George W. Shannon Wetlands at Richland-Chambers

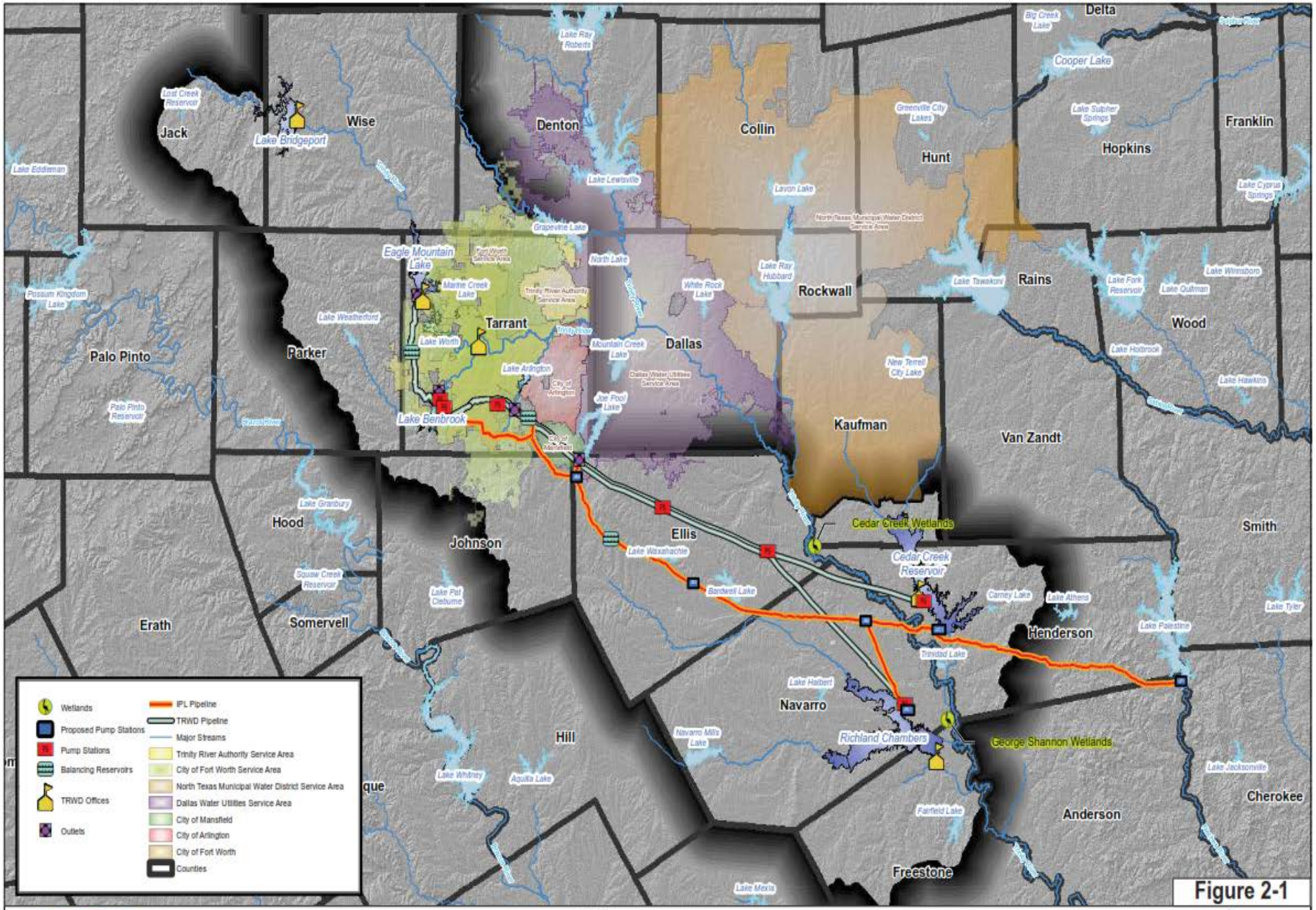


Figure 2-1

trwd

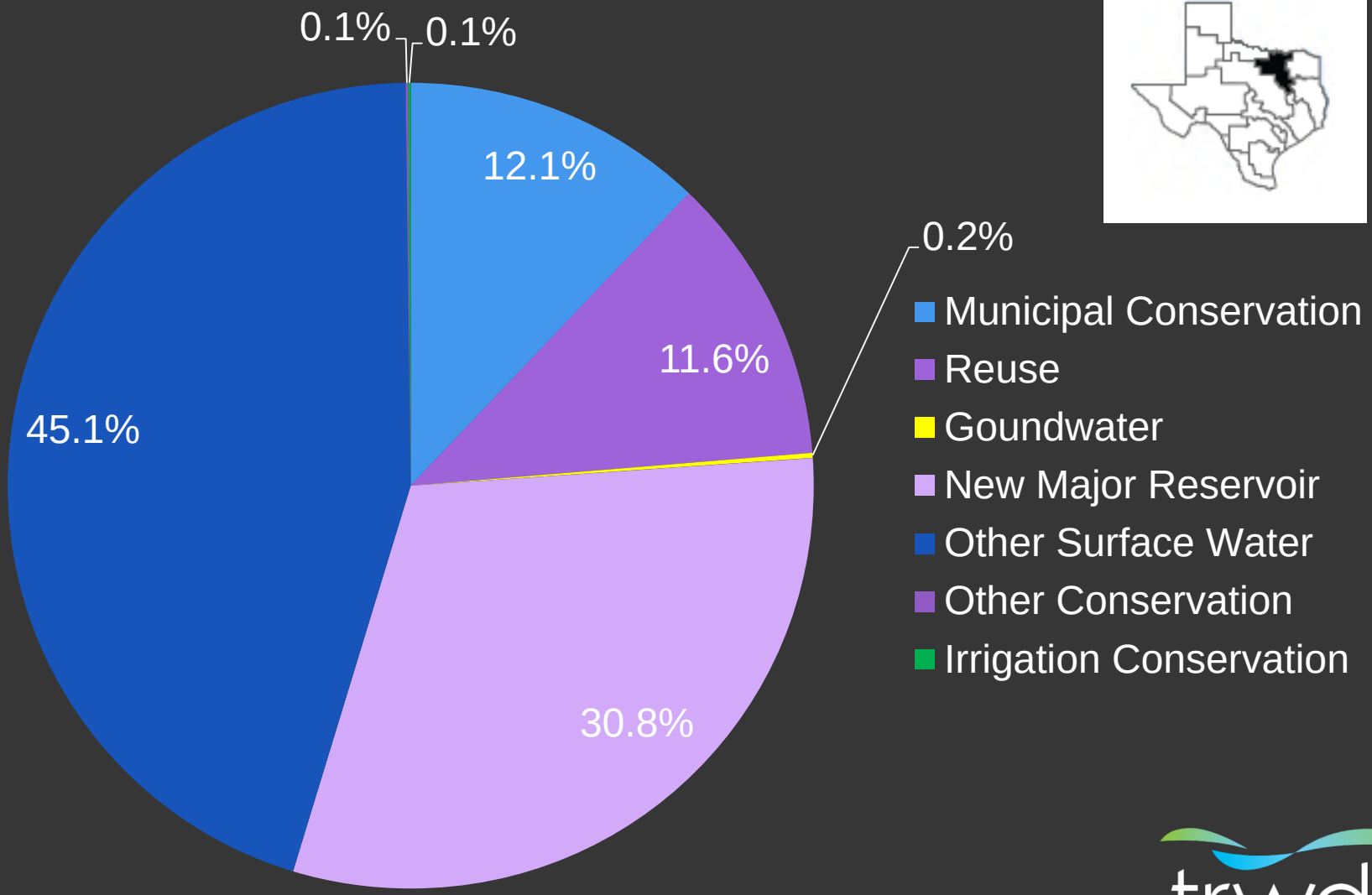
Tarrant Regional Water District
WATER SUPPLY SYSTEM

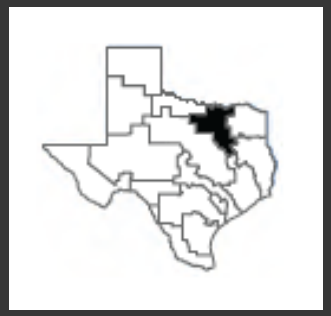
Disclaimer:
This data is an approximation based upon the best information available at the time of printing. Information contained on this map is intended for general planning level use only and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and only represents approximate relative locations. The Tarrant Regional Water District is not liable for misuse of this information or derivative products resulting from this map.

0 5 10 20 Miles

N W E S

Region C: 2060 Long-Range Water Management Strategies





trwd Tarrant Regional Water District

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

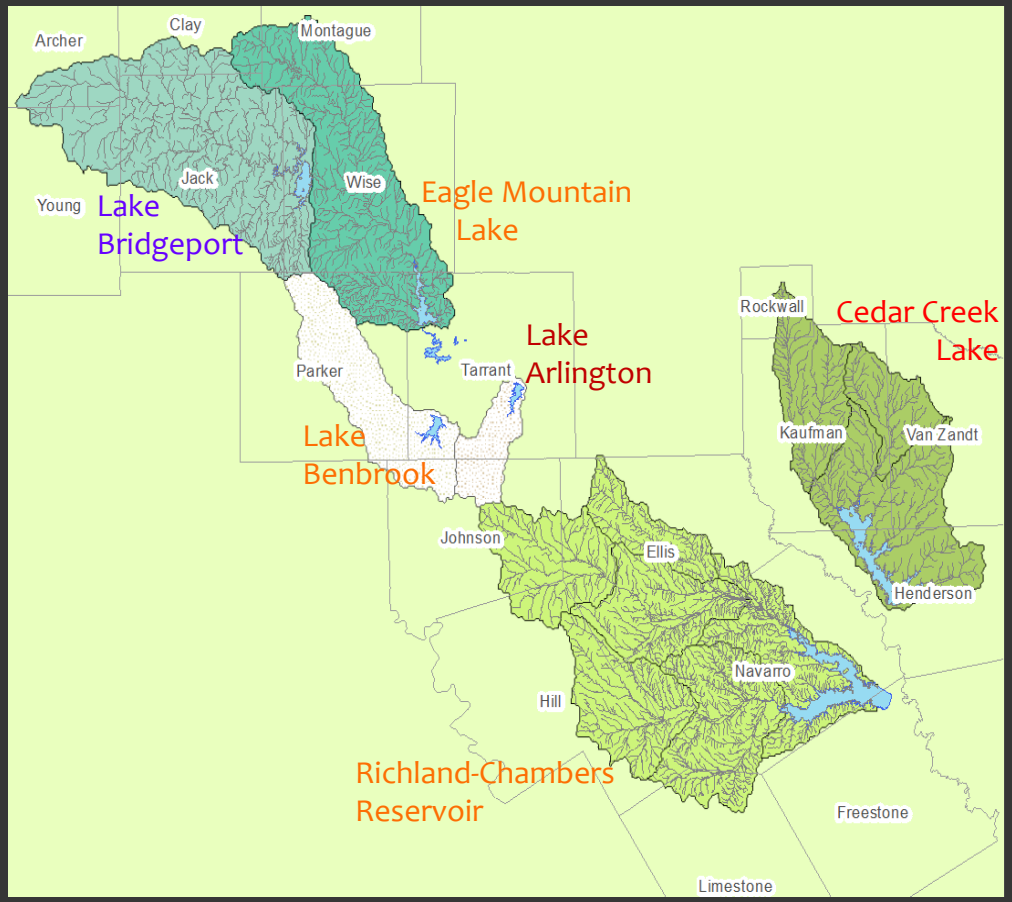
Water Resource Challenges

Water Quality: Eutrophication

20-Year Trend Study

Chlorophyll-*a*

Lake	Median (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



trwd Tarrant Regional Water District

3 Types of Reuse Considered by TRWD

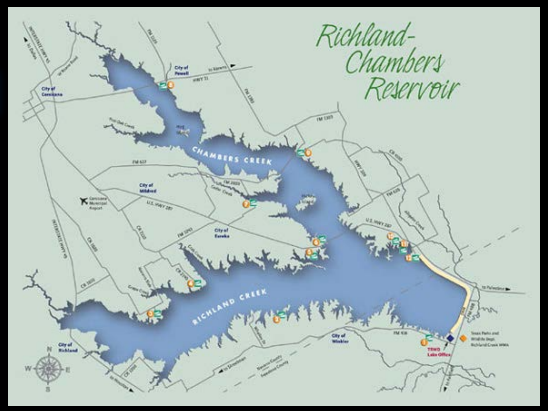
Wetlands

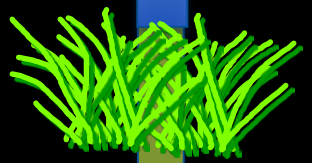
Chemical Treatment

Aquaculture

trwd Tarrant Regional Water District

Constructed Wetlands for Water Reuse





TRWD WETLANDS

Project Timeline

1989 – 1990
Evaluation of Alternatives for Future Water Supply

1997
TRWD / TPWD Memorandum of Understanding

2006 – 2009
Phase One Expansion/Construction and Relift Pump Station

1992
Pilot-Scale Wetland Construction

2000-2002
Field-Scale and Trinity River Pump Station Construction

2010 – 2013
Full-Scale Wetland Construction

1992 – 2000
Pilot-Scale Operation and Testing

2003 – 2009
Phase One Operation and Testing

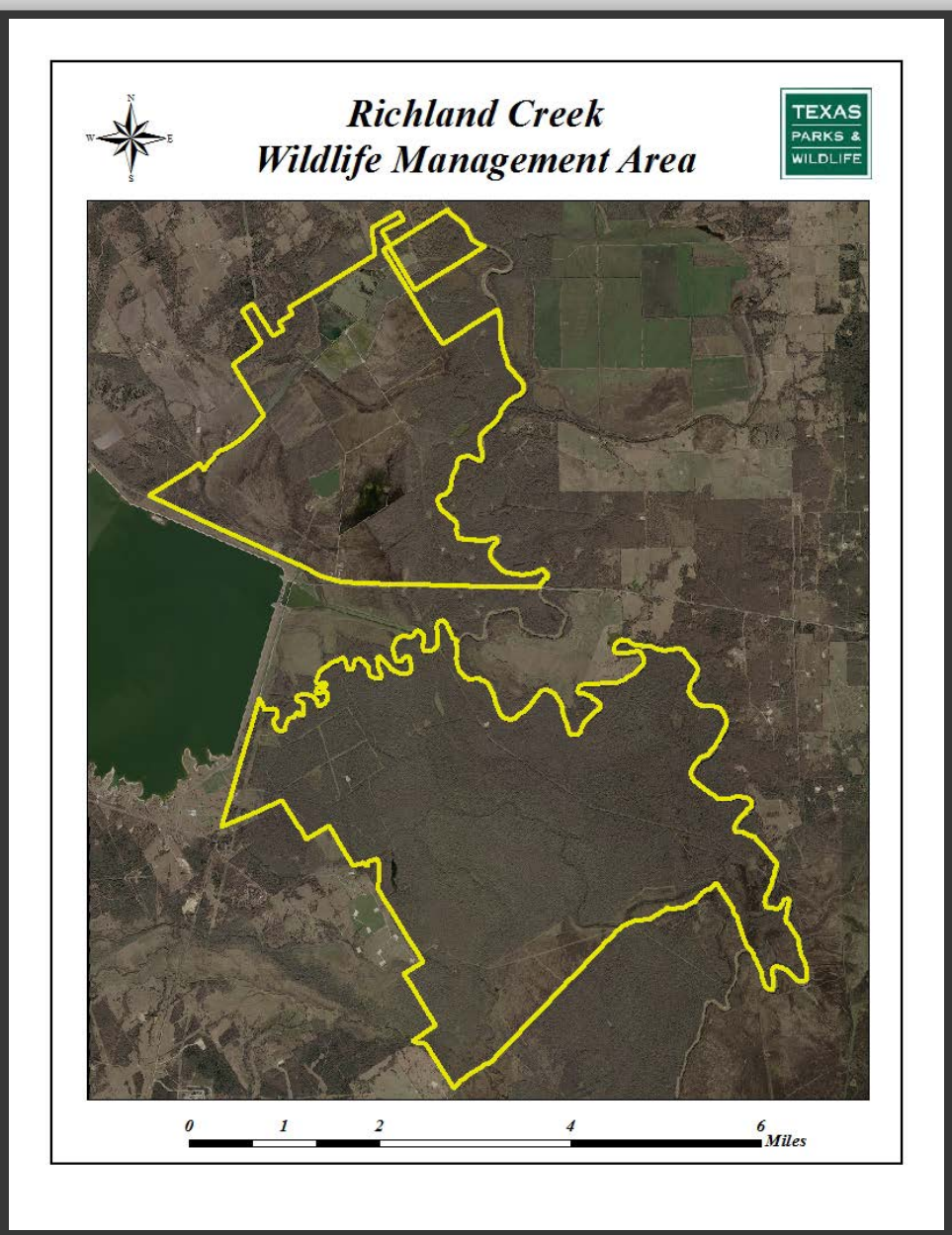
trwd Tarrant Regional Water District

TRWD Pilot-Scale Wetland Project

trwd Tarrant Regional Water District

RC Reservoir Construction Mitigation

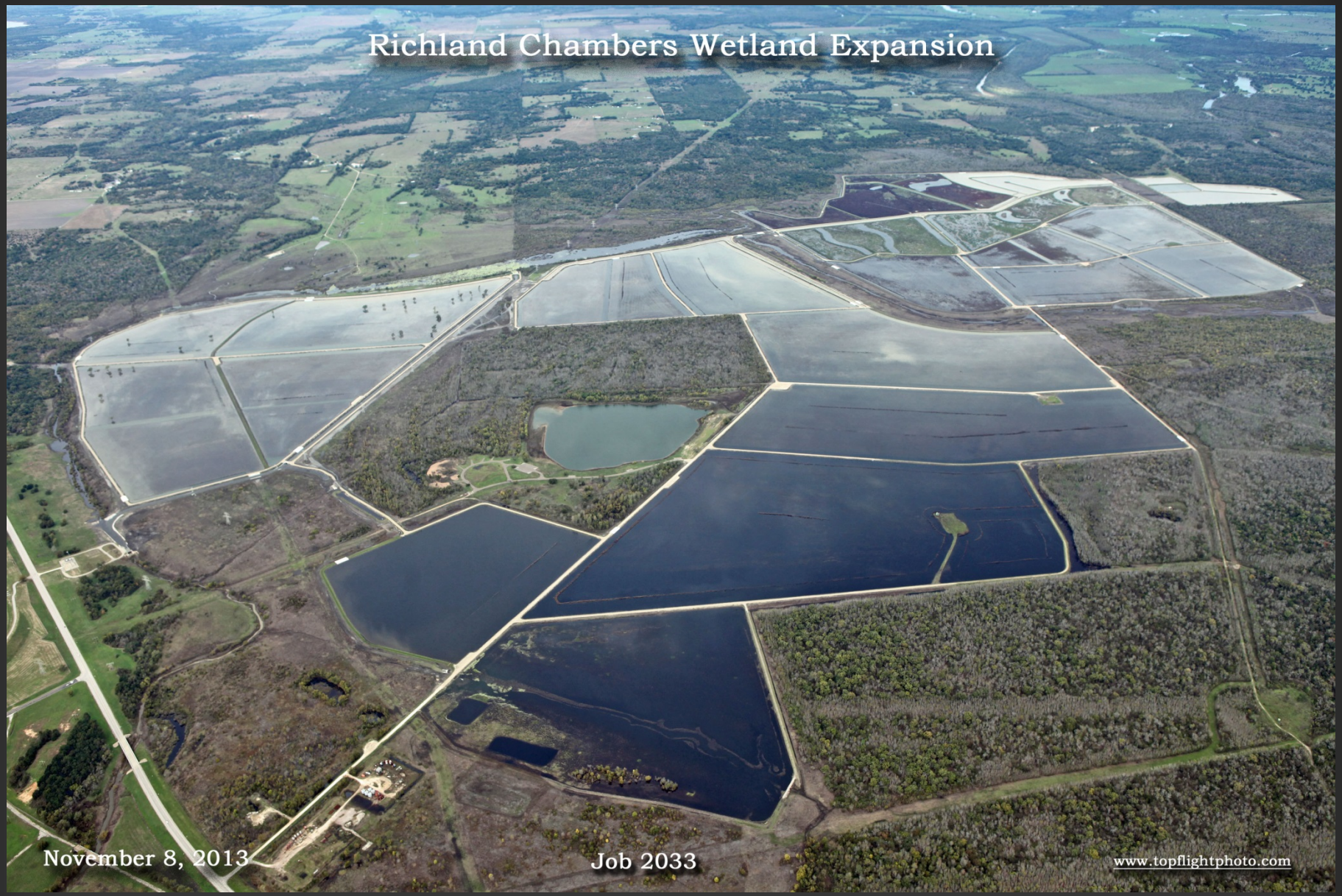
TPWD RCWMA
North Unit: 5,000 acres
South Unit: 8,000 acres



trwd Tarrant Regional Water District

Field Scale Construction 2000-2003

trwd Tarrant Regional Water District



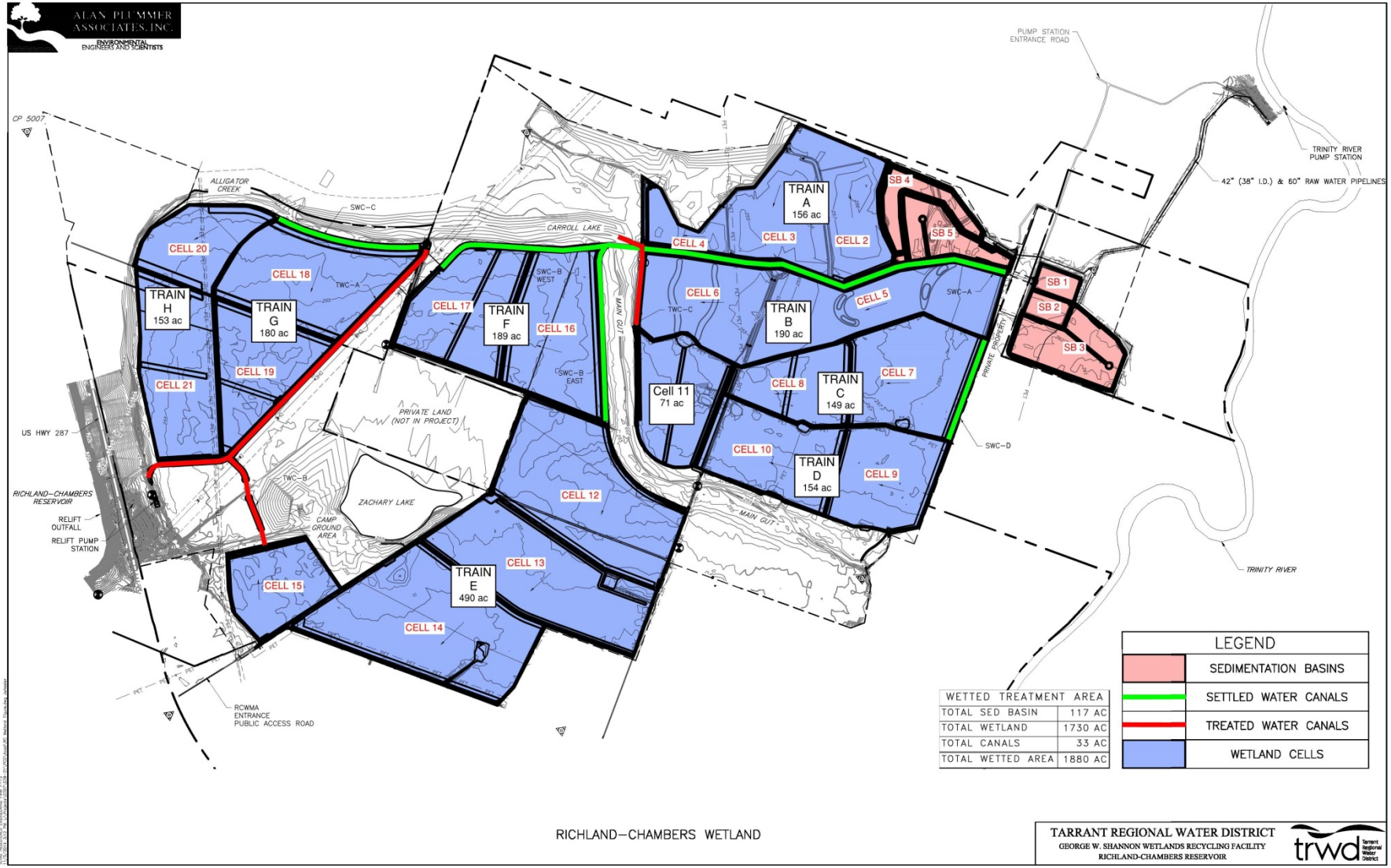
Full Scale Wetland Operation October 2013

trwd Tarrant Regional Water District

Constructed Wetlands

- 5 major components:
  - River Pump Station
  - Sedimentation Basins
  - Conveyance Canals
  - Wetland Cells
  - Relift Pump Station

trwd Tarrant Regional Water District



WETLAND LAYOUT

trwd Tarrant Regional Water District

SED. BASINS 1 - 5

trwd Tarrant Regional Water District

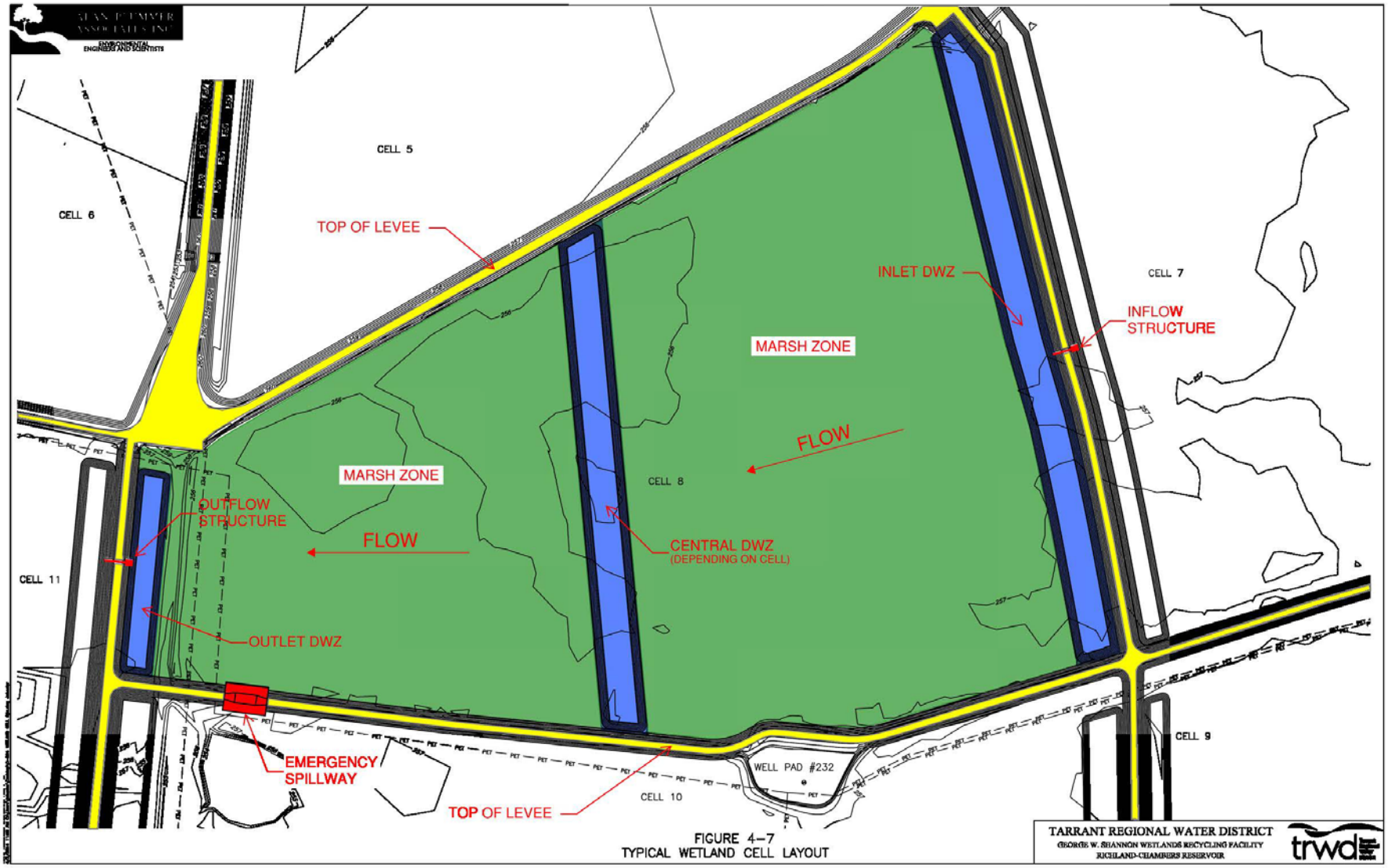


FIGURE 4–7
TYPICAL WETLAND CELL LAYOUT

TYPICAL WETLAND CELL

trwd Tarrant Regional Water District

WETLAND SYSTEM STRUCTURES

SB3, 4, & 5 INFLOW STRUCTURE

COLLECTION POOL OUTFLOW STRUCTURE

trwd Tarrant Regional Water District

WETLAND SYSTEM STRUCTURES

TYP. PH II INTERMEDIATE STRUCTURE

TYP. FIELD SCALE OUTFLOW STRUCTURE

trwd Tarrant Regional Water District

- Wetland Plants Play a Key Role in Wetland Treatment Performance by:
  - Shading the water column
  - Providing media for microbial growth
  - Aiding in cycling organic carbon and nutrients
- Wetland Plant Types
  - Emergent vegetation
  - Submerged Aquatic Vegetation (SAV)
- A diverse mixture of emergent and submerged aquatic species is desirable to provide robust water quality improvement.

trwd Tarrant Regional Water District

EMERGENT VEGETATION

FIELD-SCALE AND PHASE I

trwd Tarrant Regional Water District

SUBMERGED AQUATIC VEGETATION

trwd Tarrant Regional Water District

Wet Cell 14 Summer 2014

Wetland Monitoring

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

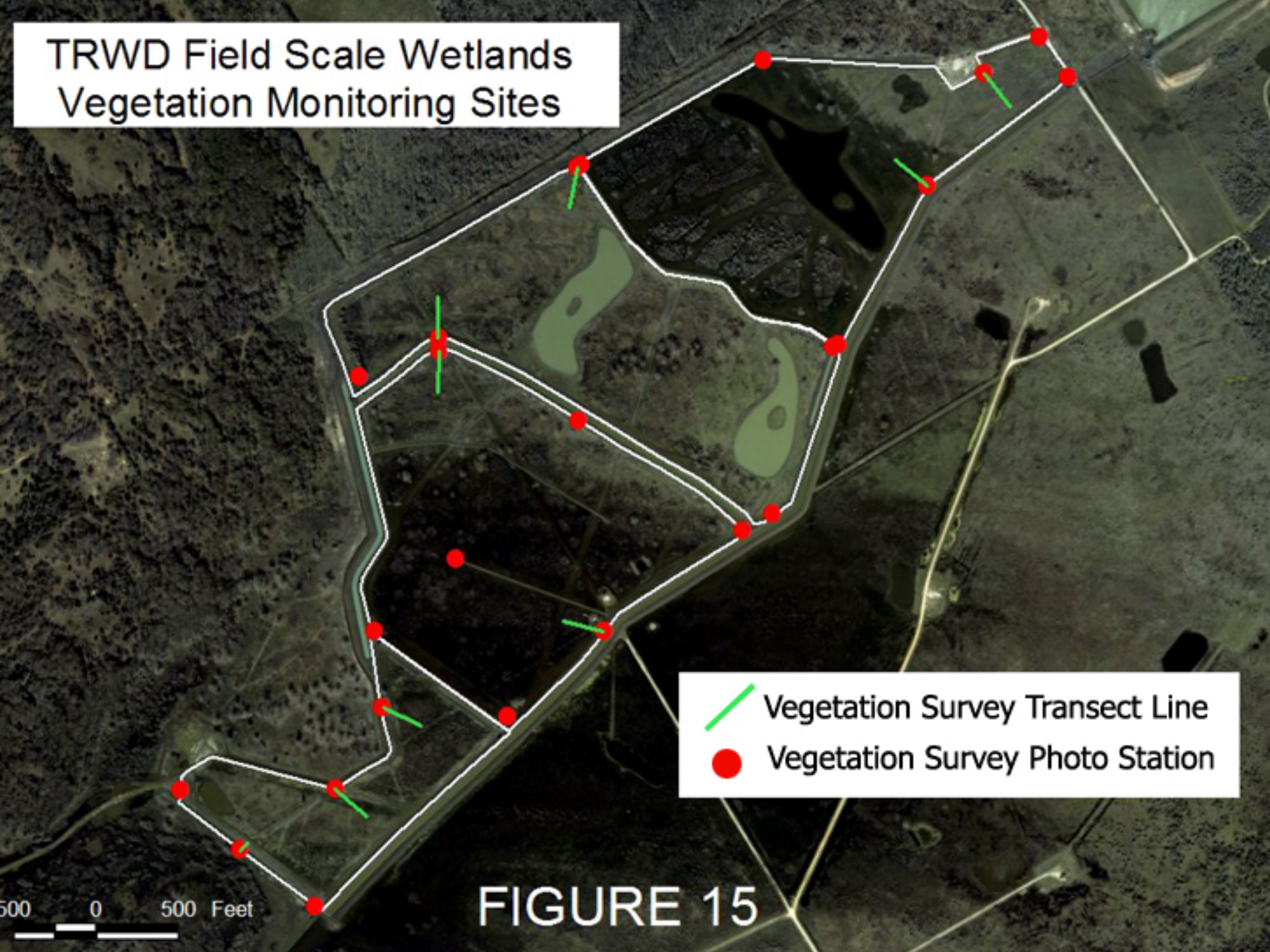
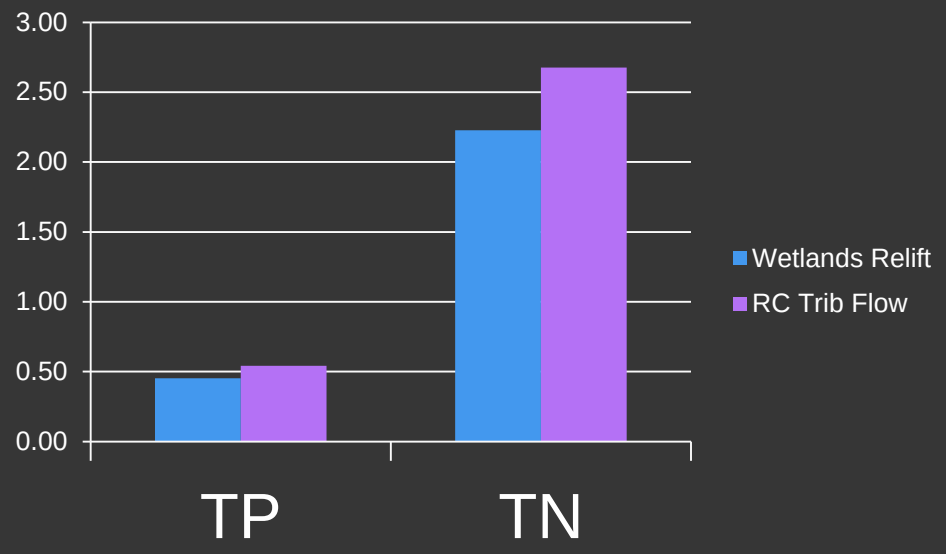
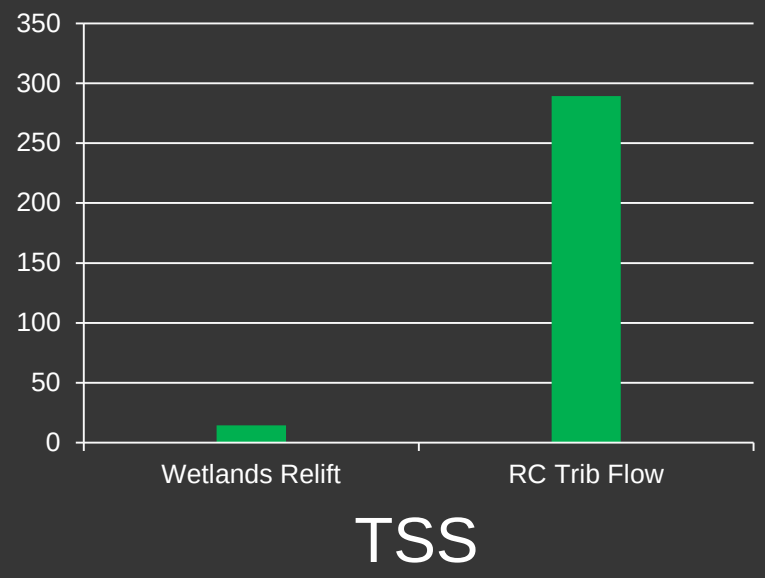

TRWD Field Scale Wetlands
Vegetation Monitoring Sites
Vegetation Survey Transect Line
Vegetation Survey Photo Station
500 0 500 Feet

FIGURE 15

Wetland vs. RC Tributary: Water Quality
(April 2015)





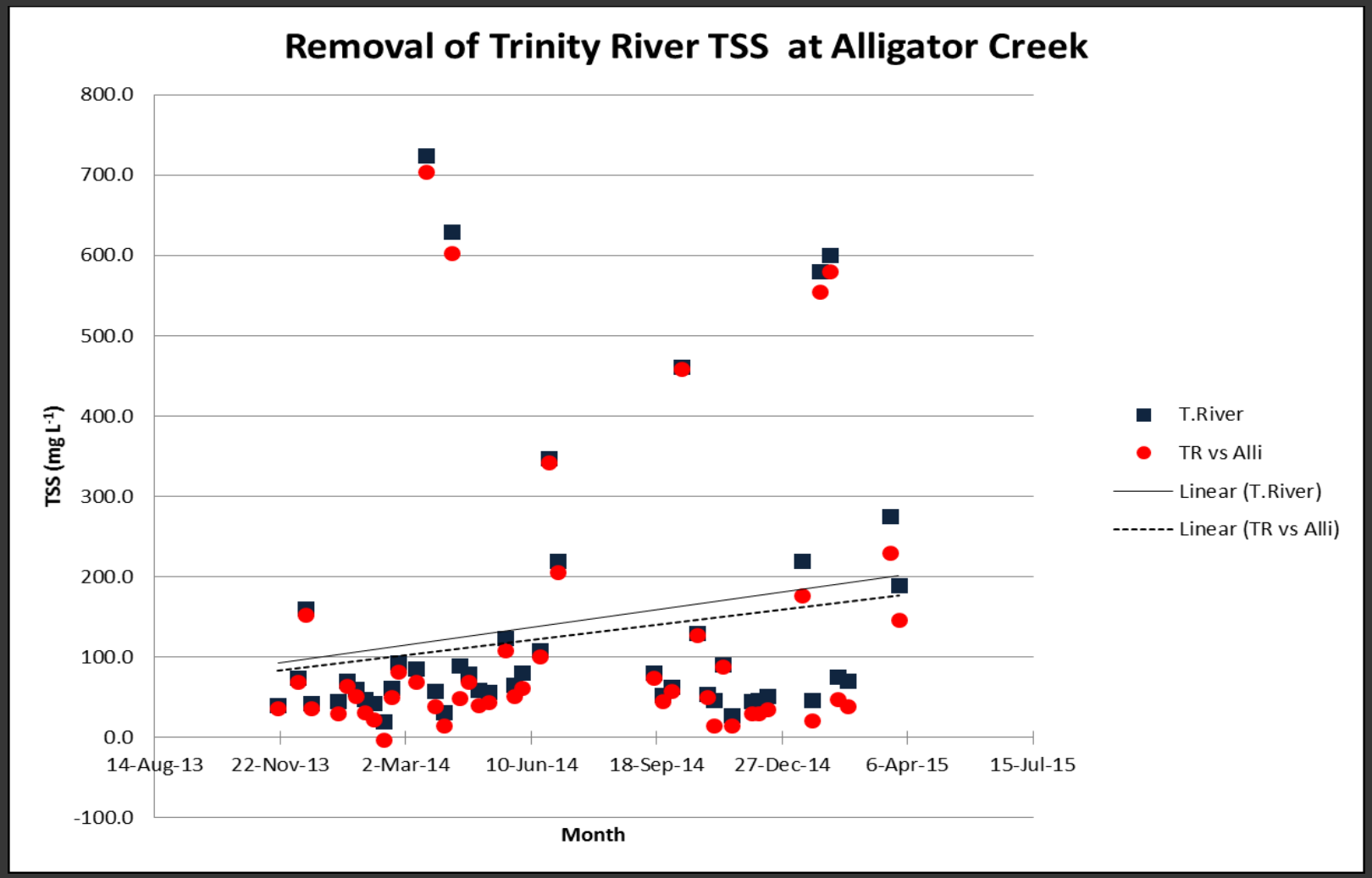
trwd Tarrant Regional Water District

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%

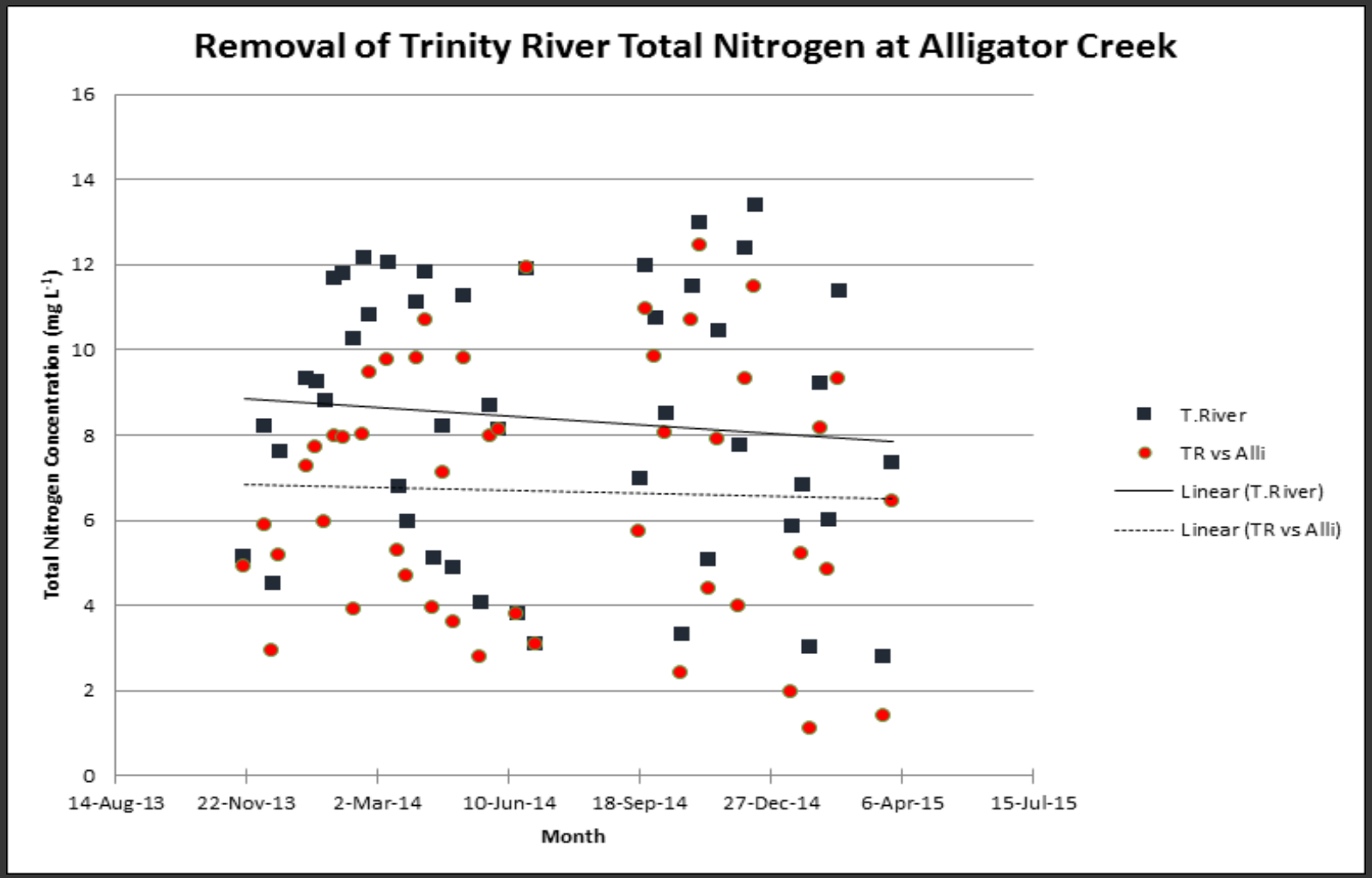
trwd Tarrant Regional Water District

Wetland Treatment Performance Full Scale Operation



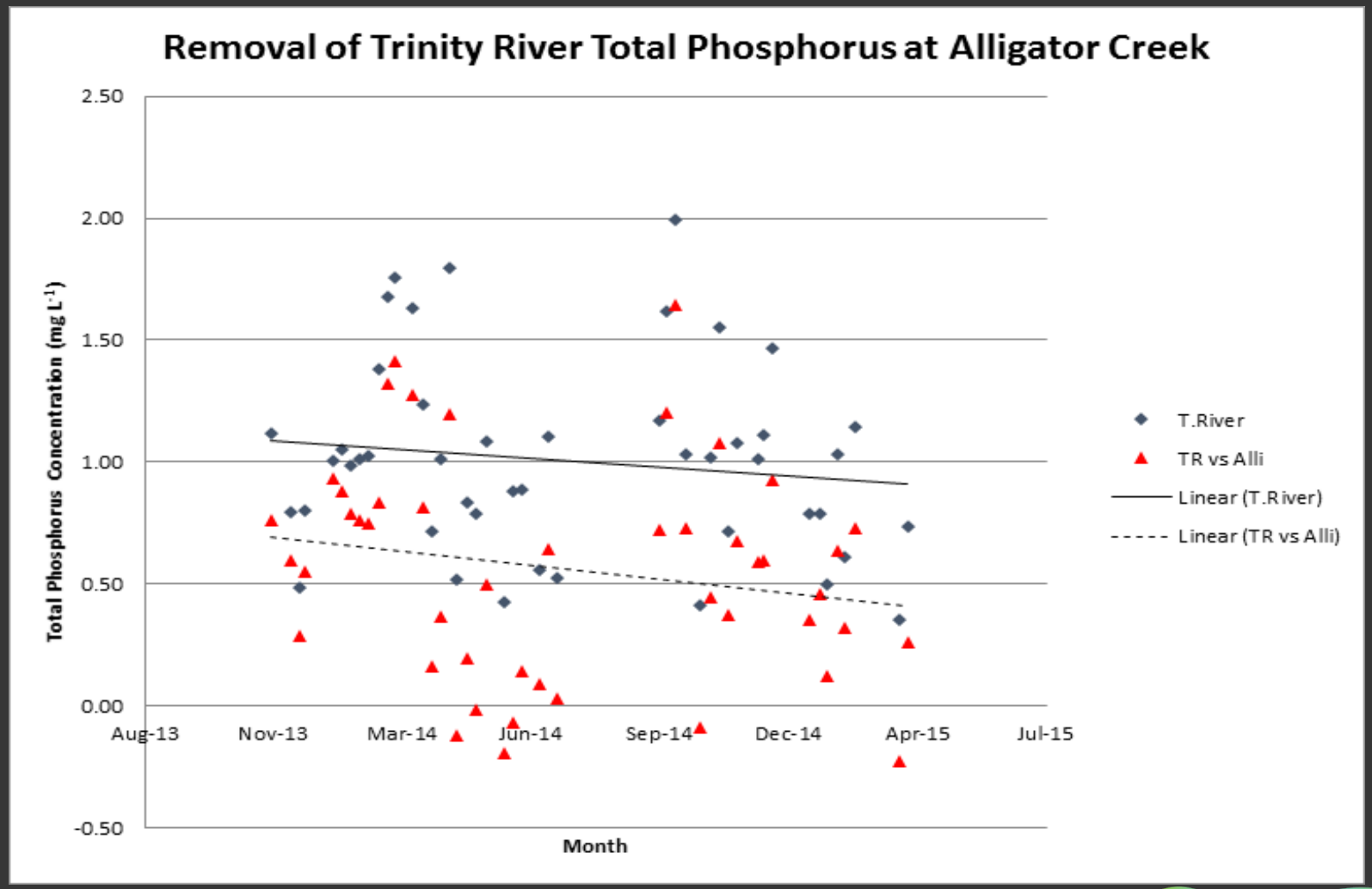
trwd Tarrant Regional Water District

Wetland Treatment Performance Full Scale Operation



trwd Tarrant Regional Water District

Wetland Treatment Performance Full Scale Operation



trwd Tarrant Regional Water District

Outreach and Education

Questions?
chris.zachry@trwd.com