

Jun 11th, 11:20 AM - 11:40 AM

Stream and vegetative habitat restoration in a spring-fed stream to augment endangered species habitat

E. Oborny

University of Wisconsin - Madison

T. Osting

University of Wisconsin - Madison

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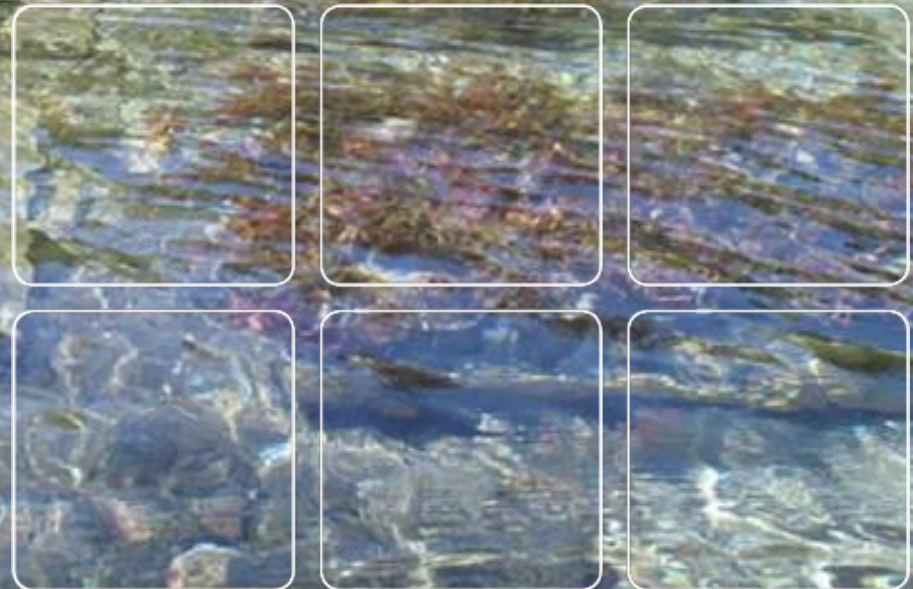
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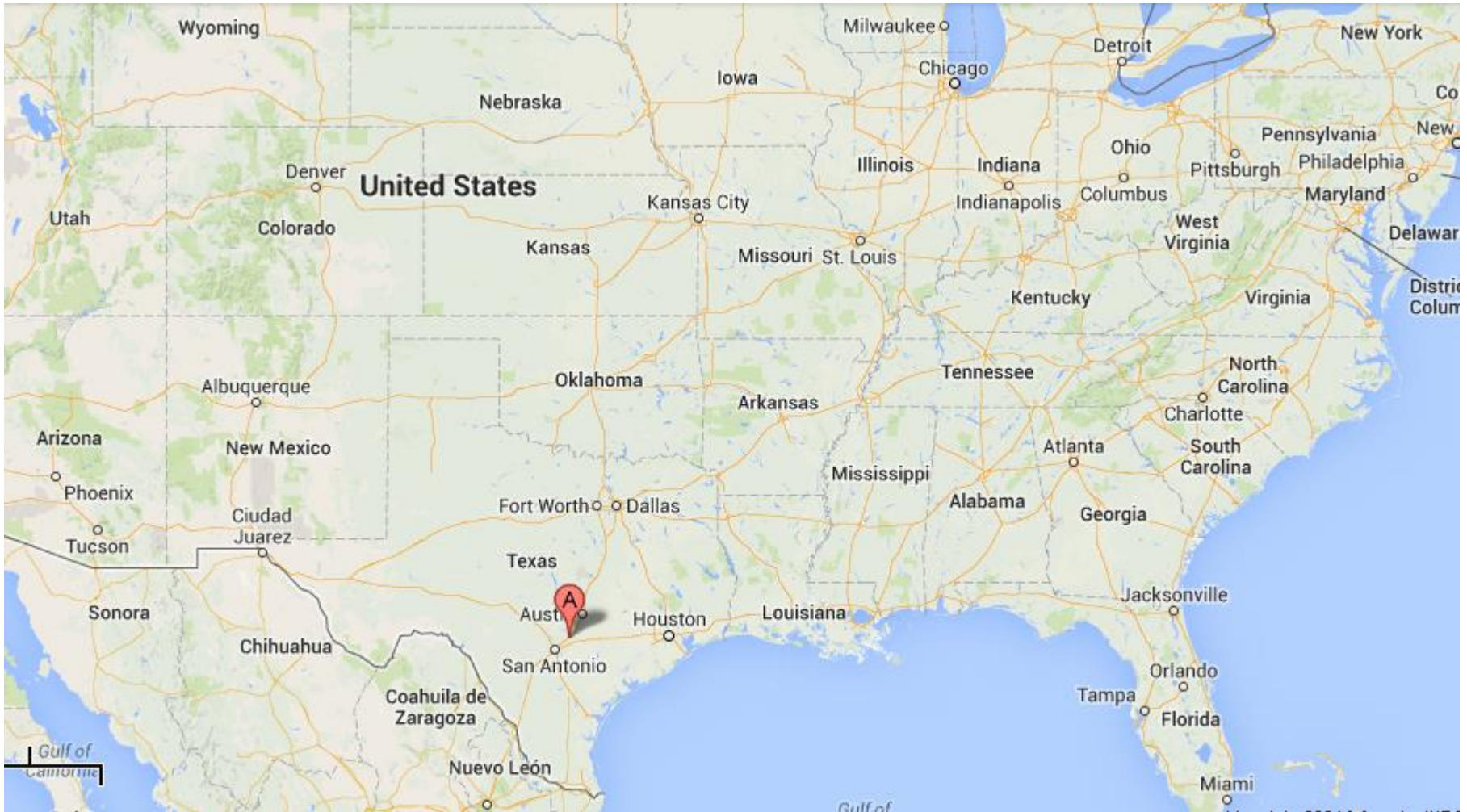
June 11, 2014

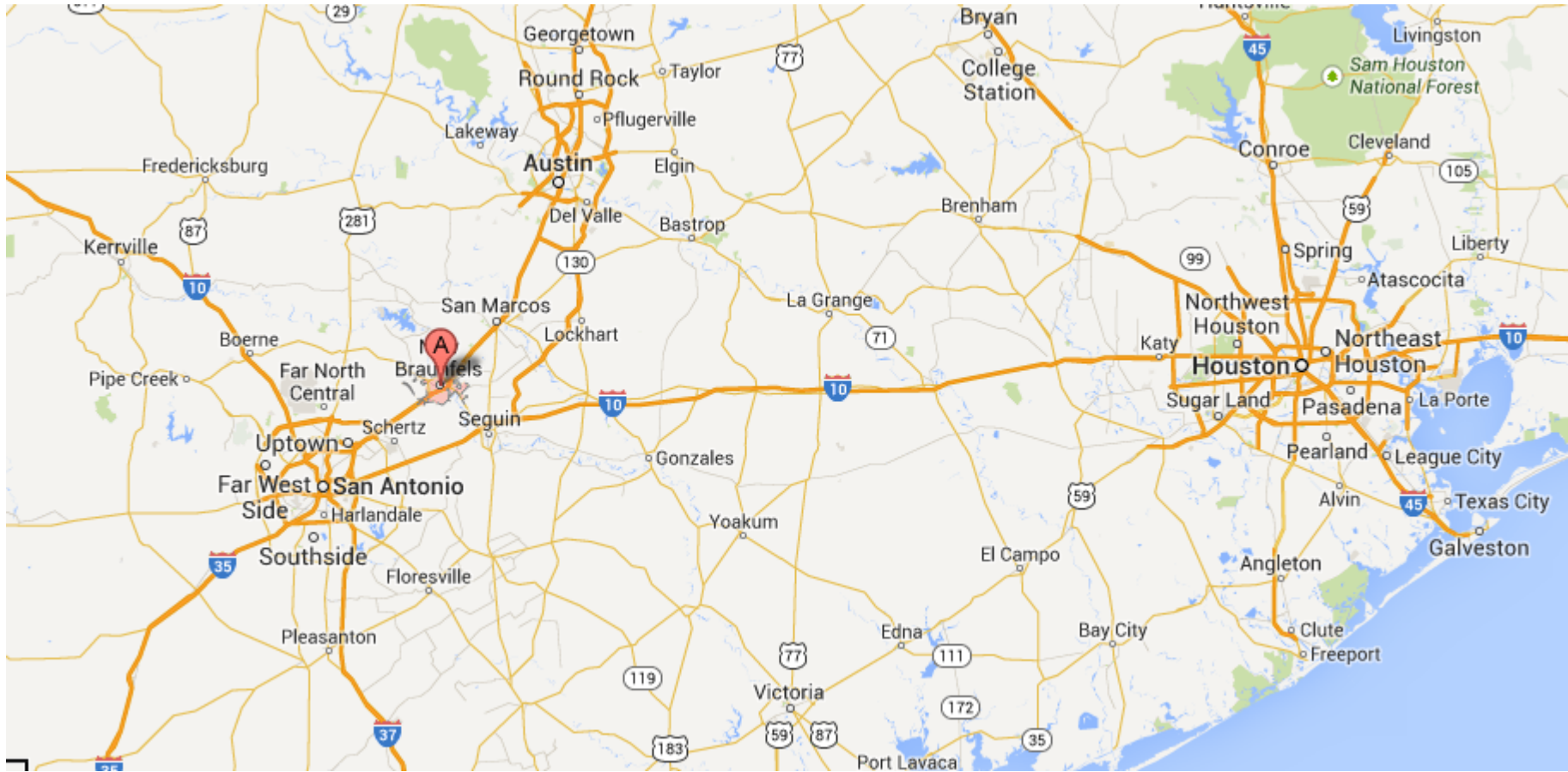
Ed Oborny – BIO-WEST
Tim Osting, PE, D.WRE – RPS
Zac Martin – City of New Braunfels



RPS



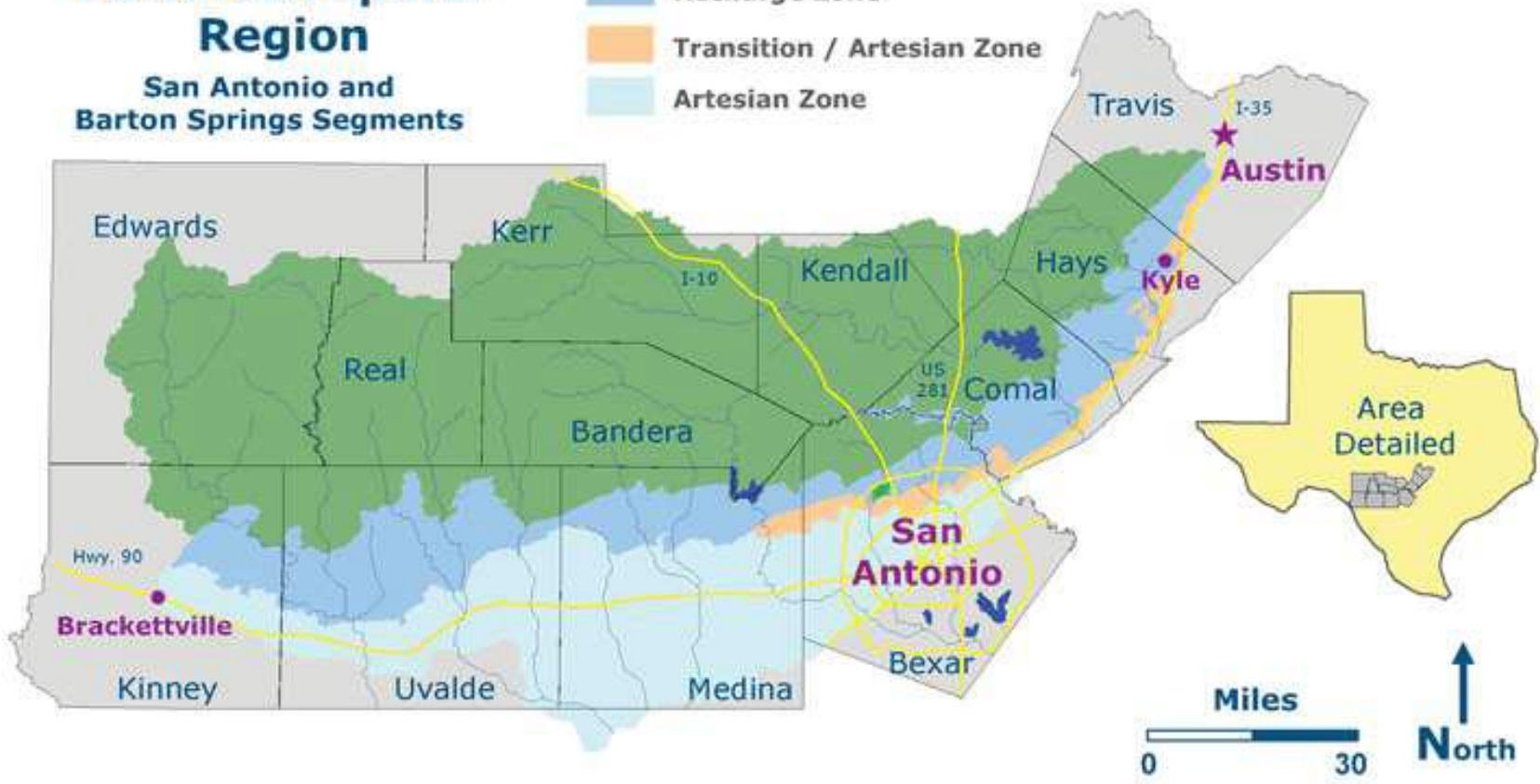




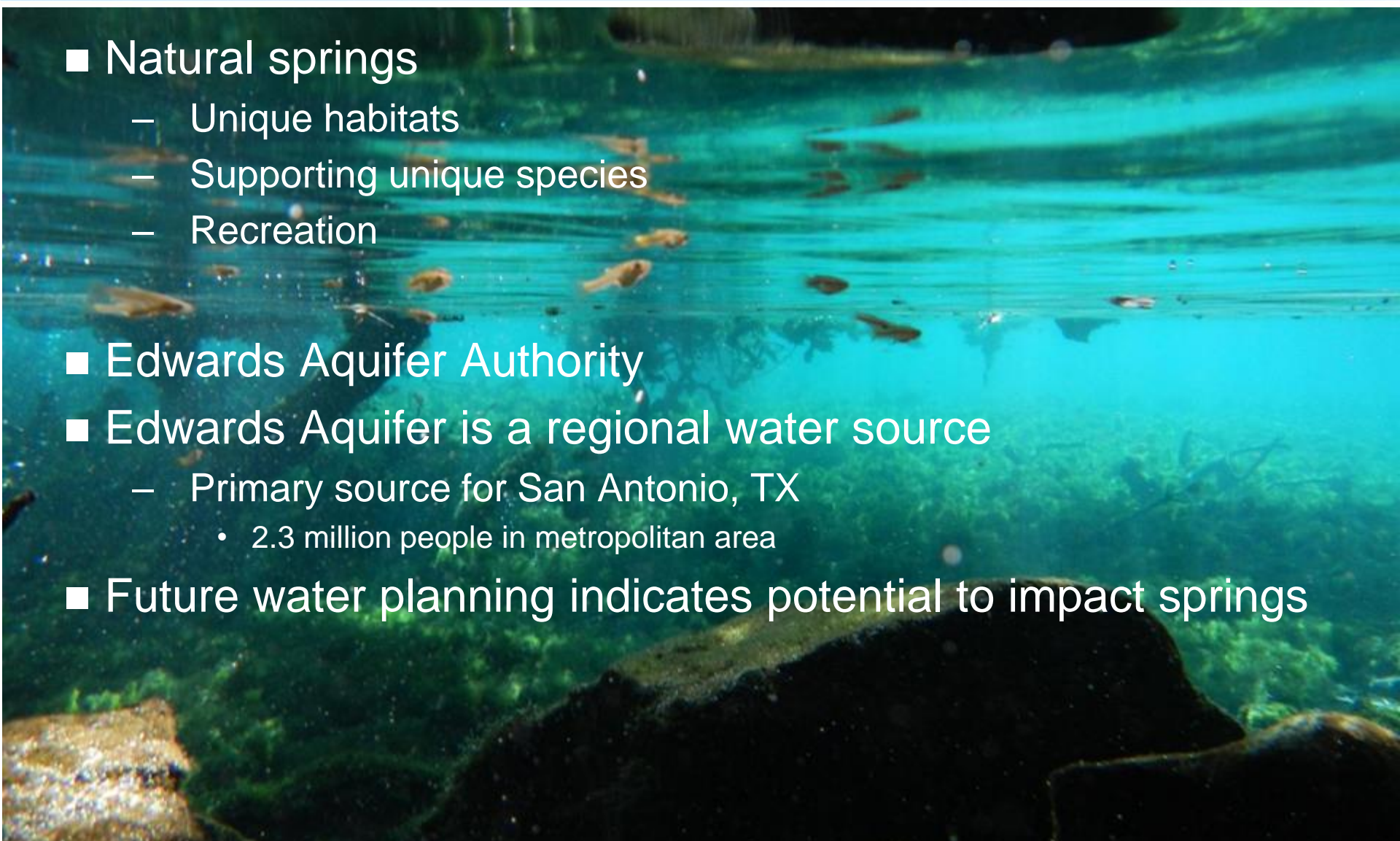
The Edwards Aquifer Region

San Antonio and Barton Springs Segments

- Contributing Zone
- Recharge Zone
- Transition / Artesian Zone
- Artesian Zone





- 
- An underwater photograph showing a vibrant coral reef with numerous small fish swimming in clear, turquoise water. The scene is illuminated by natural light filtering through the water, creating a bright and lively environment.
- Natural springs
 - Unique habitats
 - Supporting unique species
 - Recreation
 - Edwards Aquifer Authority
 - Edwards Aquifer is a regional water source
 - Primary source for San Antonio, TX
 - 2.3 million people in metropolitan area
 - Future water planning indicates potential to impact springs

- Endangered species
- USFWS Incidental Take Permit
- Permit Holders
 - City of San Antonio
 - San Antonio Water System (SAWS)
 - City of New Braunfels
 - City of San Marcos
 - Texas State University
- Habitat Conservation Plan (HCP)
- Water use fee implemented to fund the HCP

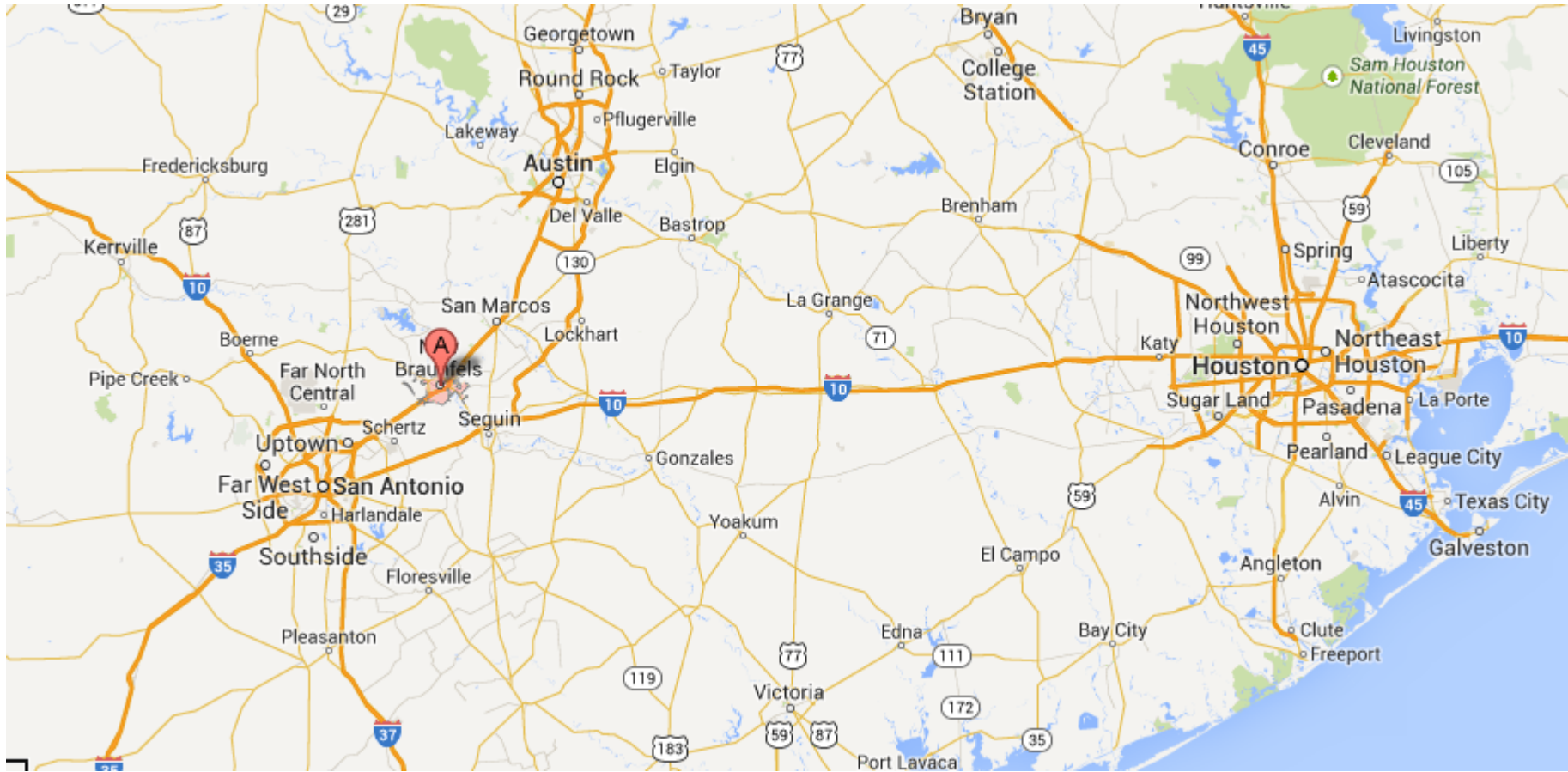
Common Name	Scientific Name	ESA Status
Fountain Darter	<i>Etheostoma fonticola</i>	Endangered
Comal Springs Riffle Beetle	<i>Heterelmis comalensis</i>	Endangered
San Marcos Gambusia	<i>Gambusia georgei</i>	Endangered
Comal Springs Dryopid Beetle	<i>Stygoparnus comalensis</i>	Endangered
Peck's Cave Amphipod	<i>Stygobromus pecki</i>	Endangered
Texas Wild Rice	<i>Zizania texana</i>	Endangered
Texas Blind Salamander	<i>Eurycea</i> [formerly <i>Typhlomolge</i>] <i>rathbuni</i>	Endangered
San Marcos Salamander	<i>Eurycea nana</i>	Threatened
Edwards Aquifer Diving Beetle	<i>Haideoporus texanus</i>	Petitioned
Comal Springs Salamander	<i>Eurycea</i> sp.	Petitioned
Texas Troglobitic Water Slater	<i>Lirceolus smithii</i>	Petitioned

- Conservation activities, 30+ line items totaling \$1.7M/year for first 7 years:
 - prevent impacts
 - augment habitat
 - non-native species removal
 - research

- Fountain Darter
 - *Etheostoma fonticola*



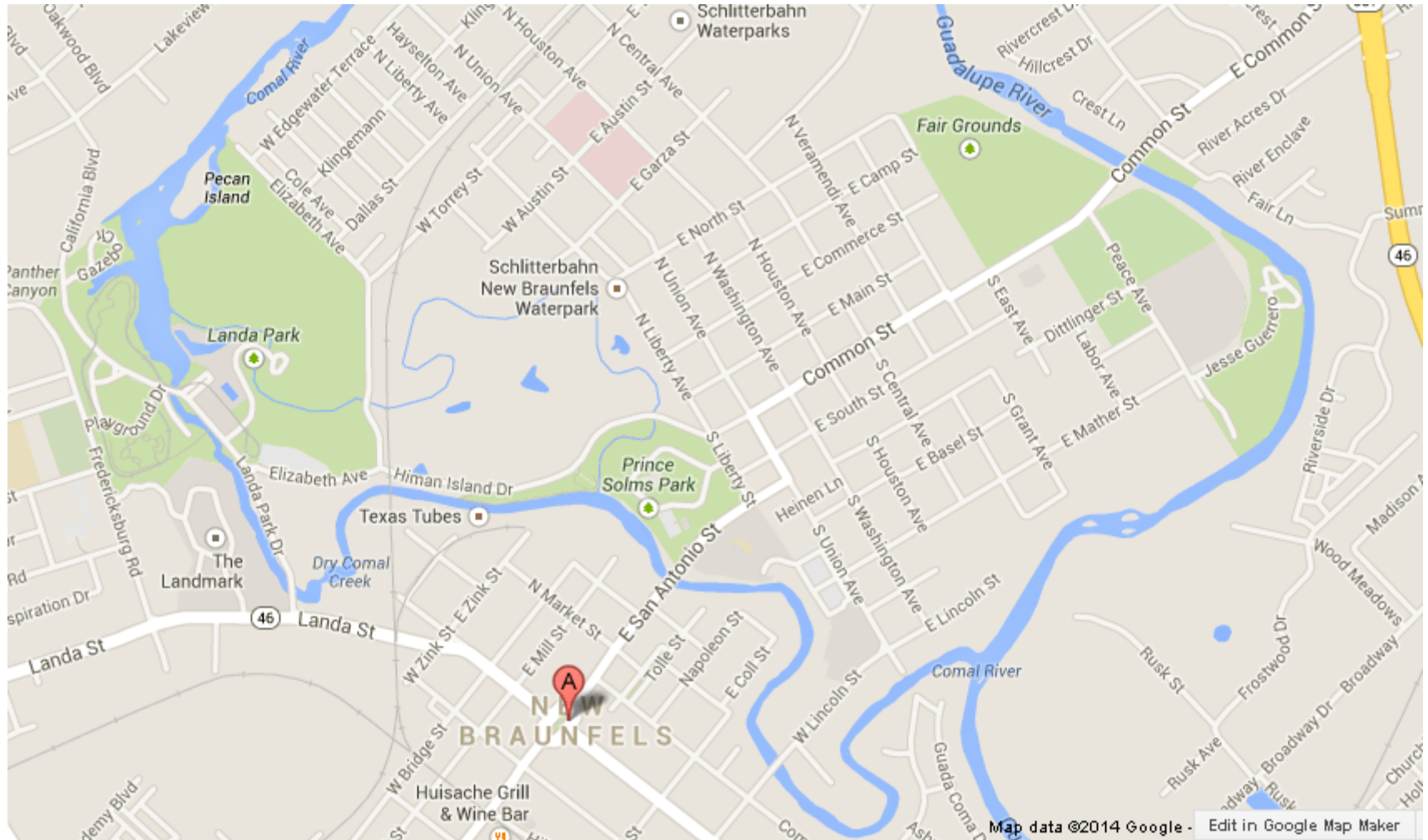
- Sediment Island Removal
- Non-native vegetation removal
- Re-vegetation and Habitat Restoration



Comal River and Landa Lake in New Braunfels, TX

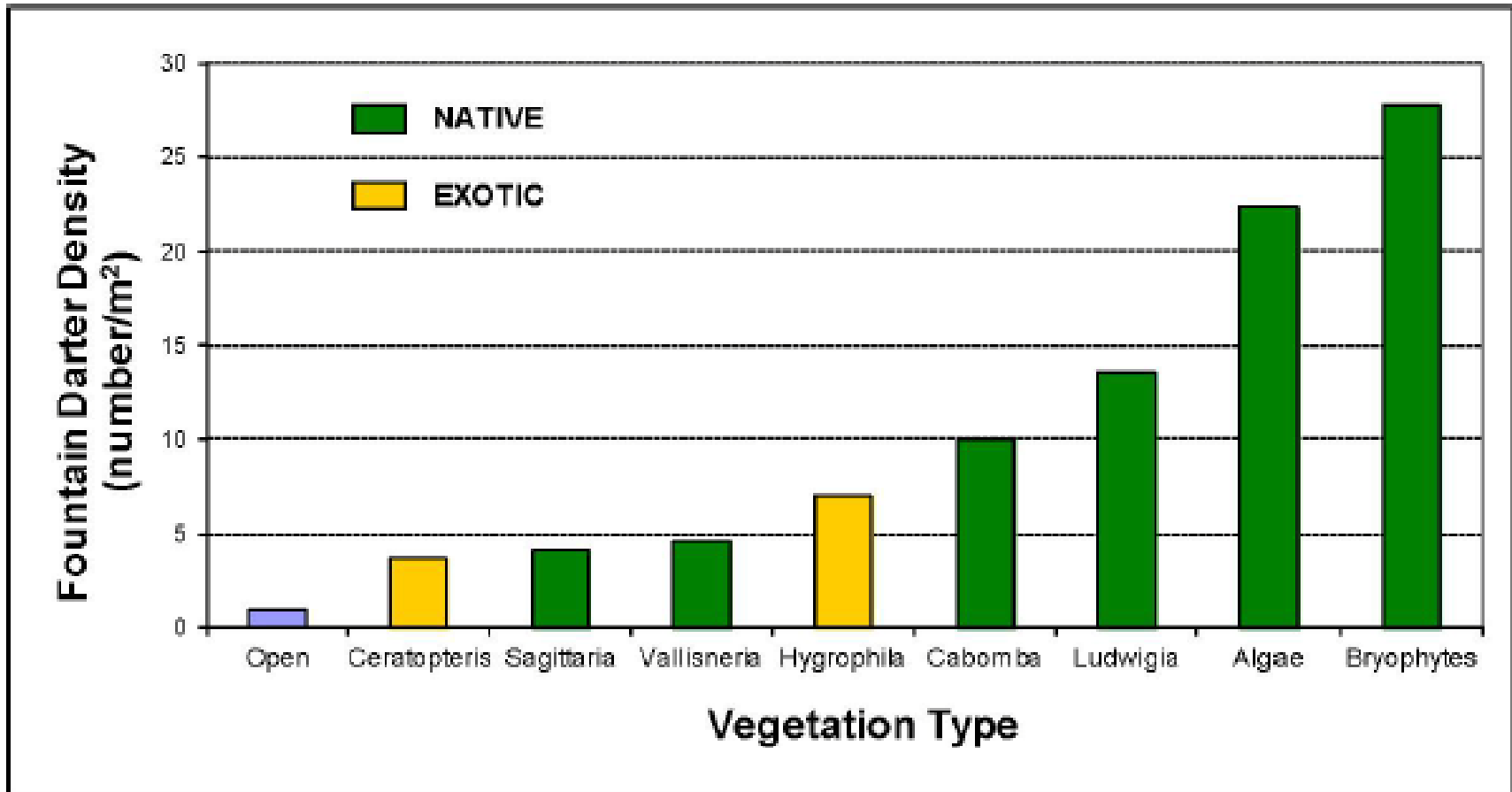


Comal River and Landa Lake in New Braunfels, TX



Comal River – At 2.5 miles is the shortest River in Texas!

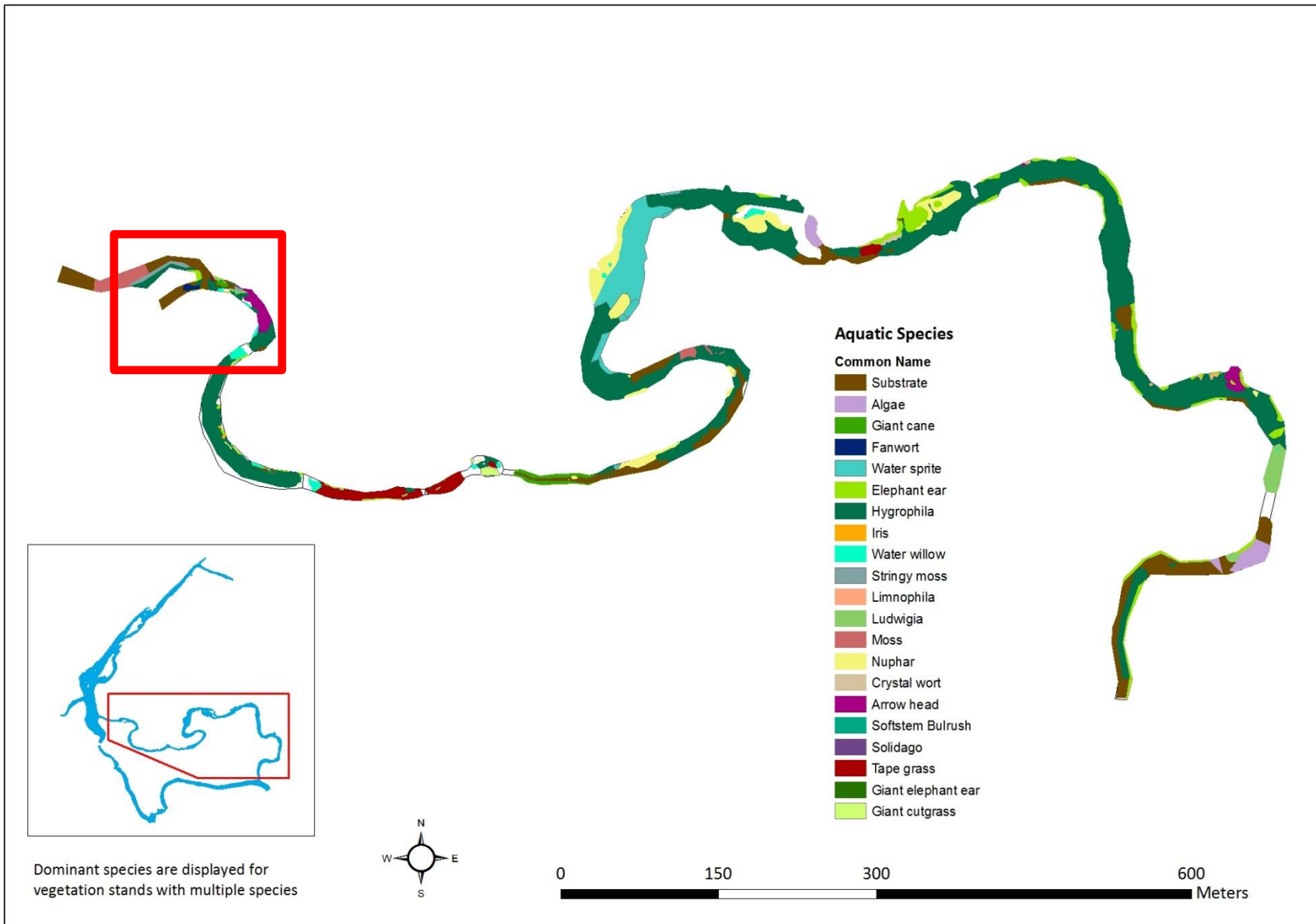


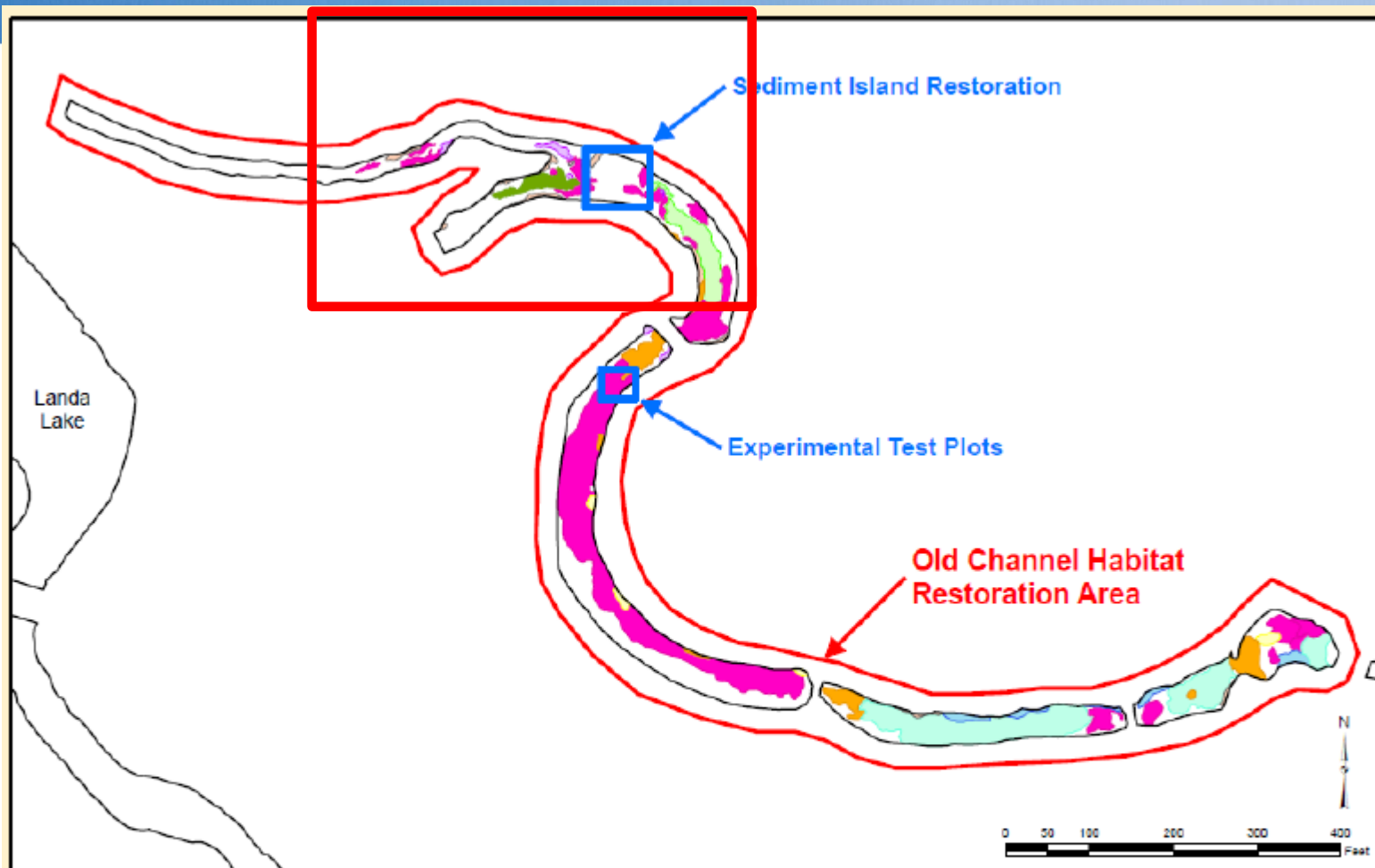


Based on 8-10 years of sampling and mapping

Comal River Aquatic Vegetation

Old Channel of the Comal River



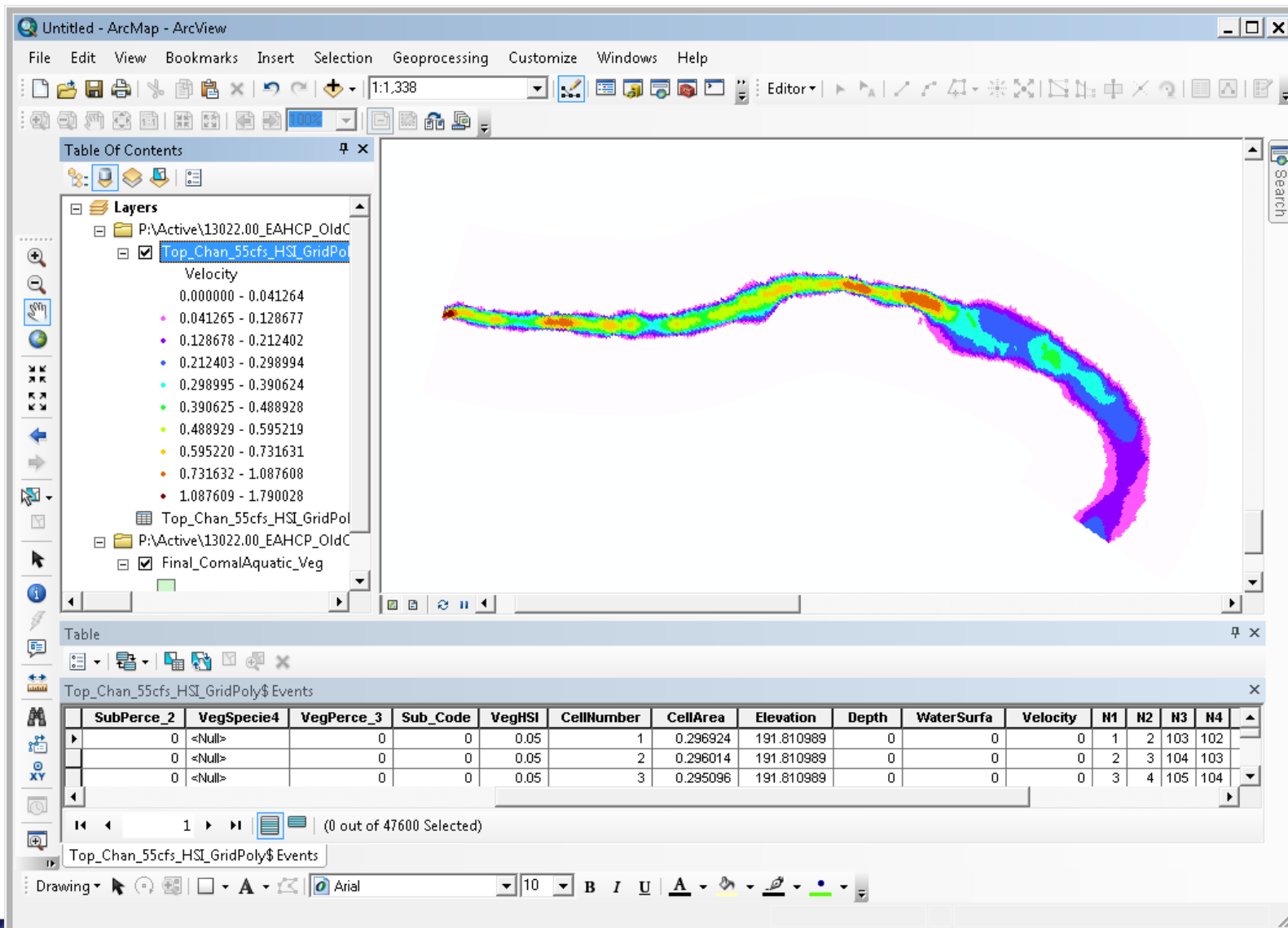


Legend		
2013 Project Area	<i>Hydrocotyle</i>	<i>Nuphar</i>
Bare Substrate	<i>Hygrophila</i>	<i>Sagittaria</i>
<i>Cabomba</i>	<i>Justicia</i>	<i>Vallisneria</i>
<i>Colocasia</i>	<i>Ludwigia</i>	<i>Zizaniopsis</i>



Old Channel Restoration

Vegetation and Shoreline Mapped January-February 2013



Table

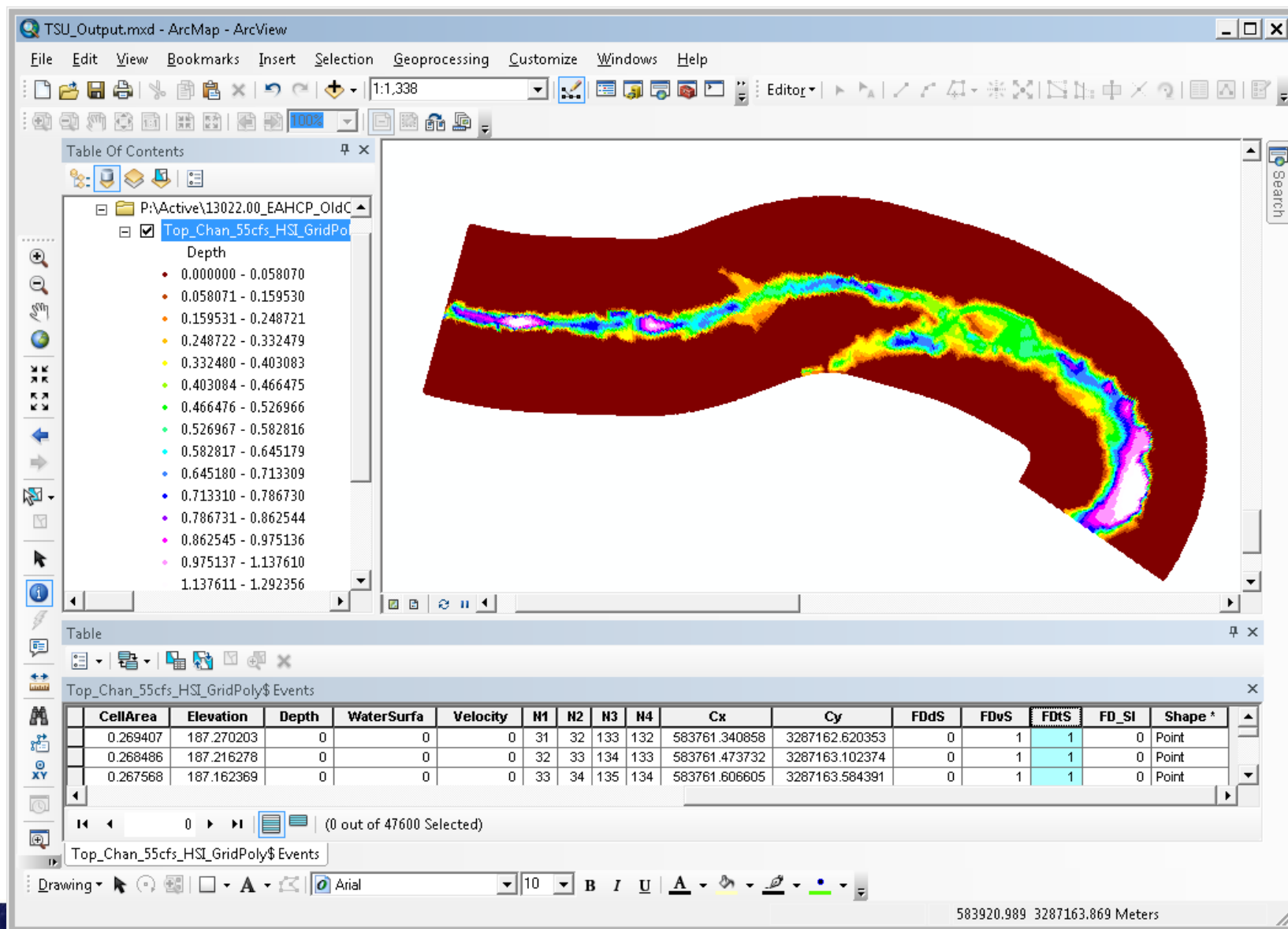
Top_Chan_55cfs_HSI_GridPoly\$ Events

	SubPerce_2	VegSpecie4	VegPerce_3	Sub_Code	VegHSI	CellNumber	CellArea	Elevation	Depth	WaterSurfa	Velocity	N1	N2	N3	N4
▶	0	<Null>	0	0	0.05	1	0.296924	191.810989	0	0	0	1	2	103	102
	0	<Null>	0	0	0.05	2	0.296014	191.810989	0	0	0	2	3	104	103
	0	<Null>	0	0	0.05	3	0.295096	191.810989	0	0	0	3	4	105	104

1 (0 out of 47600 Selected)

Top_Chan_55cfs_HSI_GridPoly\$ Events

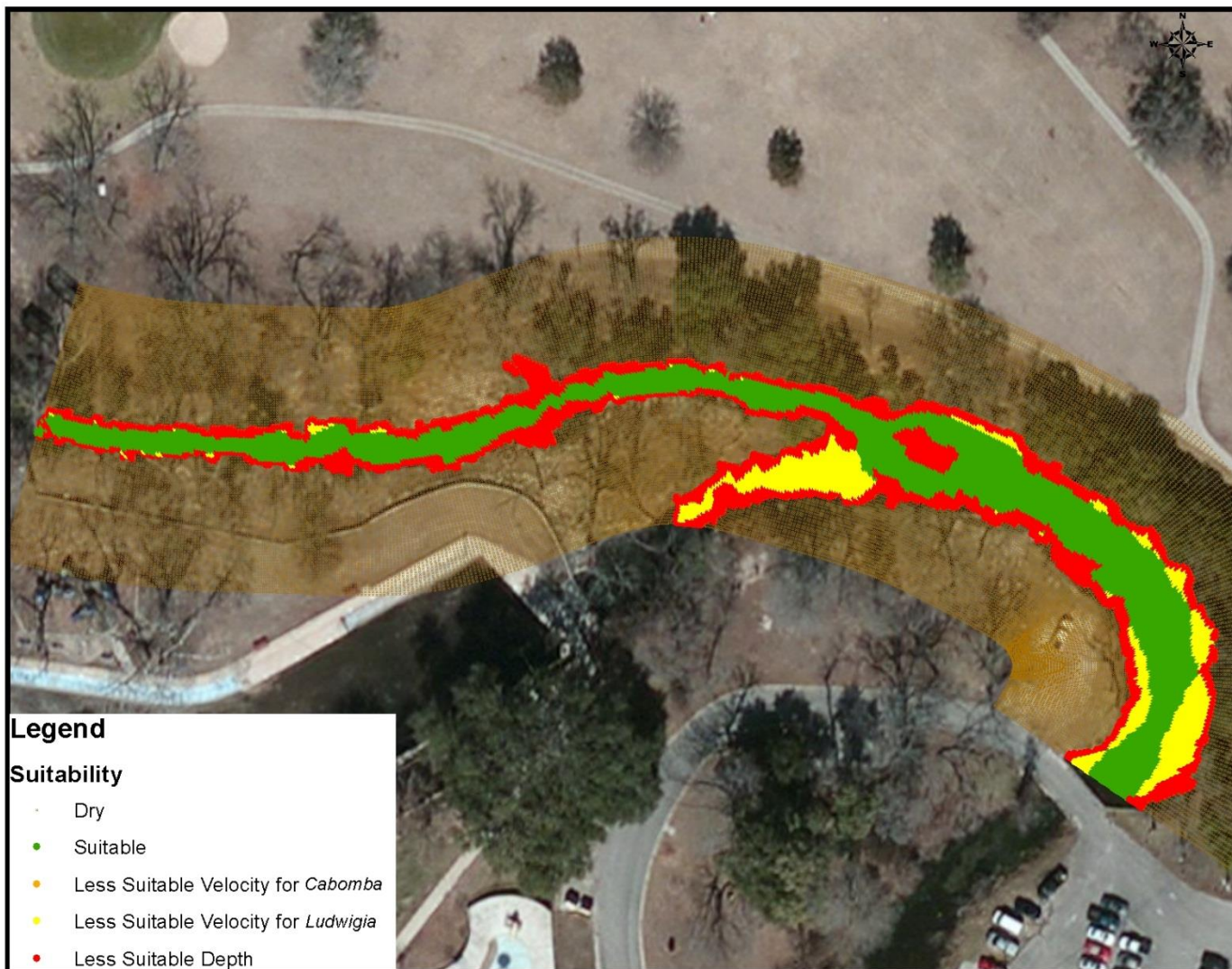
Drawing | Arial | 10 | B I U | A |



UOC1 20cfs

Unsuitable for Ludwigia
< 0.25 feet
< 0.05 fps

Unsuitable for Cabomba
>2fps



0 5 10 20 30 40
Meters

Comal River – Old Channel Sediment Island Removal Clearing non-native invasive vegetation (*Arundo donax*)





RPS

Island's last sunrise











RPS

Ready for re-vegetation
to increase fountain darter habitat



RPS

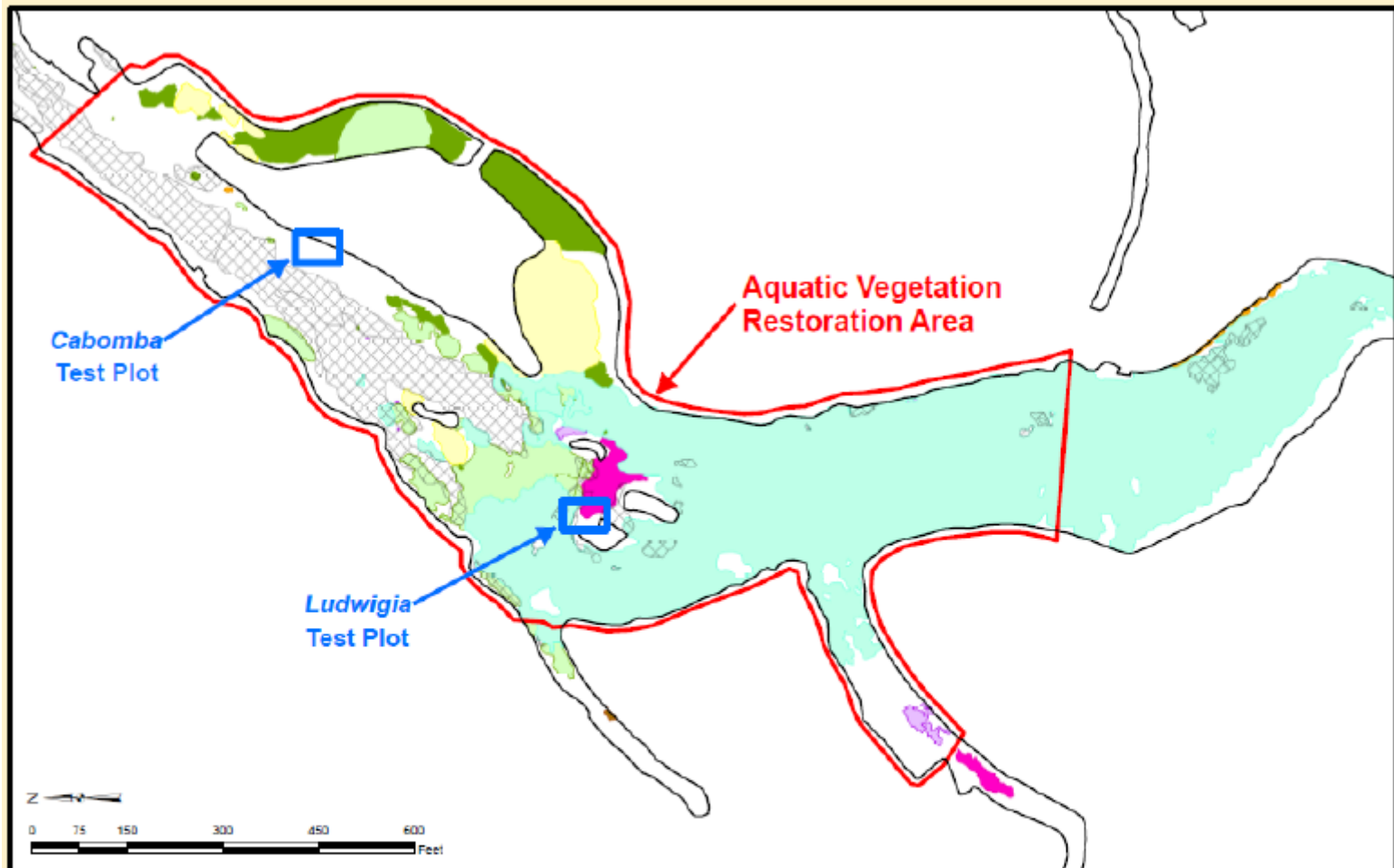
Ready for re-vegetating



- Three sources of native vegetation
 - Relocated from lake and river
 - Propagated in pond at USFWS Aquatic Resource Center
 - Propagated in Landa Lake

Plants to be Sourced in the Lake/River	Plants to be Propagated at ARC Pond	Plants to be Propagated in Landa Lake Nursery Areas
<i>Cabomba caroliniana</i> <i>Ludwigia repens</i> <i>Sagittaria platyphylla</i> Bryophytes	<i>Cabomba caroliniana</i> <i>Ludwigia repens</i> <i>Sagittaria platyphylla</i> Bryophytes	<i>Cabomba caroliniana</i> <i>Ludwigia repens</i> <i>Sagittaria platyphylla</i>



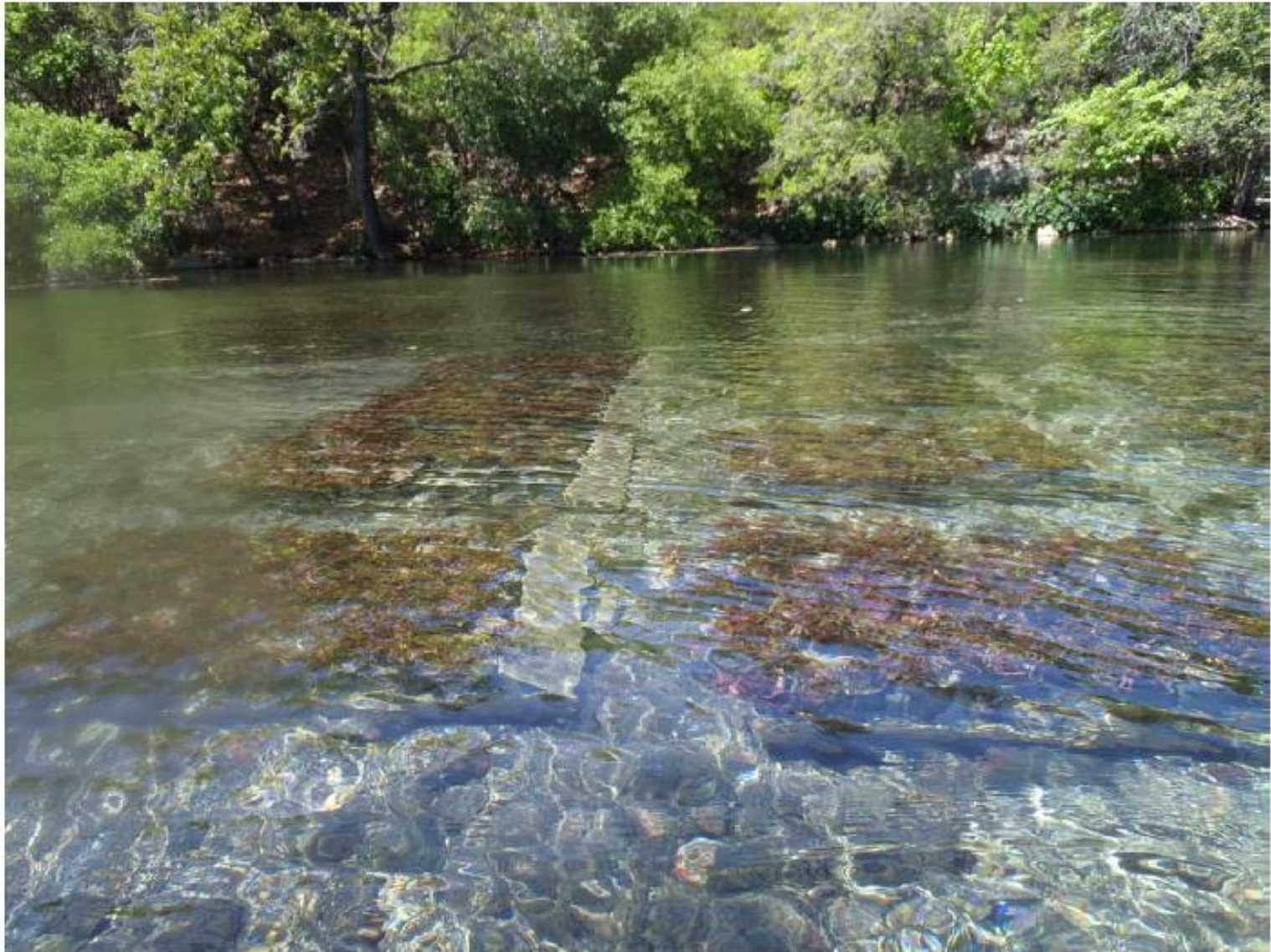


Legend		
2013 Project Area	<i>Hygrophila</i>	<i>Potamogeton</i>
Bare Substrate	<i>Justicia</i>	<i>Sagittaria</i>
Bryophytes	<i>Ludwigia</i>	<i>Vallisneria</i>
<i>Cabomba</i>	<i>Nuphar</i>	



Landa Lake Restoration

Vegetation and Shoreline Mapped January-February 2013



Mobile Underwater Plant Propagation Tray

48 pots per MUPPT
26 MUPPTs
=1,248 plants every 3 weeks







Replanting Restoration Area Ludwigia and Sagittaria







Replanting Restoration Area Ludwigia





The contractor reminded us...



- Sediment Island Removal
 - Hands-on collaborative approach
 - Good contractor

- Aquatic vegetation nurseries
 - Over 10,000 plants raised and transplanted in 2013
 - Natural water nursery outperformed laboratory pond

- Fountain Darter Habitat
 - Increased habitat during low flows

- Contact:
 - Tim Osting – tim.osting@rpsgroup.com
 - Ed Oborny – eoborny@bio-west.com

