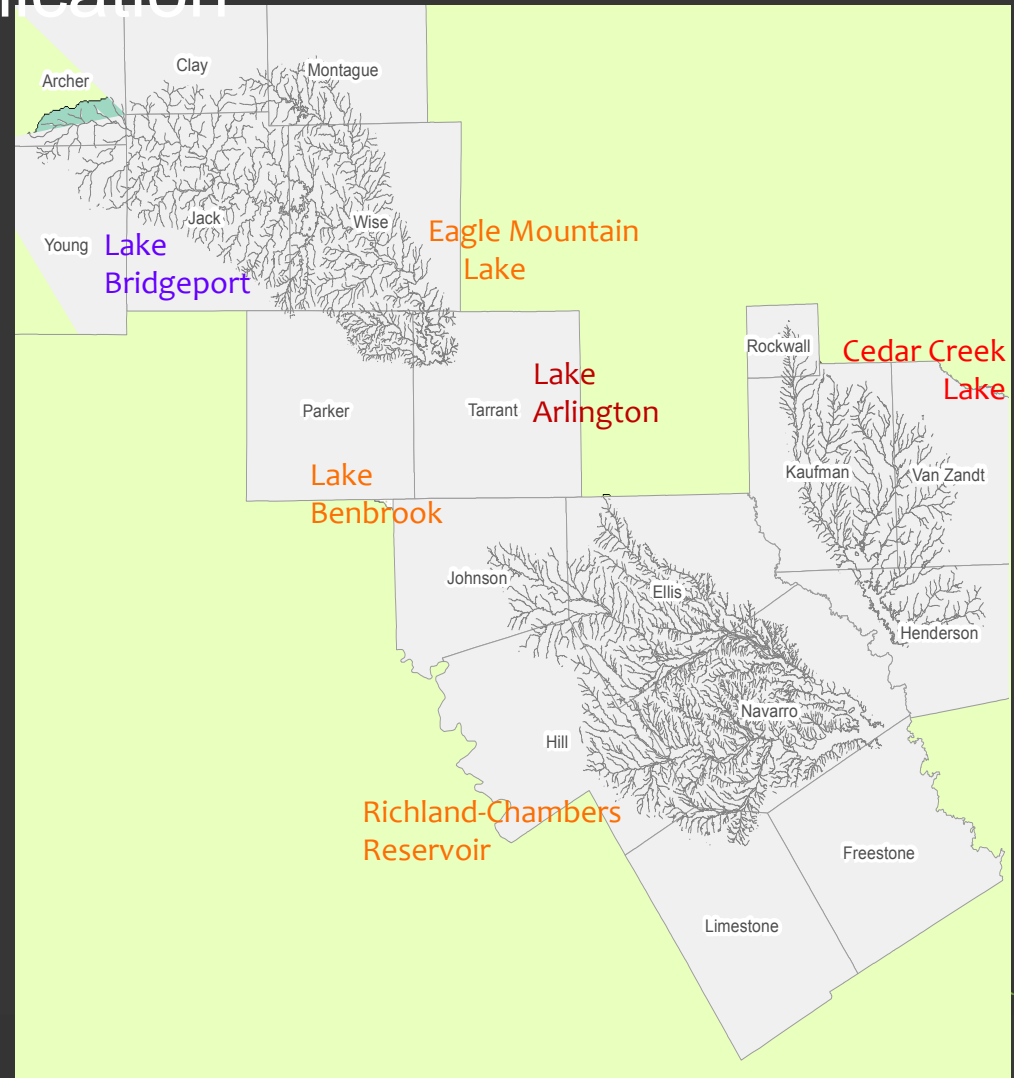


Water Resource Challenges

Water Quality: Eutrophication

20-Year Trend Study Chlorophyll-a

Lake	Media n (u/gL)	 Trend (%APR)
Arlington	27.5	6.23
Cedar Crk	20.0	3.60
Eagle Mtn	18.8	2.84
Richland	11.4	2.70
Benbrook	16.7	2.48
Bridgeport	3.5	1.79



3 Types of Reuse Considered by TRWD

Wetlands

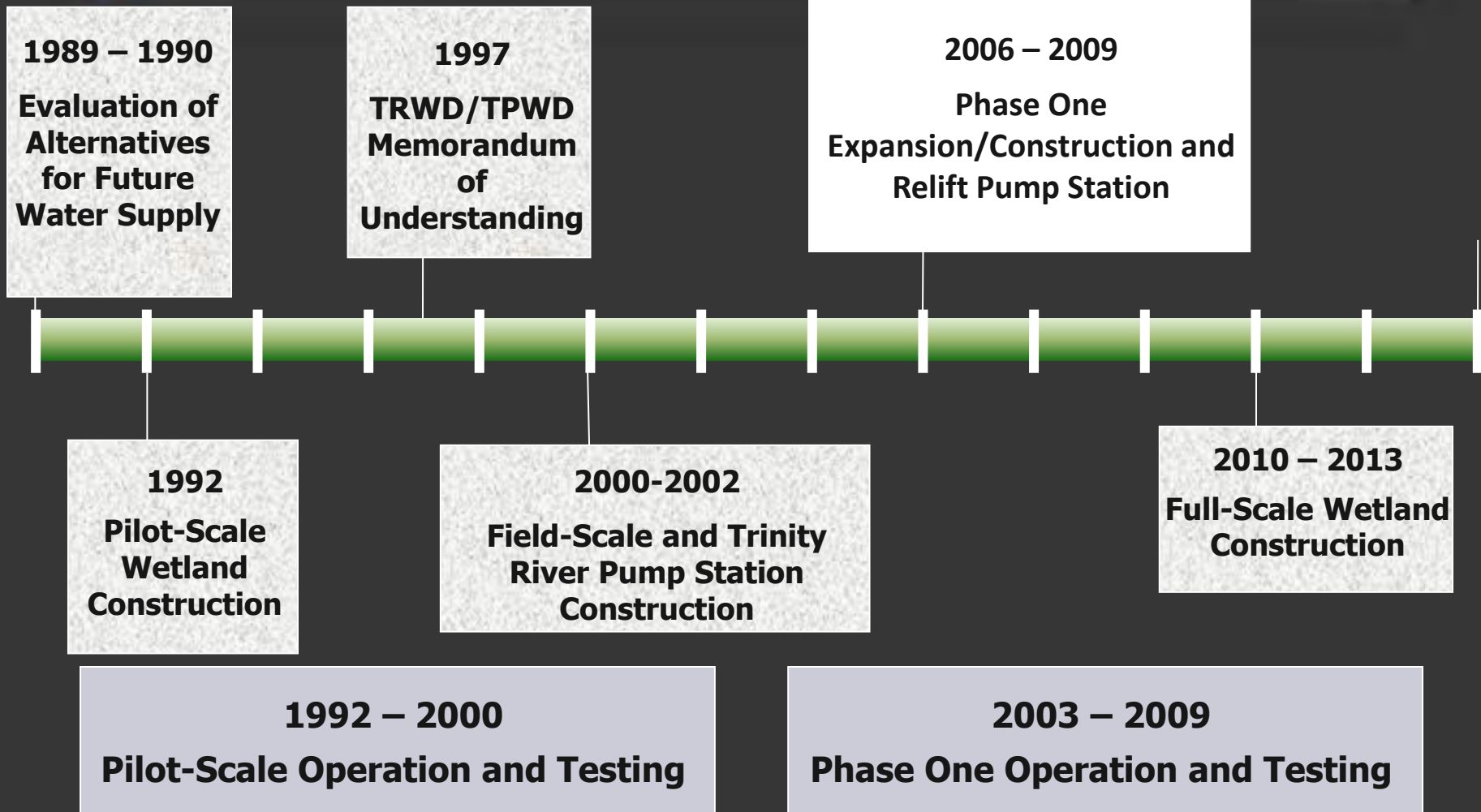


Aquaculture



Chemical Treatment

Project Timeline



TRWD Pilot-Scale Wetland Project



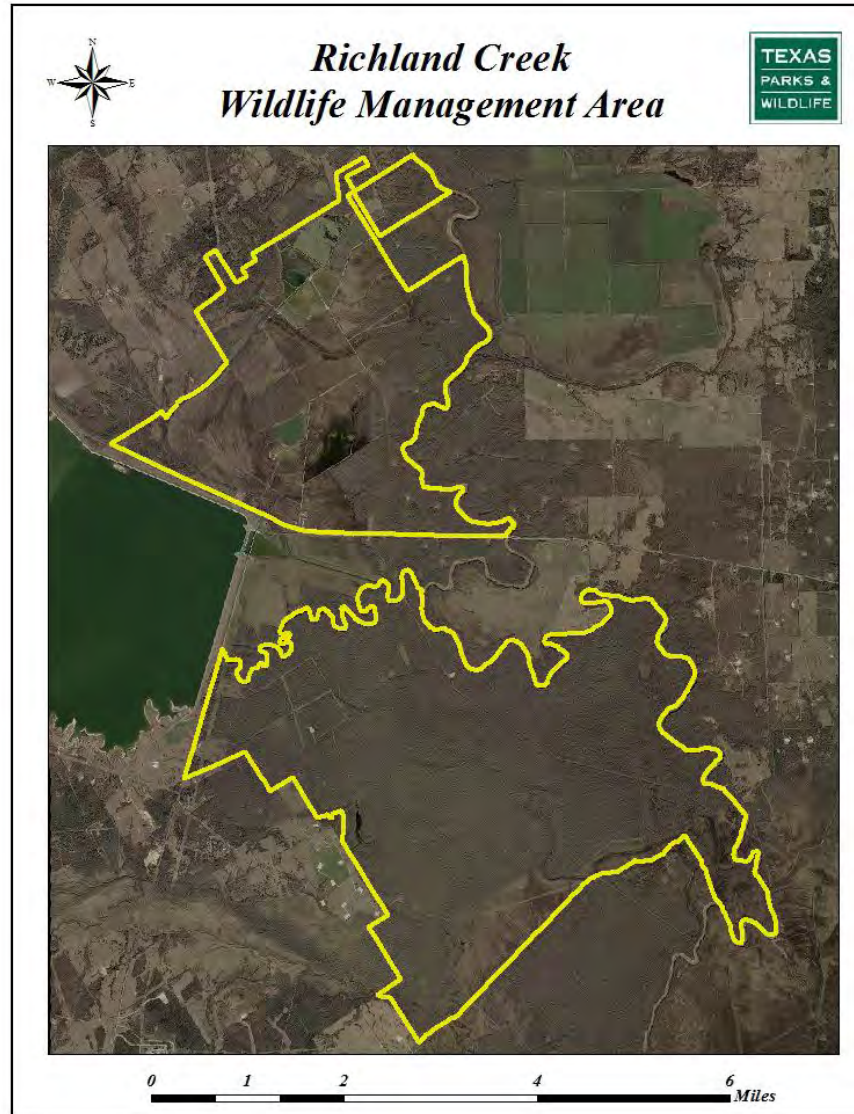
TRWD Pilot-Scale Wetland Project (1992 – 2000)

Site selection
Flooding effects
Bioaccumulation
Long-term viability
Water management
Planting requirements

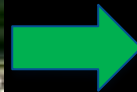
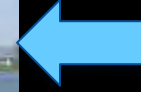
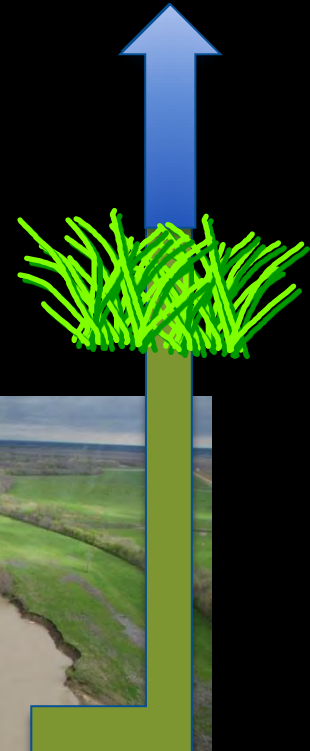


RC Reservoir Construction Mitigation

TPWD RCWMA
North Unit: 5,000 acres
South Unit: 8,000 acres



Constructed Wetlands for Water Reuse

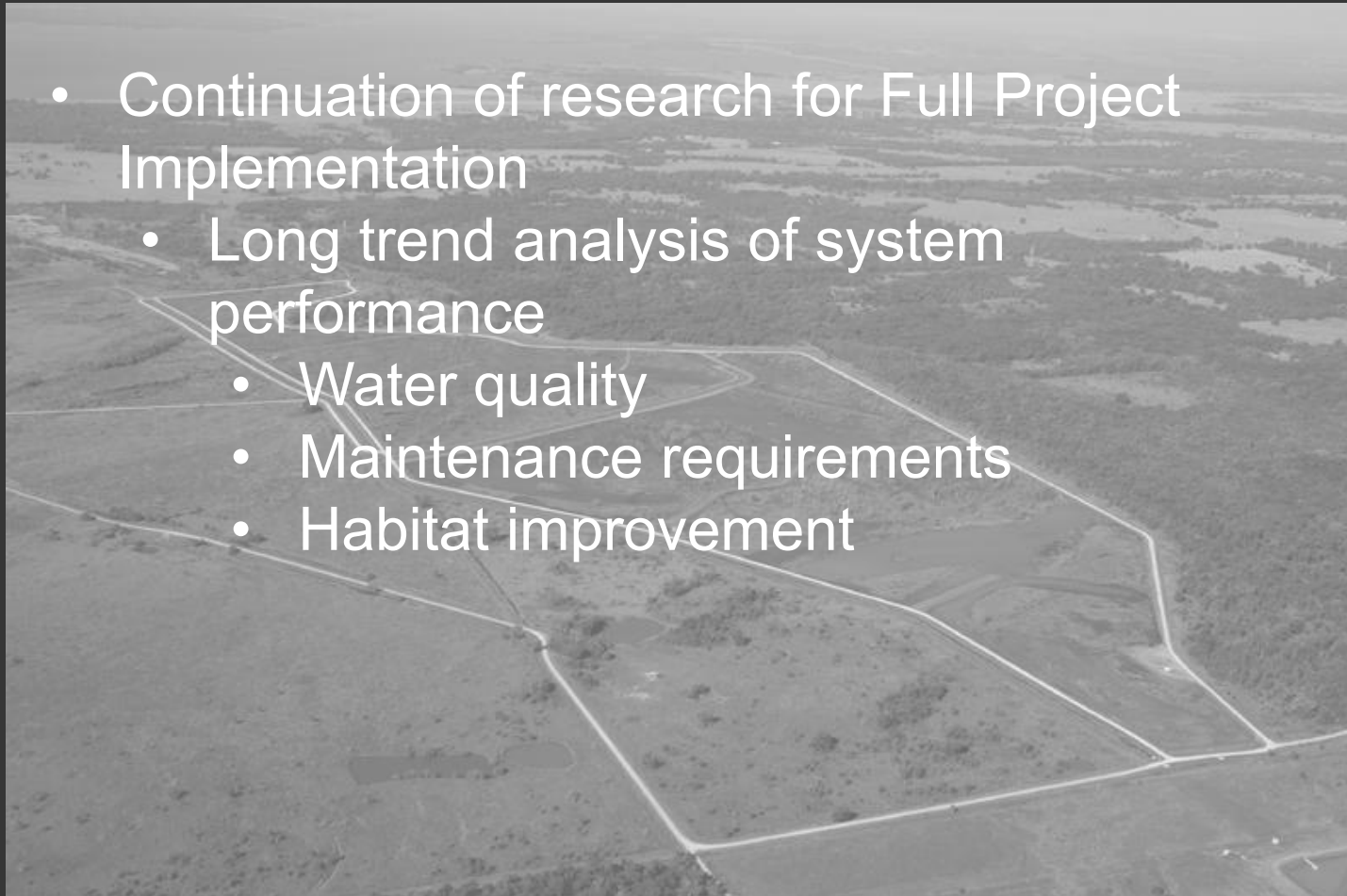




George W. Shannon Wetland Project Richland-Chambers

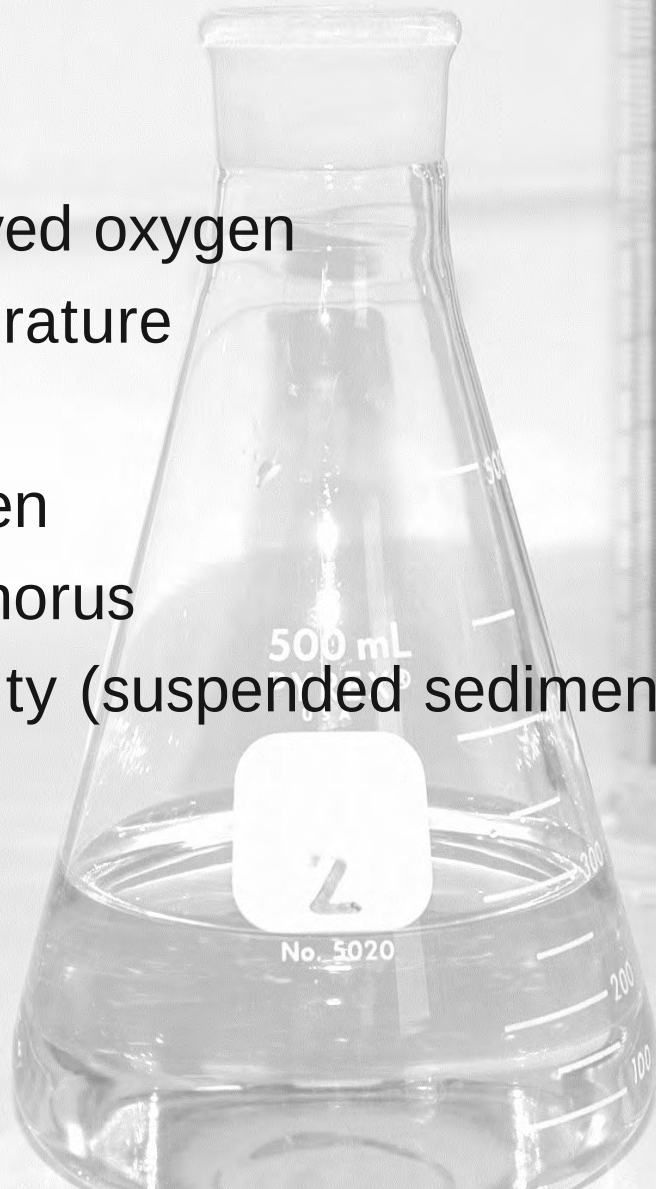
TRWD Field-Scale Wetland Project (2003 – 2009)

- Continuation of research for Full Project Implementation
 - Long trend analysis of system performance
 - Water quality
 - Maintenance requirements
 - Habitat improvement



Water Quality Parameters

- pH
- Dissolved oxygen
- Temperature
- Flow
- Nitrogen
- Phosphorus
- Turbidity (suspended sediment)



TRWD Field Scale Wetlands Vegetation Monitoring Sites

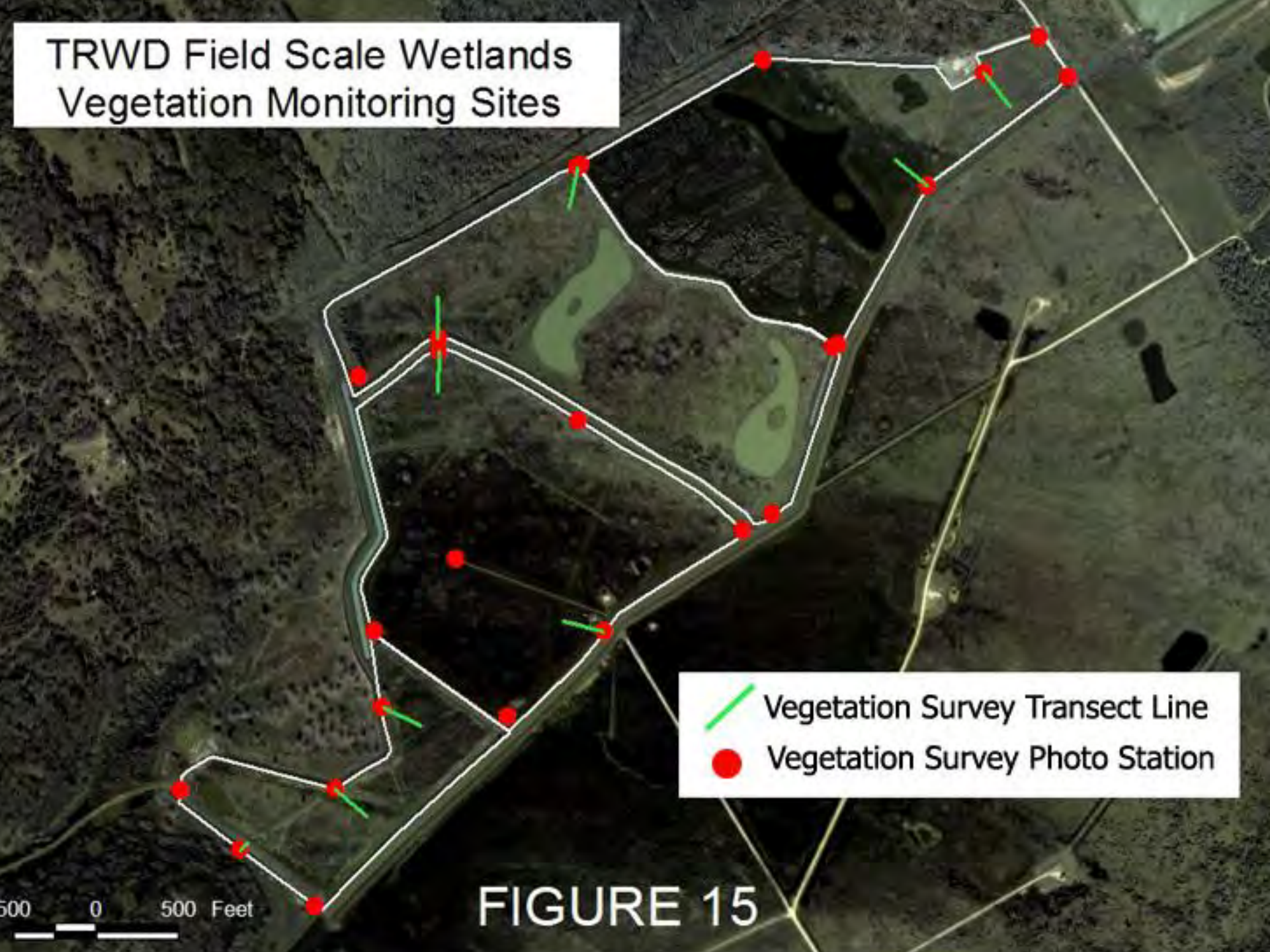


FIGURE 15



08/30/2011 11:23

Site Layout Plan

River Pump Station

PROPOSED 42-INCH DIAMETER
PIPELINE (TO PARALLEL EXISTING
42-INCH DIAMETER PIPELINE)

FIELD SCALE WETLAND
(CELLS 1 THROUGH 4)
FUTURE SED BASIN 4 AND 5
TO BE CONSTRUCTED WITHIN
EXISTING CELL 1

PHASE I EXPANSION
(CELLS 5 AND 6)

SB 1

SB 2

SED BASIN
3

CELL 20

CELL 18

CELL 17

CELL 16

CELL 21

CELL 19

CELL 11

CELL 8

CELL 7

CELL 10

CELL 9

CELL 12

CELL 13

CELL 15

CELL 14

Re-Lift
Station

Trinity River

Richland Chambers Wetland Expansion



July 5, 2011

Job 2033

www.topflightphoto.com

Richland Chambers Wetland Expansion



October 7, 2013

Job 2033

www.topfl...

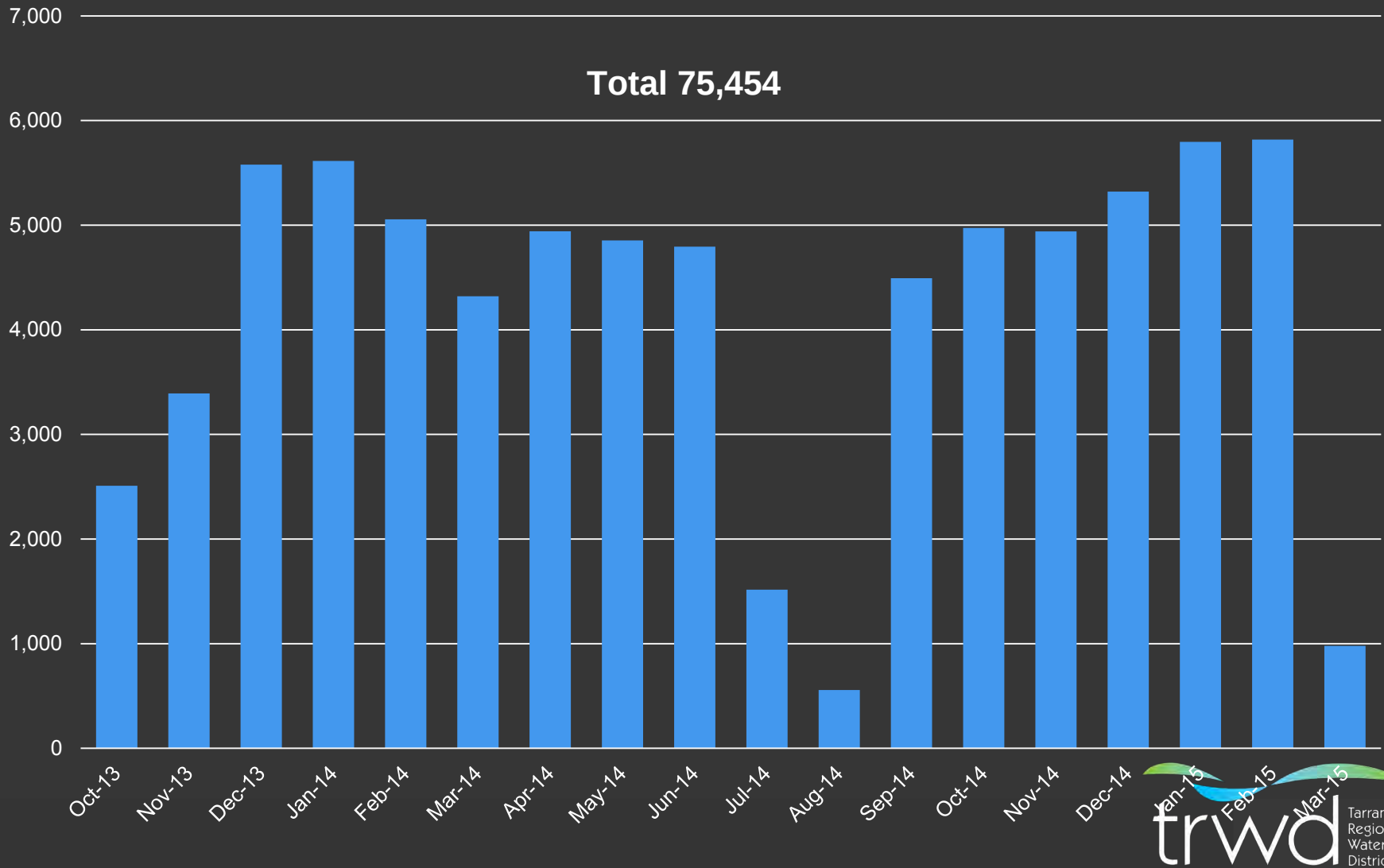


Wetland Treatment Performance Full Scale Operation

Full Scale Operation Oct 2013 – March 2015 (n=45)

	Average Concentration In (mg L ⁻¹)			Average Concentration Out (mg L ⁻¹)			Percent Concentration Reduction		
Location	TSS	TN	TP	TSS	TN	TP	TSS	TN	TP
Sed Basins	139.10	8.53	1.03	35.27	8.03	0.94	75%	6%	8%
Wetlands	35.27	8.03	0.94	15.30	2.27	0.44	57%	72%	53%
Overall System	139.10	8.53	1.03	15.30	2.27	0.44	89%	73%	57%

Monthly Wetland Diversions to Richland Chambers Reservoir



Questions

A photograph of a sunset or sunrise scene. The sky is filled with soft, orange and yellow light, with some clouds visible. In the foreground, there are several bare, silhouetted trees with intricate branch structures. Below the trees, a body of water reflects the light from the sky, creating a shimmering effect. The overall mood is calm and contemplative.

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