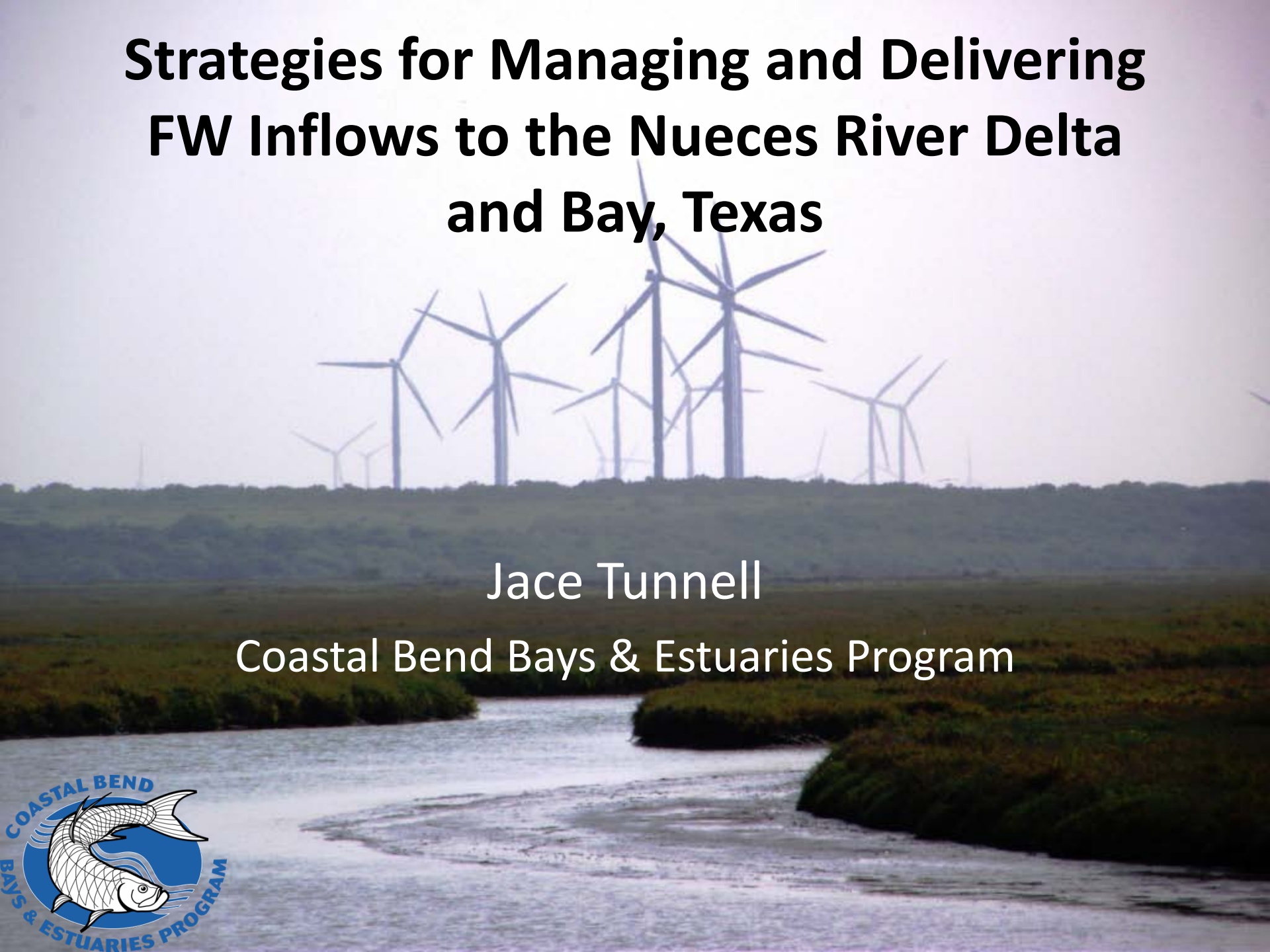
Strategies for Managing and Delivering FW Inflows to the Nueces River Delta and Bay, Texas



Jace Tunnell

Coastal Bend Bays & Estuaries Program

Who Regulates Nueces River Surface Water?

- Texas Commission on Environmental Quality
  - Water Rights
- Texas Parks and Wildlife
  - Fish and wildlife
- Texas General Land Office
  - Submerged land
- U.S. Army Corps of Engineers
  - Navigable waters
- City of Corpus Christi
  - Dam operator and distributor


0
90
km
Nueces Watershed
Barksdale
San Antonio
Uvalde
Crystal City
Carrizo Springs
Mathis
Nueces Bay
N
Image Source: USGS

History

- 1898 Saltwater Barrier Dam completed
- 1958 Wesley Seal Dam completed - ~257K AF cap.
- 1972 Clean Water Act
- 1982 Choke Canyon Reservoir completed - ~695K AF cap.
- 1987 Choke Canyon filled
- 1990 TAC created
- 1992 NEAC created, Agreed Order
- 1994 Coastal Bend Bays & Estuaries Program
- 1995 Agreed Order
- 1998 Mary Rhodes Pipeline completed ~42K AF/yr
- 1999 City of CC purchased Garwood water rights ~35K AF/yr
- 2001 Agreed Order
- 2007 – Senate Bill 3 Process initiated

Adaptive Management

1987 – CC filled, 151,000 AF required for Env. Flows

1990 – TAC, developed recommendations for Env. Flows

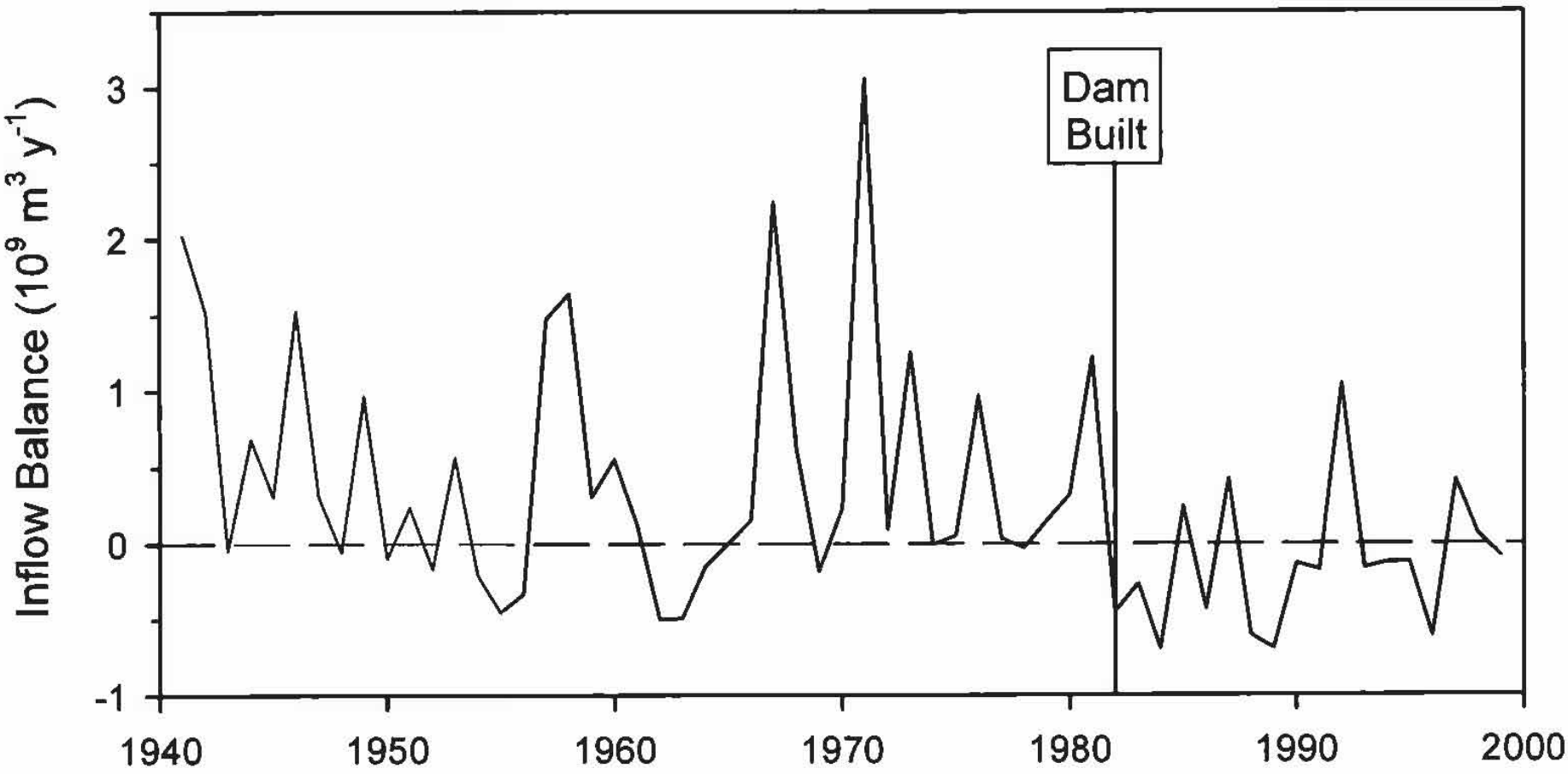
1992 – AO, established a monthly release schedule and NEAC

1995 – AO, passthru plan approved

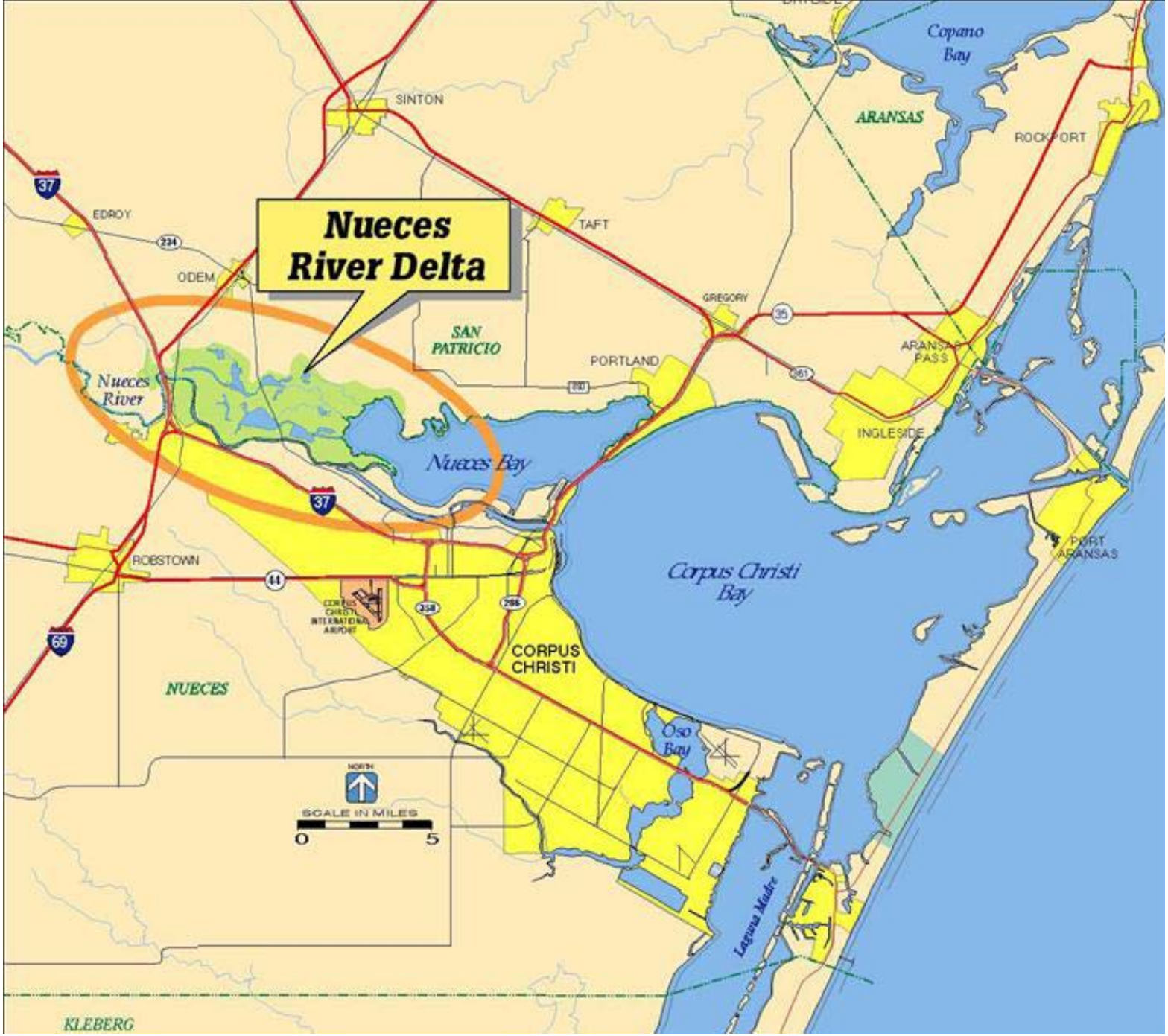
2001 – AO, drought provisions and build Rincon Pipeline

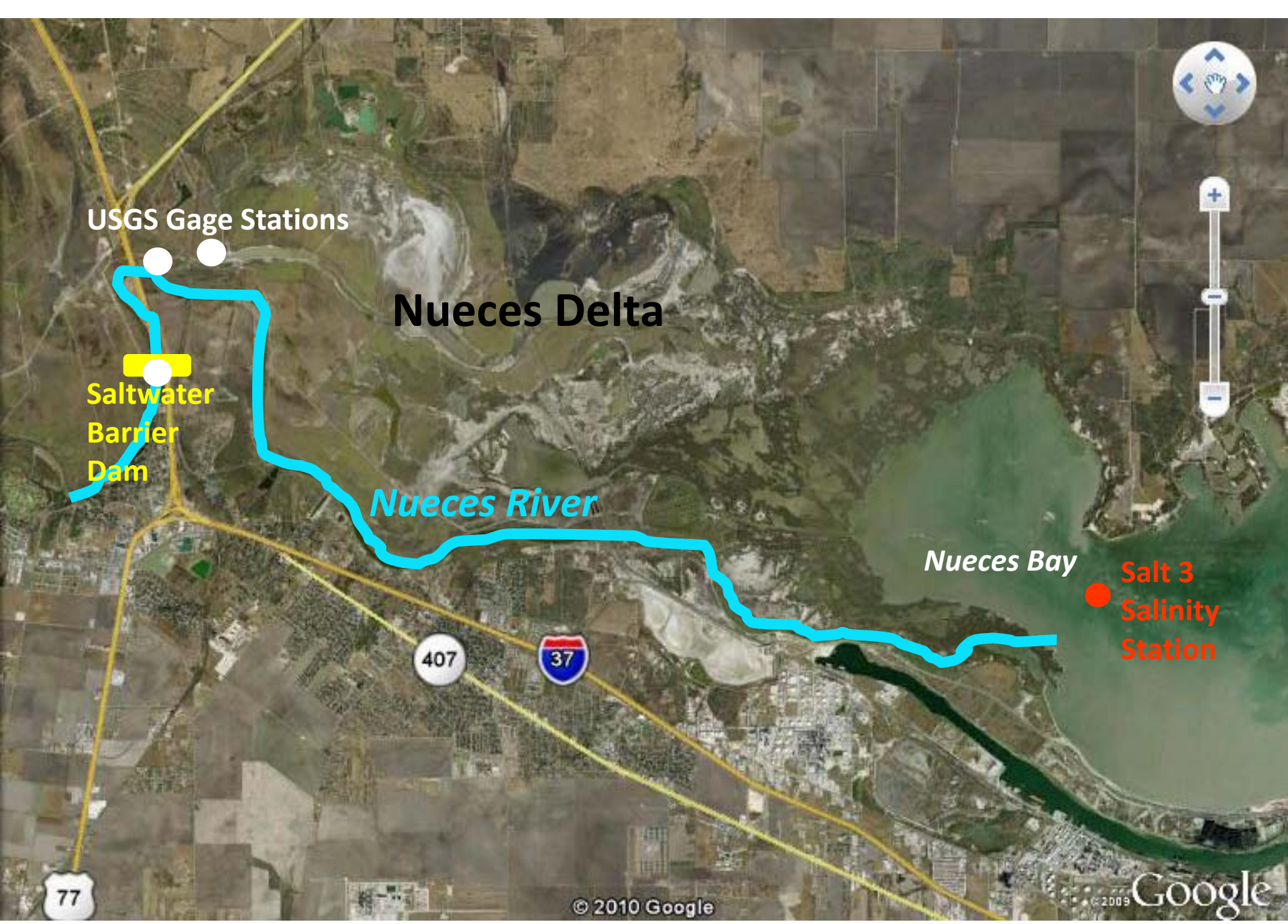
2007 – SB3, recommend Env. Flows for Sound Eco. Env.

Choke Canyon Impacts on FW Inflows



Source: Montagna et al. 2009

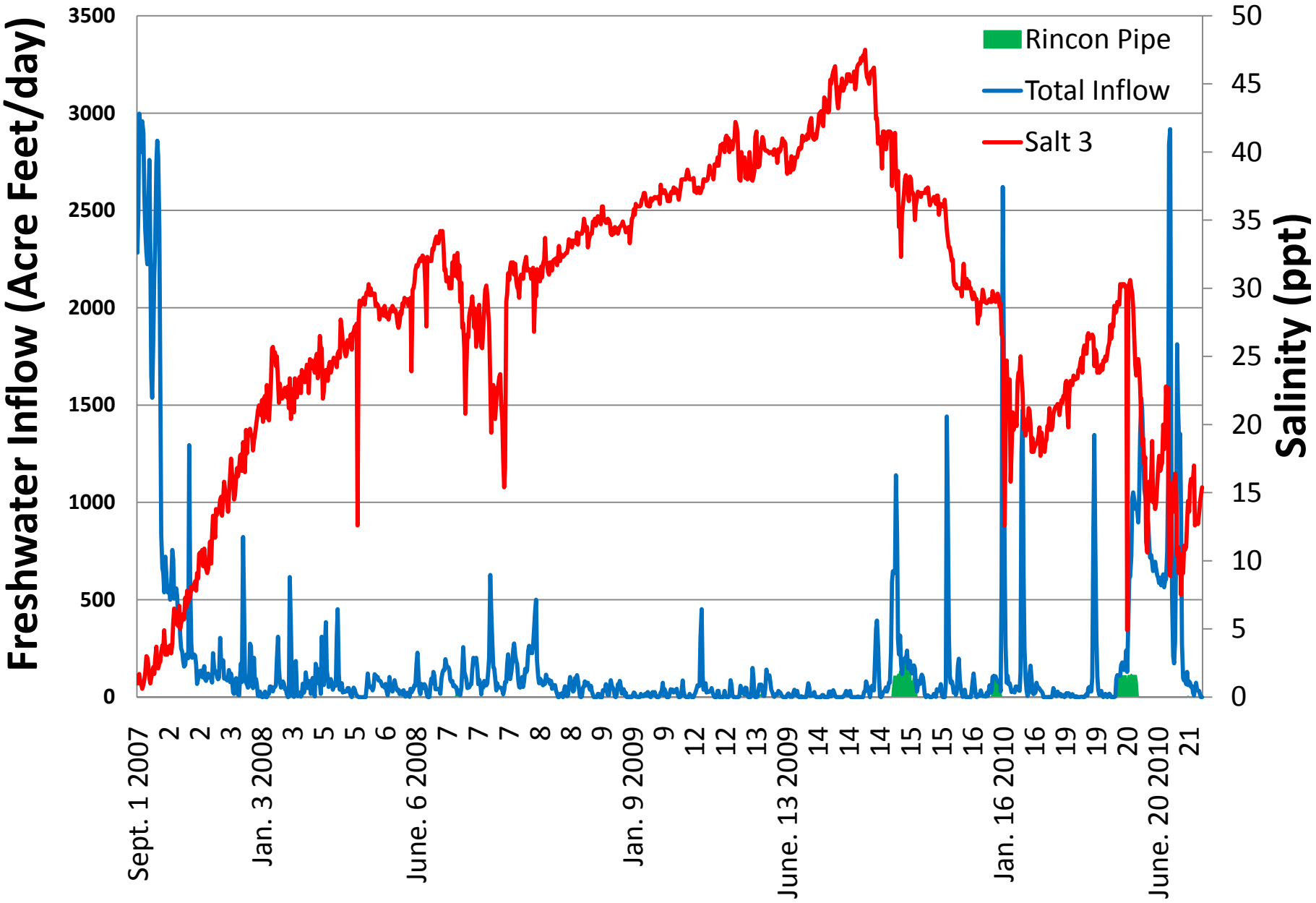

Nueces River Delta
Copano Bay
ARANSAS
ROCKPORT
SINTON
EDROY
ODEM
TAFT
GREGORY
SAN PATRICIO
PORTLAND
ARANSAS PASS
INGLESIDE
Nueces River
Nueces Bay
Corpus Christi Bay
PORT ARANSAS
ROBSTOWN
CORPUS CHRISTI
NUECES
Oso Bay
Laguna Madre
KLEBERG
NORTH
SCALE IN MILES
0
5


USGS Gage Stations
Nueces Delta
Saltwater Barrier Dam
Nueces River
Nueces Bay
Salt 3 Salinity Station
407
37
77
© 2010 Google
Google

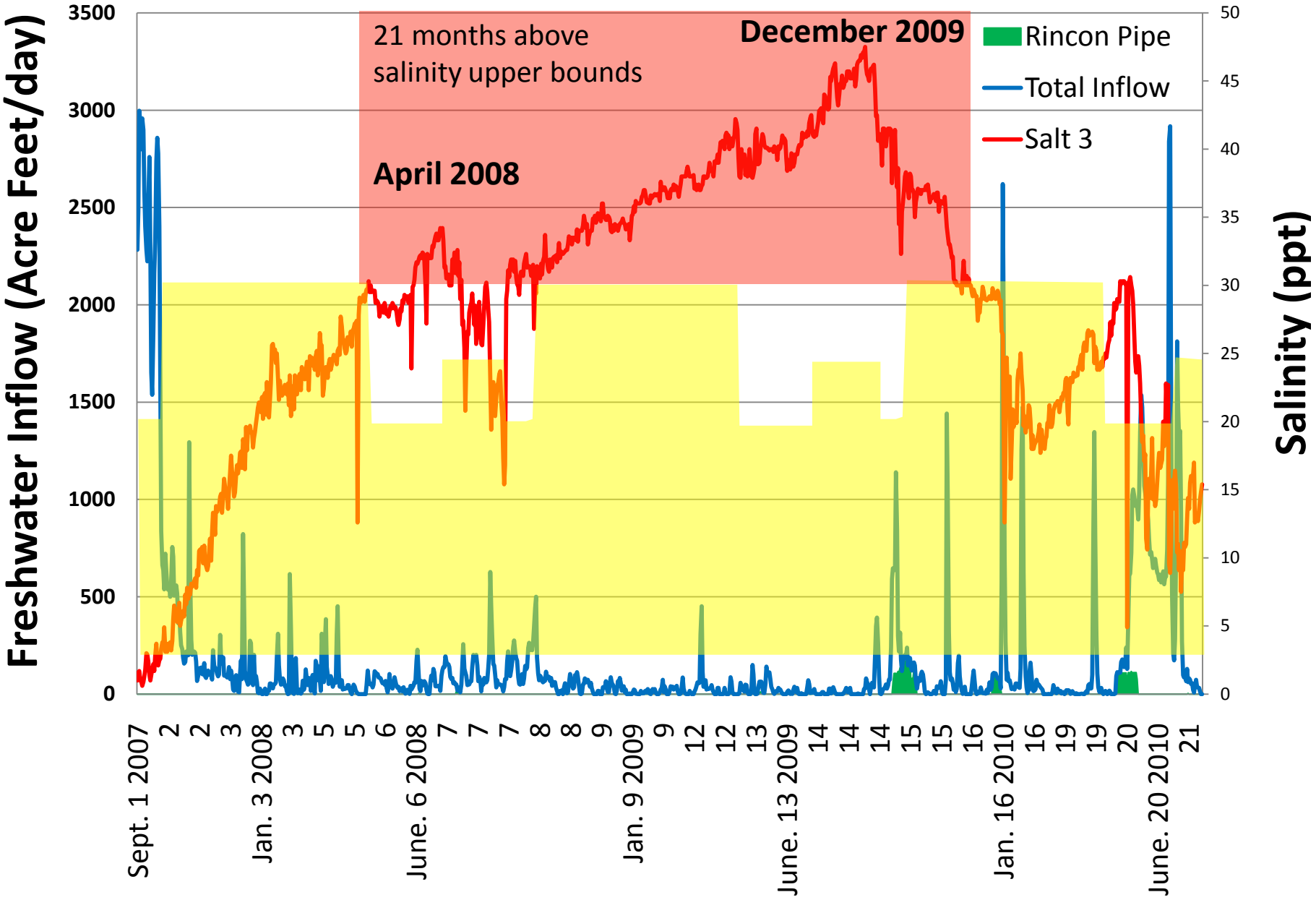
Target FW Inflow Needs (in Acre Feet) for Nueces Estuary

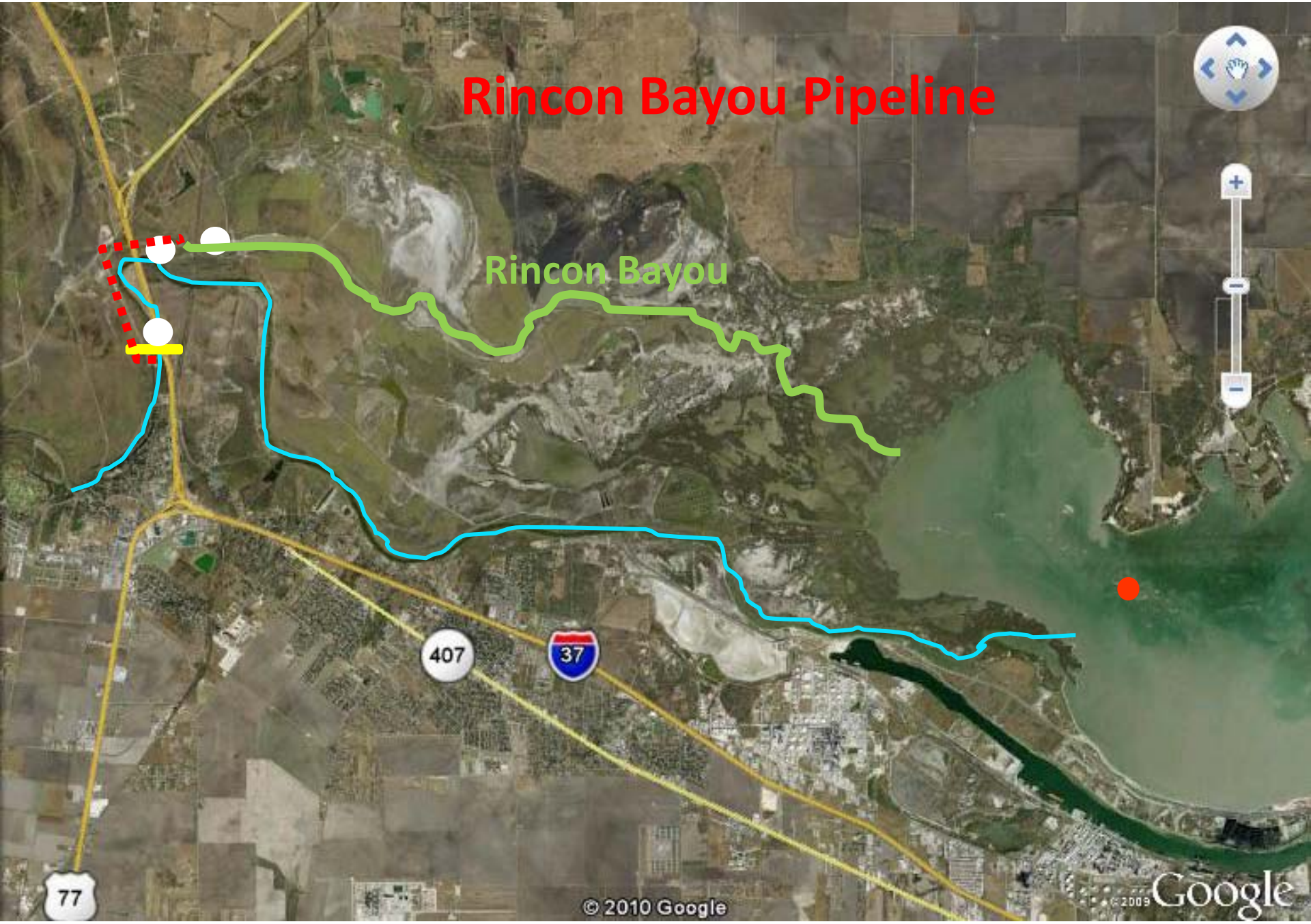
MONTH	>70%	>40-<70%	>30-<40%	<30%
January	2,500	2,500	1,200	0
February	2,500	2,500	1,200	0
March	3,500	3,500	1,200	0
April	3,500	3,500	1,200	0
May	25,500	23,500	1,200	0
June	25,500	23,000	1,200	0
July	6,500	4,500	1,200	0
August	6,500	5,000	1,200	0
September	28,500	11,500	1,200	0
October	20,000	9,000	1,200	0
November	9,000	4,000	1,200	0
December	4,500	4,500	1,200	0
TOTAL	138,000	97,000	14,400	0

Freshwater Inflow to Nueces Bay - Sept 2007 to August 2010



Freshwater Inflow to Nueces Bay - Sept 2007 to August 2010



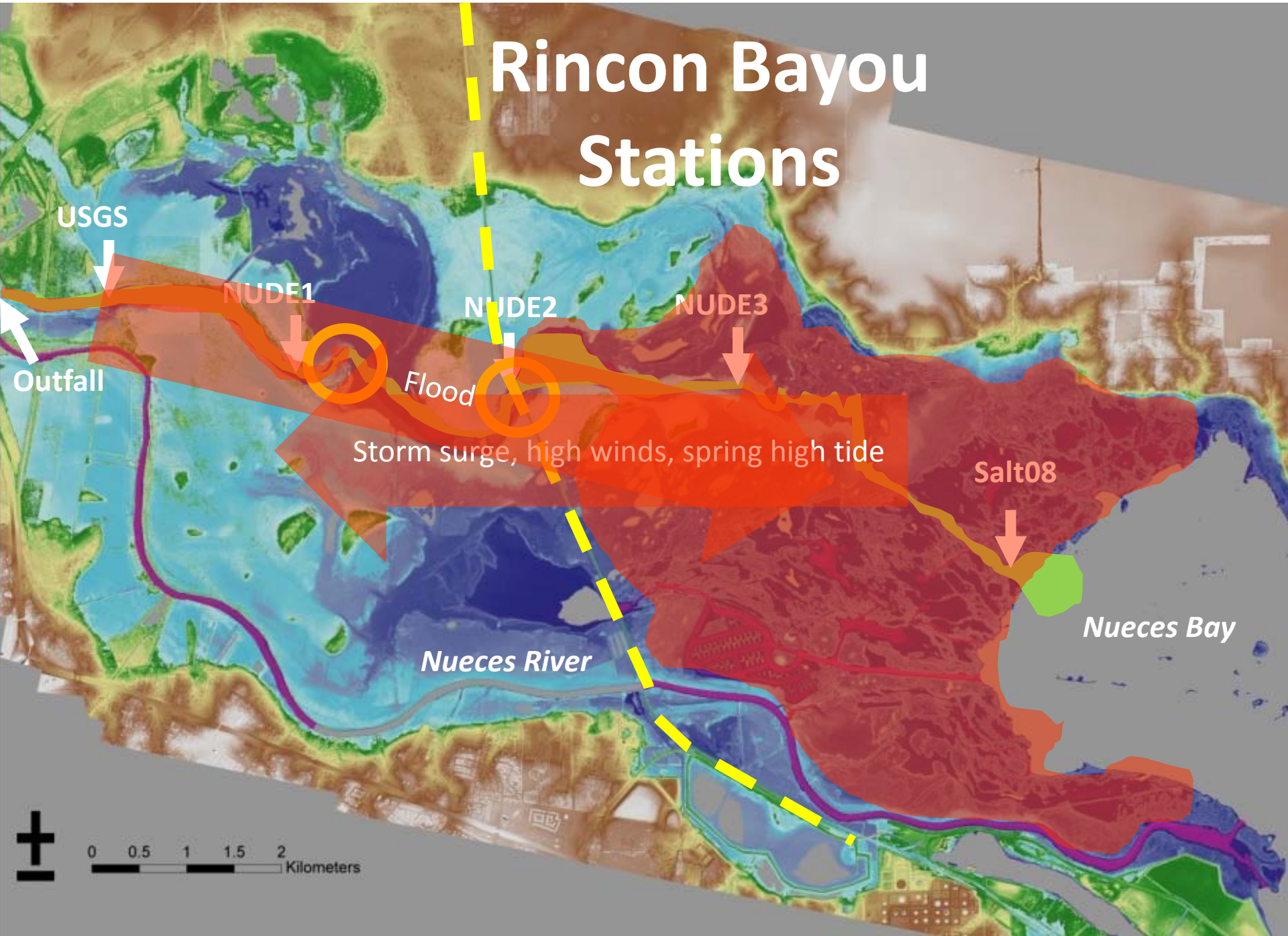

Rincon Bayou Pipeline
Rincon Bayou
407
37
77
© 2010 Google
Google

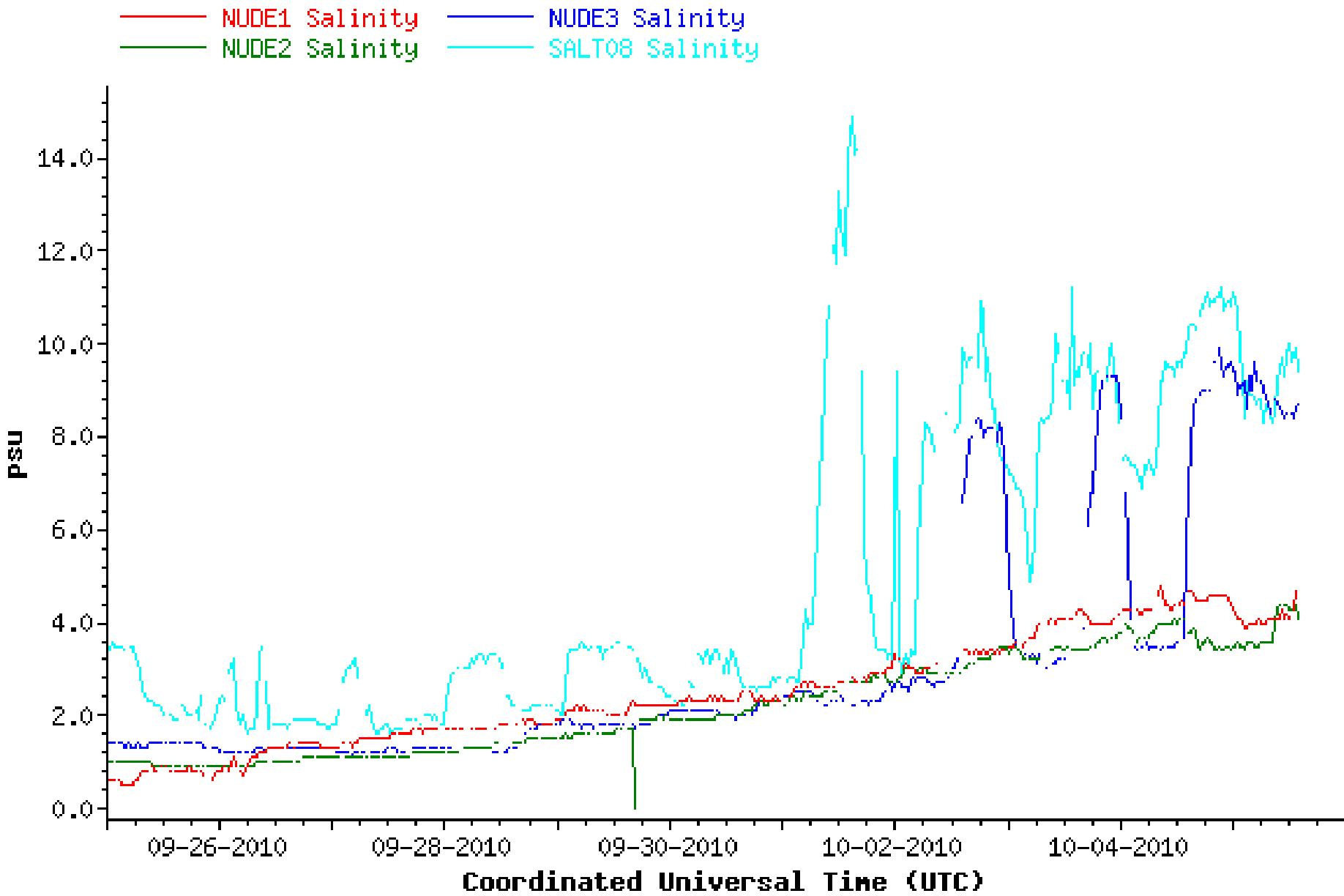
Freshwater Intake

History:

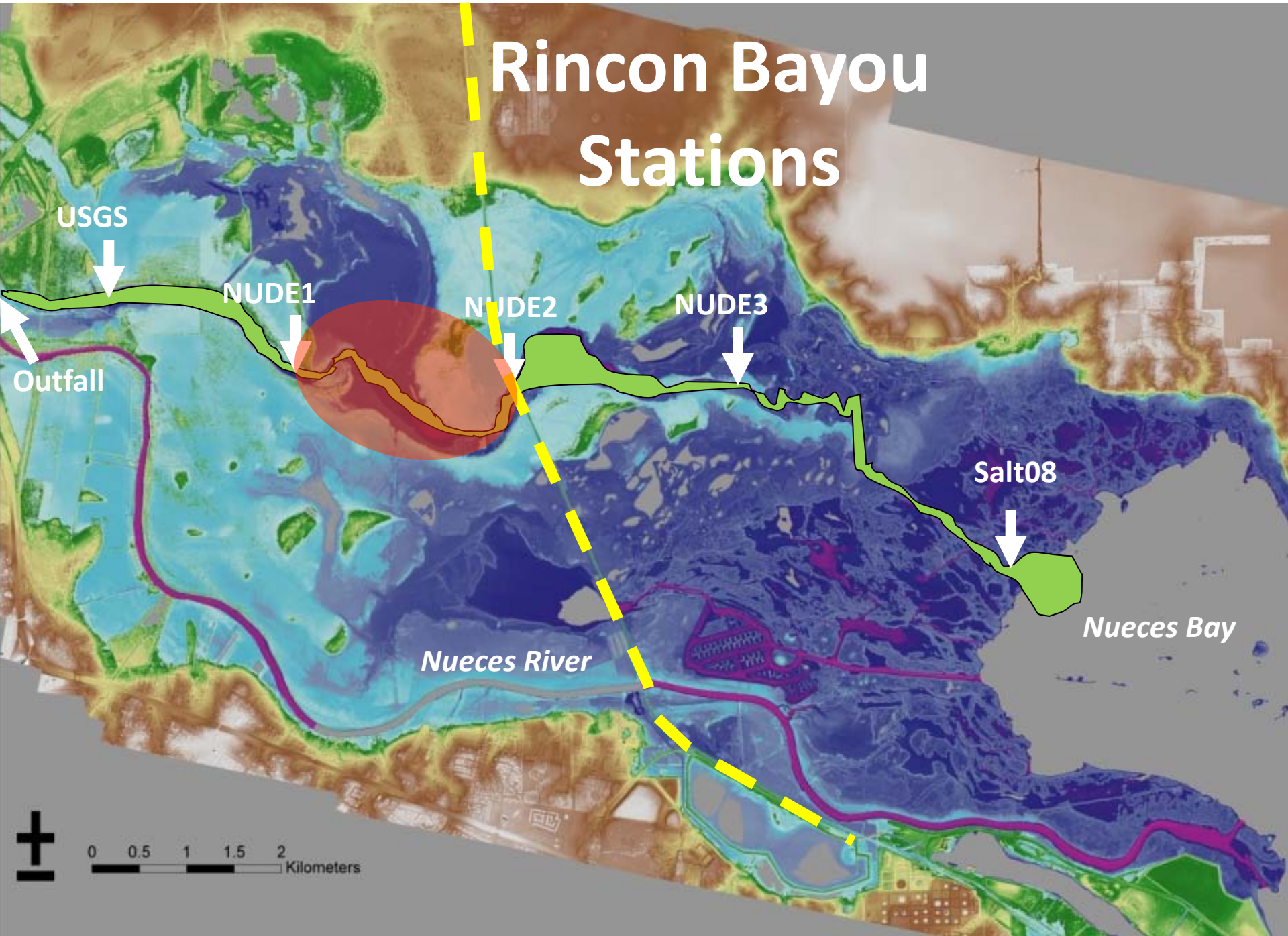
- 2001 Agreed Order
- Completed mid 2008
- 09
- ace May 2009

Pipeli

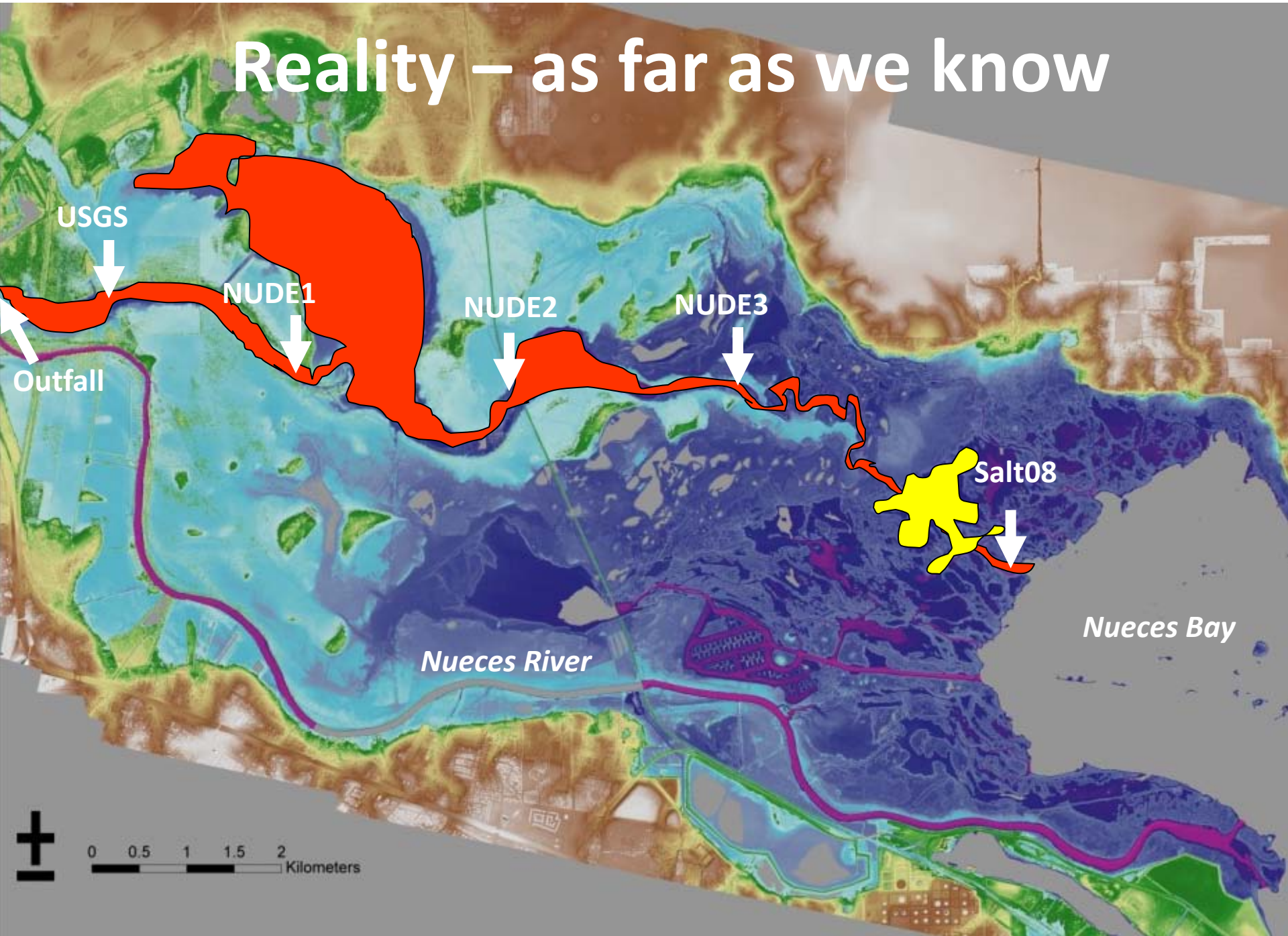

Rincon Bayou Stations
USGS
NUDE1
NUDE2
NUDE3
Outfall
Flood
Storm surge, high winds, spring high tide
Salt08
Nueces Bay
Nueces River
0 0.5 1 1.5 2
Kilometers



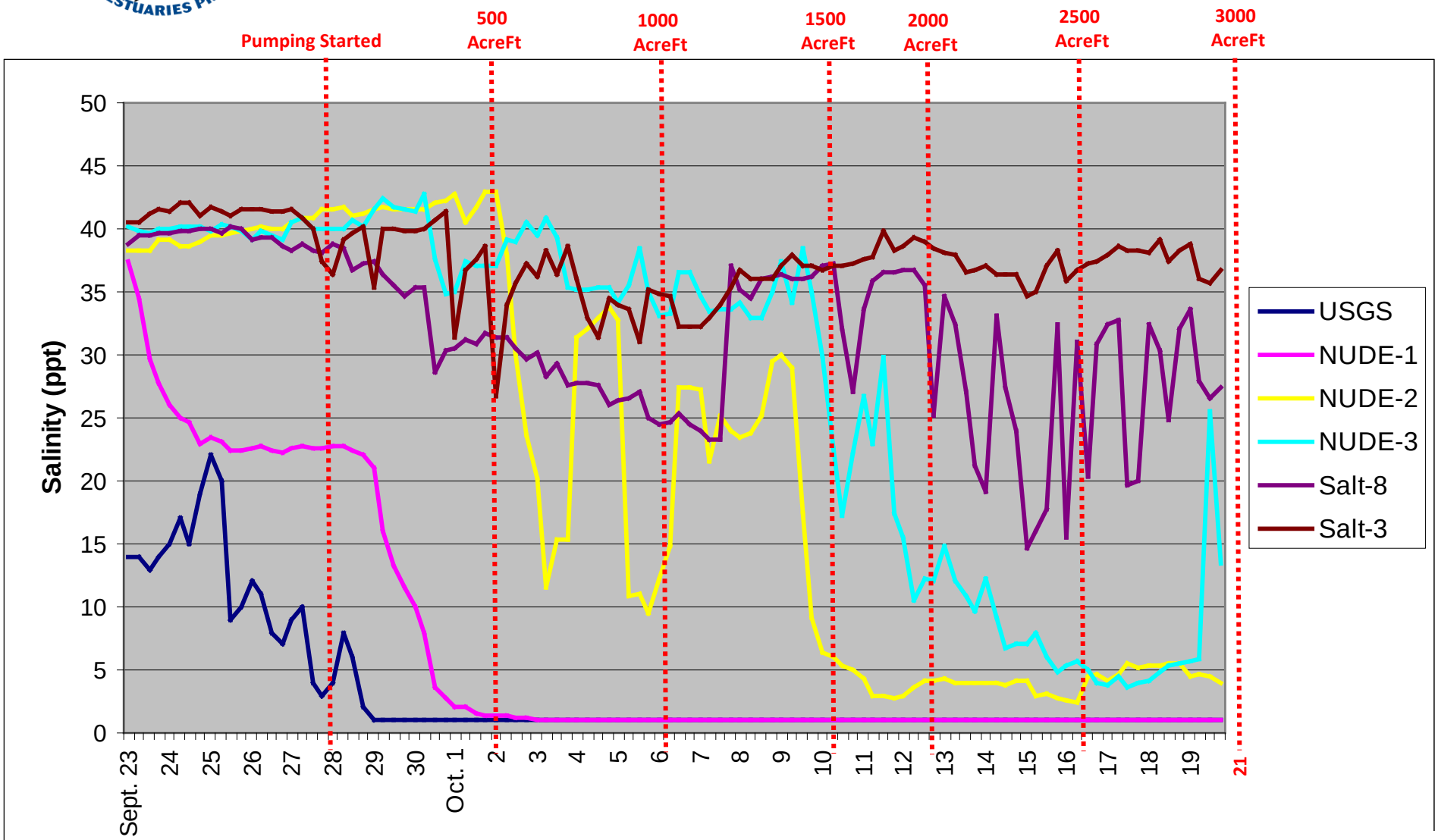
Source: Conrad Blucher Institute


Rincon Bayou
Stations
USGS
NUDE1
NUDE2
NUDE3
Outfall
Salt08
Nueces Bay
Nueces River
0 0.5 1 1.5 2
Kilometers

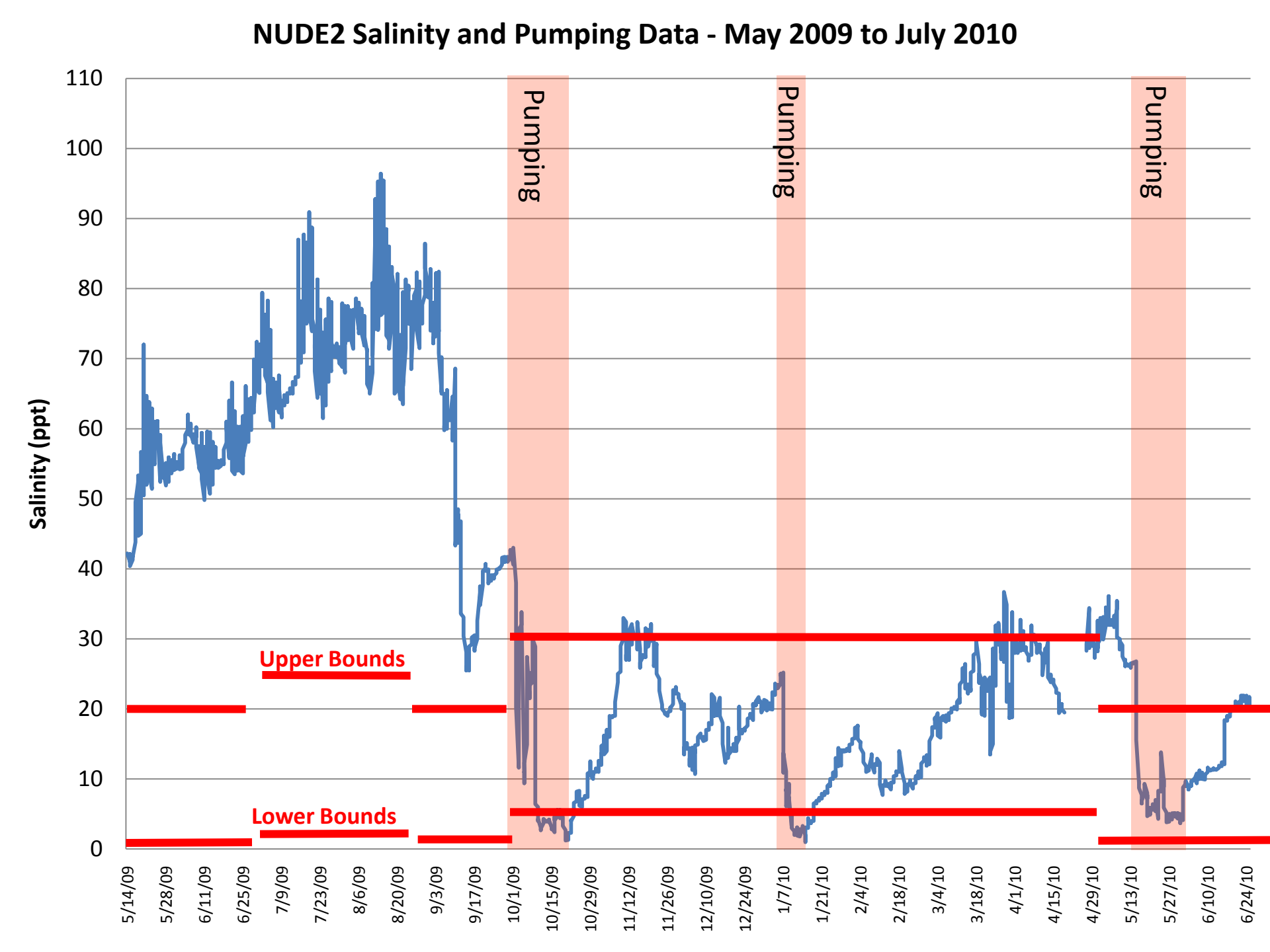
Reality – as far as we know



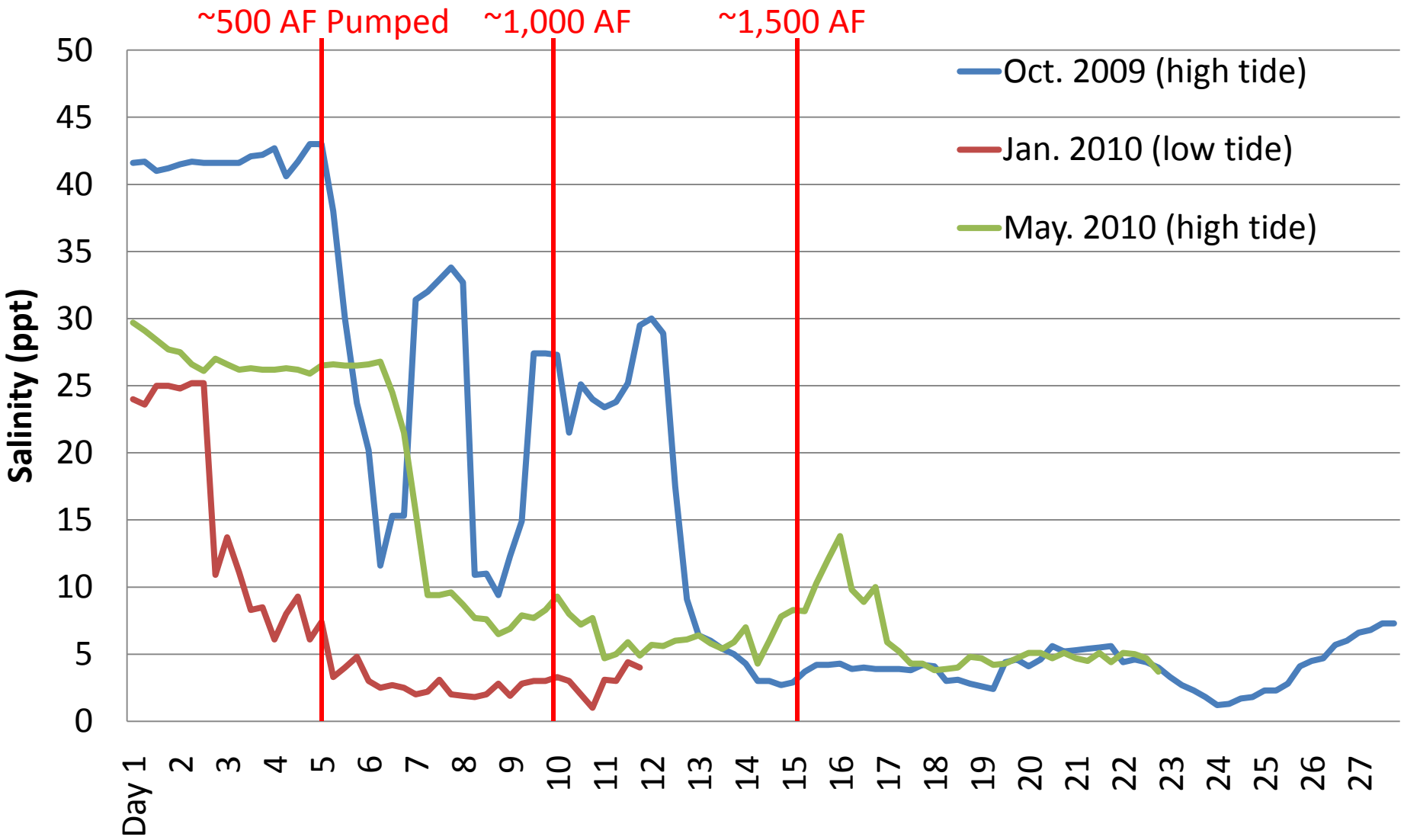
Rincon Bayou Salinity



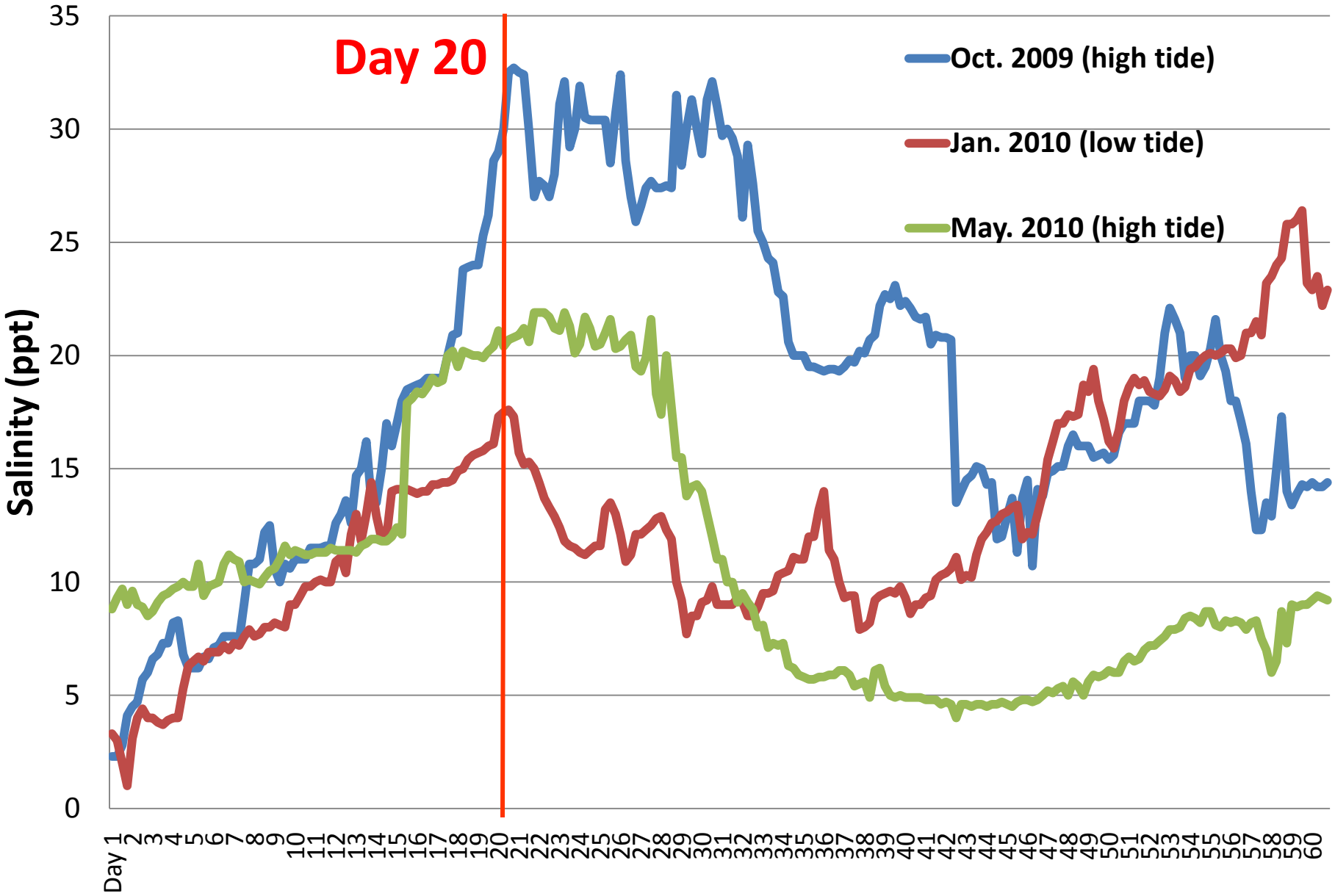
Note: Data based on 6 hour readings due to lots of noise on the 15 min. chart.


NUDE2 Salinity and Pumping Data - May 2009 to July 2010
Salinity (ppt)
110
100
90
80
70
60
50
40
30
20
10
0
Pumping
Pumping
Pumping
Upper Bounds
Lower Bounds
5/14/09
5/28/09
6/11/09
6/25/09
7/9/09
7/23/09
8/6/09
8/20/09
9/3/09
9/17/09
10/1/09
10/15/09
10/29/09
11/12/09
11/26/09
12/10/09
12/24/09
1/7/10
1/21/10
2/4/10
2/18/10
3/4/10
3/18/10
4/1/10
4/15/10
4/29/10
5/13/10
5/27/10
6/10/10
6/24/10

Reaction Time to Pipeline Freshwater Inflows – NUDE2



Post FW Inflow - Salinity Reaction Time

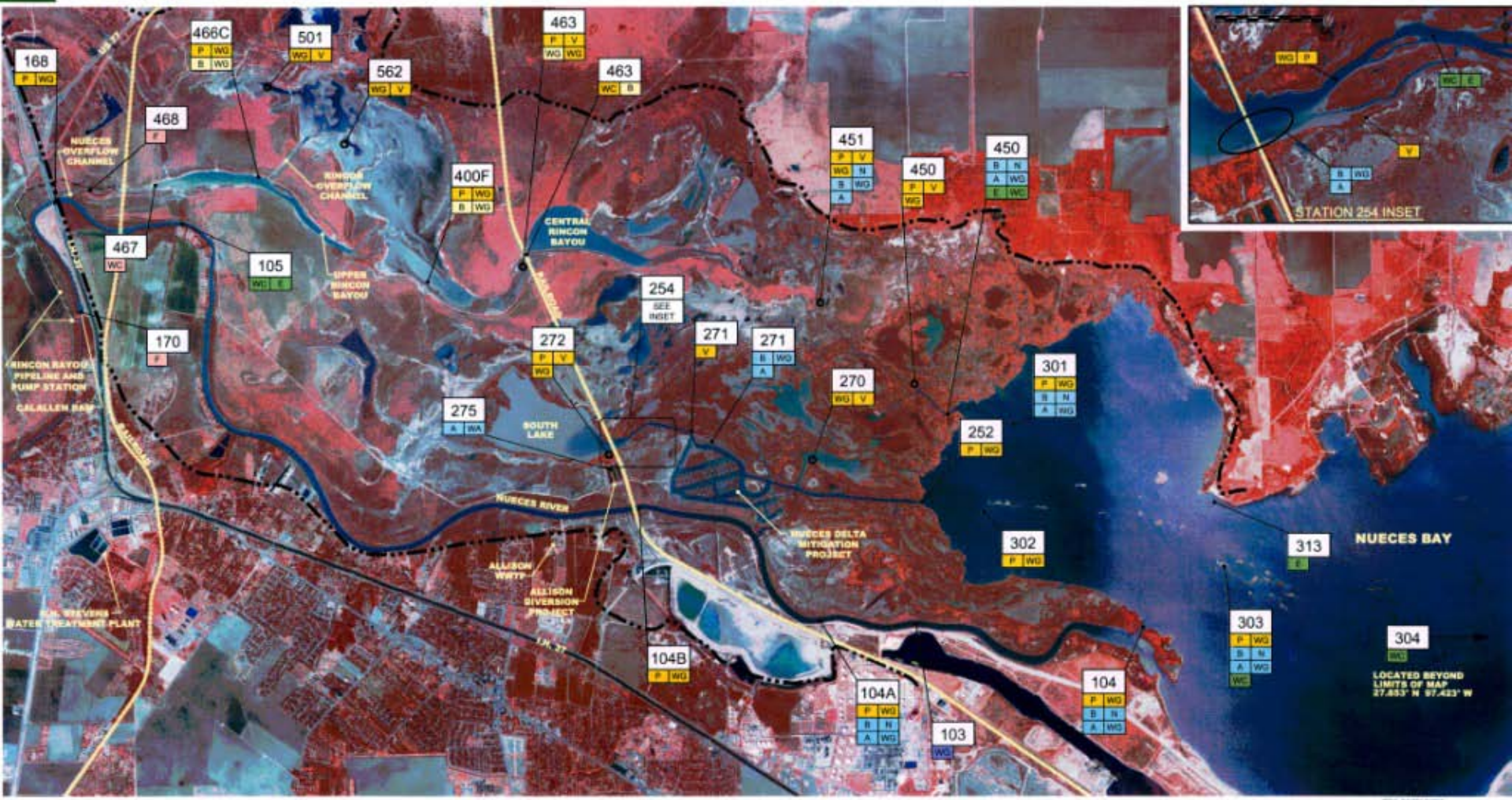


What we've learned

- NUDE2 as indicator
- Low tide gets more water faster down Rincon
- ~1,500 AF to get to NUDE2 below 5ppt
- ~27 days for 3,000 AF using 1 pump
- ~20 days to back up to bay salinities

ALAN PLUMMER ASSOCIATES, INC.

RINCON BAYOU/NUECES DELTA MONITORING LOCATIONS



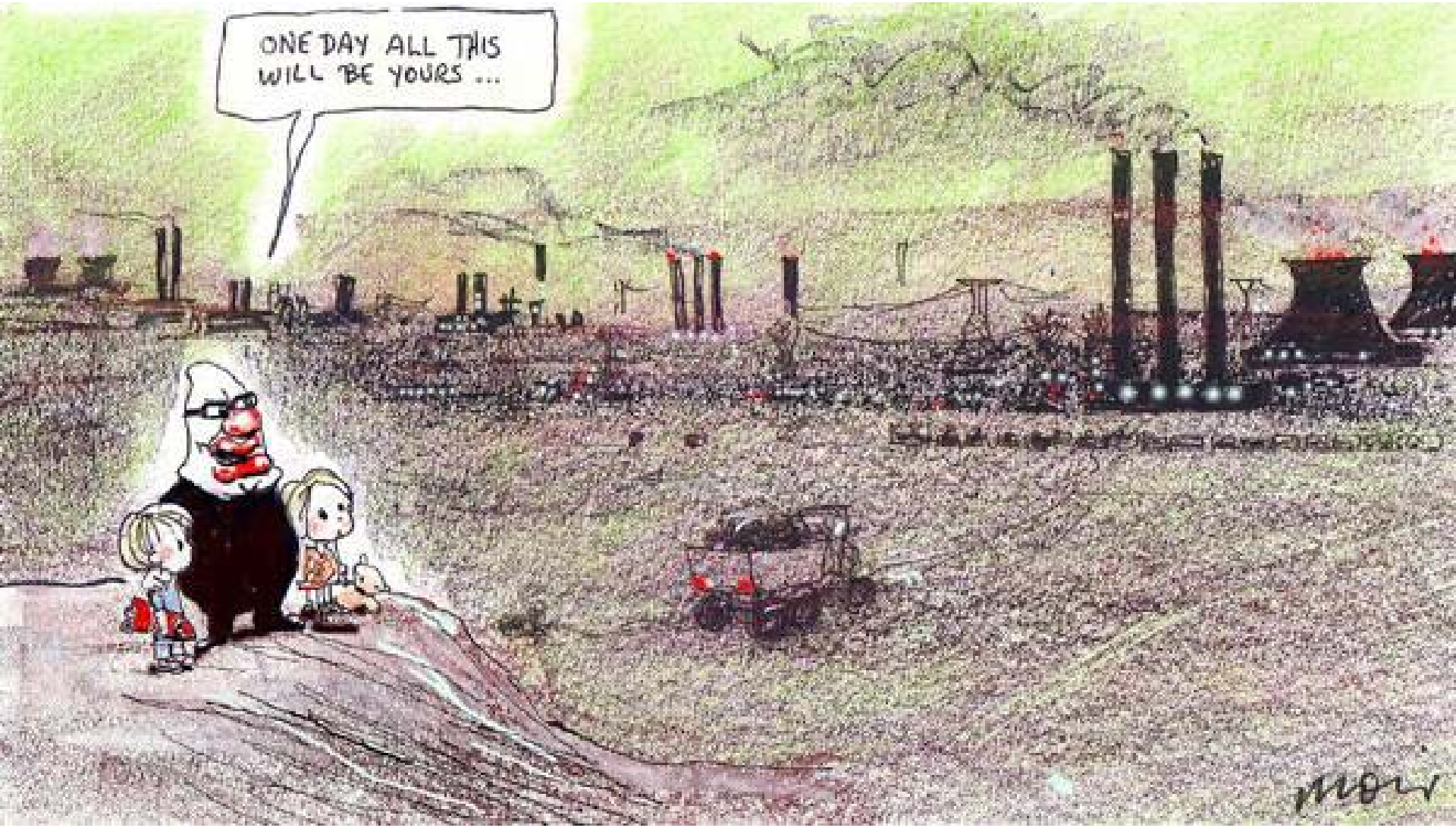
M:\Projects\0537\013-02\ACAD\Delta Map Scan 09.24.08.pd

Current Studies and Work

- CBBEP actively managing and acquiring property in the Nueces Delta
- CBBEP projects:
  - Salinity, tide, meteorological data collection
  - Hydrodynamic Modeling with UT – Dec. 2012
- SB3 – Tying FW inflows to biology – March 2012
  - Nueces BBASC
  - Nueces BBEST
    - Estuary Subcommittee

Future Outcomes

- New water rights w/provisions
- New Agreed Orders
- Existing water rights amended


ONE DAY ALL THIS WILL BE YOURS ...

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