Aquatic Vegetation Restoration in the Comal River : Year 1

Texas Society of Ecological Restoration 2013

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City of New Braunfels

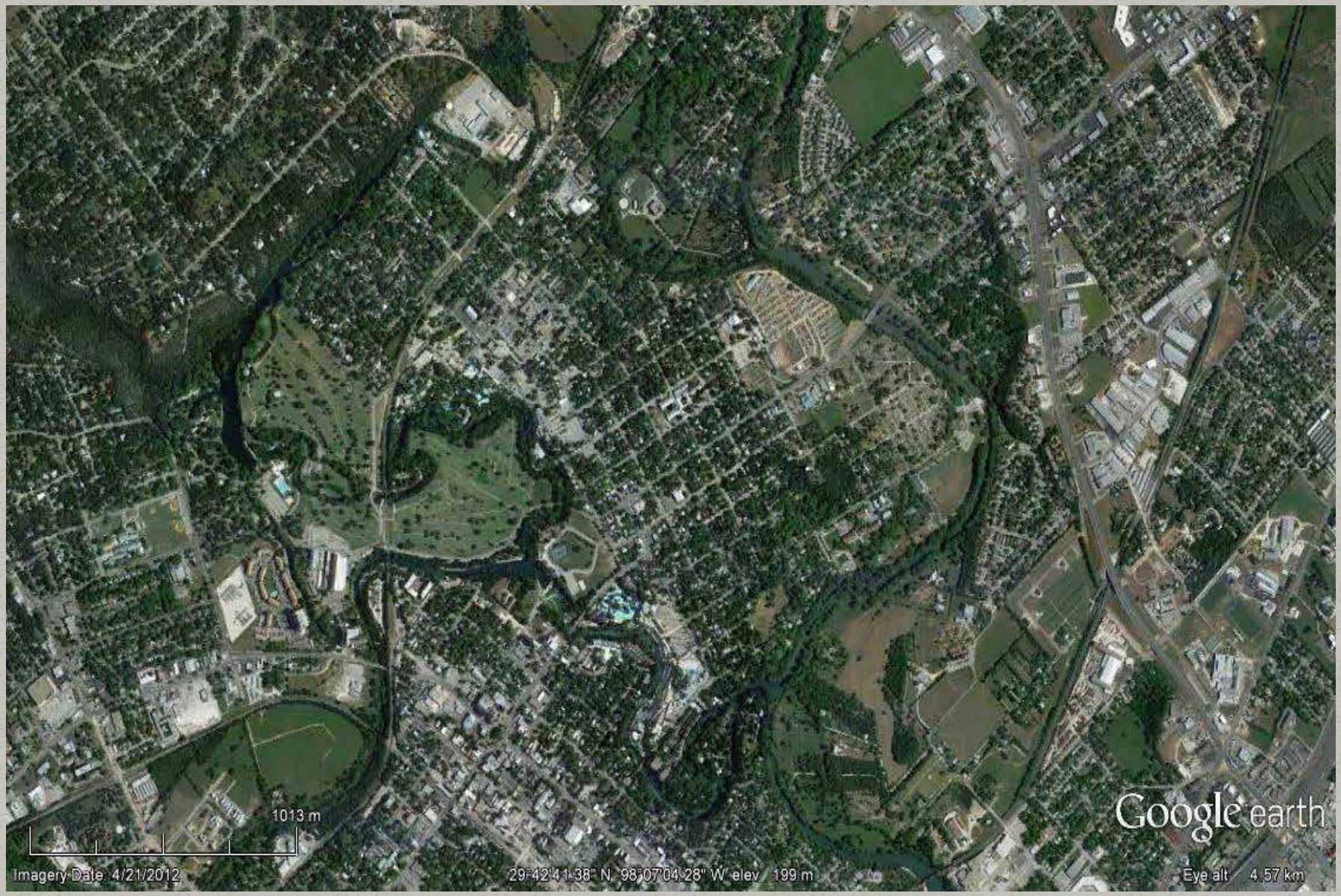
BIO-WEST


Largest springs in Texas
Cities and towns
SALADO
Salado Springs
AUSTIN
Barton Springs
San Marcos Springs
SAN MARCOS
Hueco Springs
Comal Springs
NEW BRAUNFELS
San Antonio Springs
San Felipe Springs
San Pedro Springs
SAN ANTONIO
BRACKETVILLE
DEL RIO
Las Moras Springs

Comal Springs

- Headwaters of the Comal River
- Largest spring system in Texas
- 5 T/E species (including the fountain darter)
- Short river / highly urbanized
- Highly altered ecosystem
- History of no flows

The Comal River in New Braunfels, TX



HABITAT CONSERVATION PLAN
EDWARDS AQUIFER

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Mission & Goals

The goal of the HCP is to protect endangered species from harm during the most severe drought to the extent required by state and federal law

Habitat Conservation Plan

Click Here to View the Full Documentation

HCP Goals : To minimize and mitigate the impacts of recreation and pumping during periods of low flow
INCLUDES:

- Control of non native flora and fauna

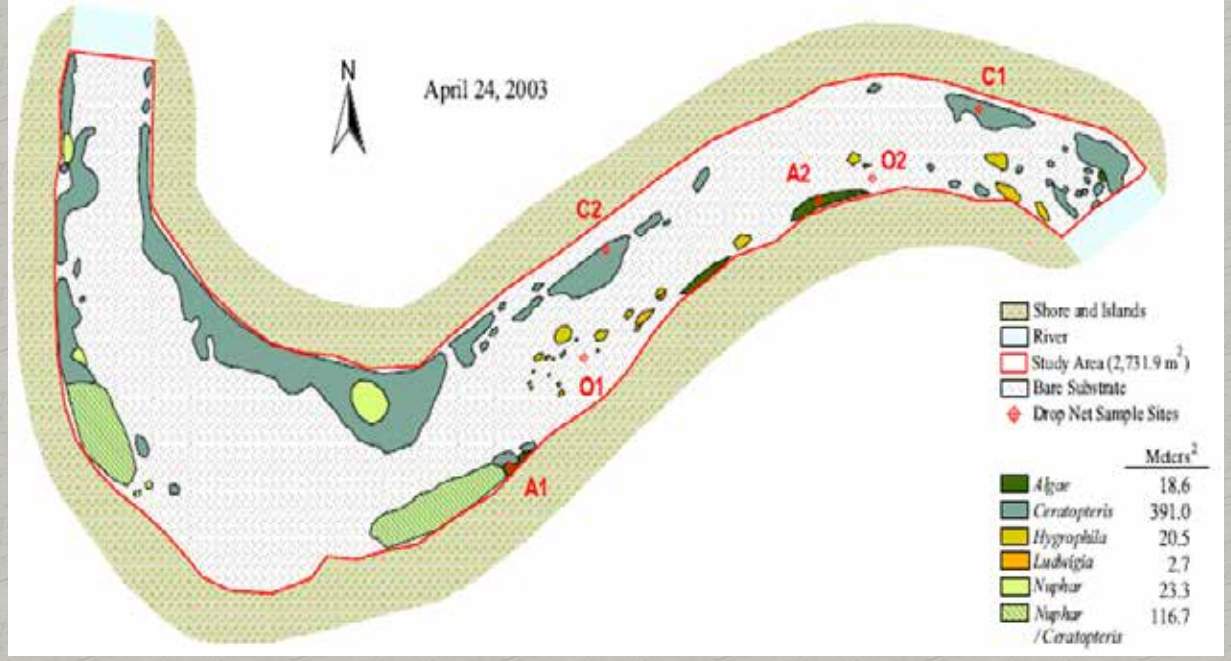
  Hygrophila polysperma, Arundo donax

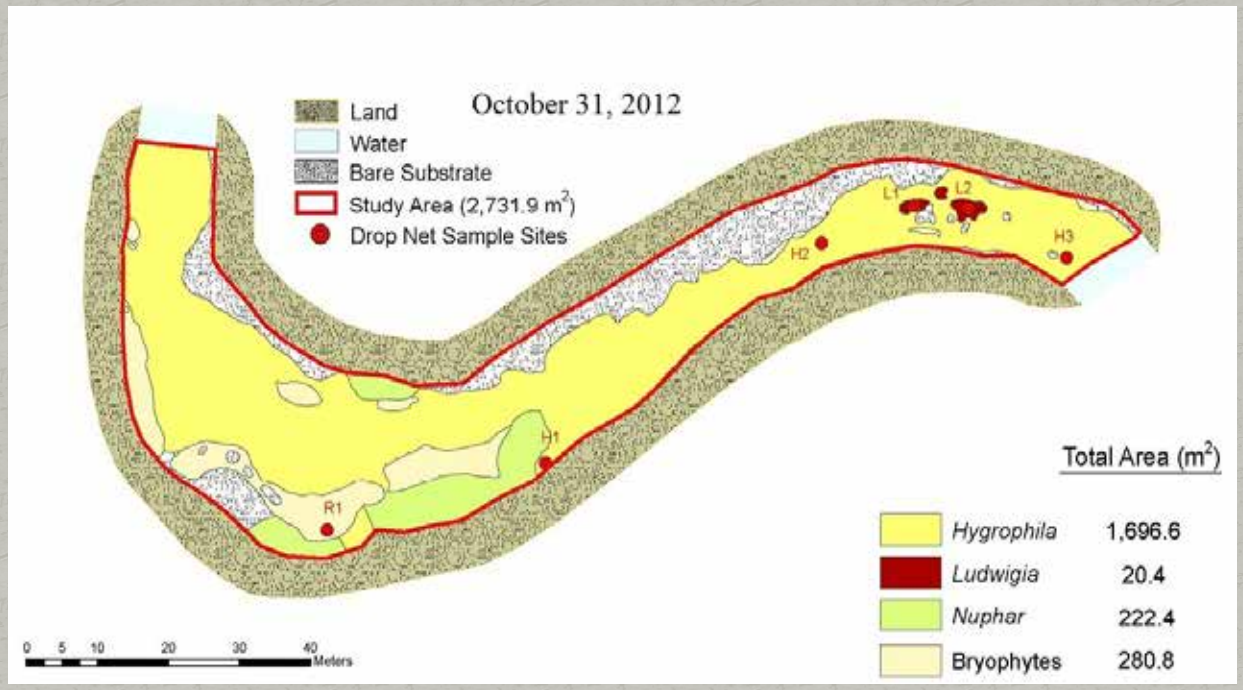
- Restore native habitat for the fountain darter

  Revegetation in Old Channel and Landa Lake, produce refugia areas

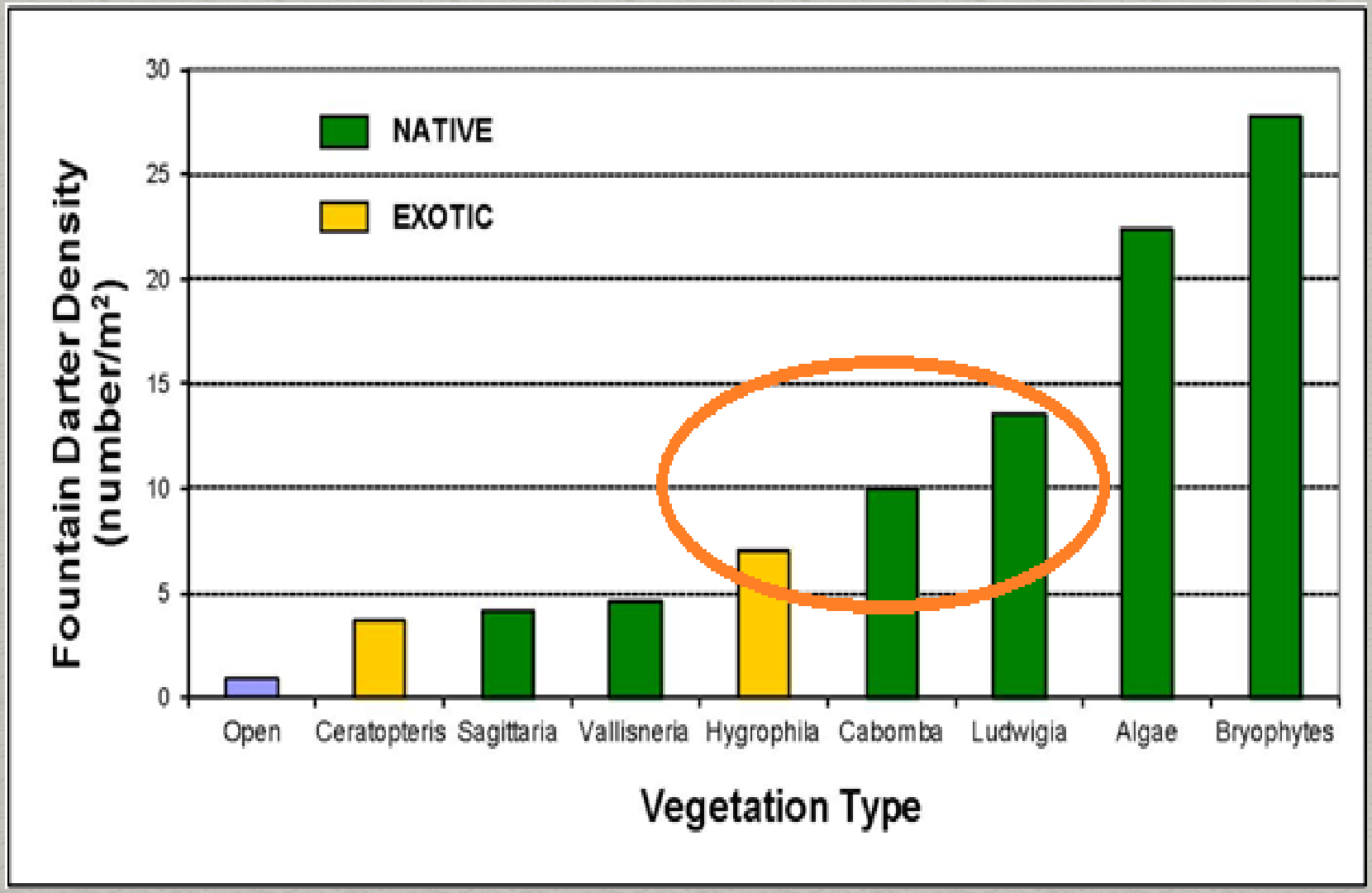
Hygrophila polysperma (Acanthaceae)

- **Native to Southeast Asia**
- **Currently found in Florida, Texas and Tamaulipas, Mexico**
- **Found in the three largest spring systems in Texas**
- **Listed as a Federal Noxious Weed**

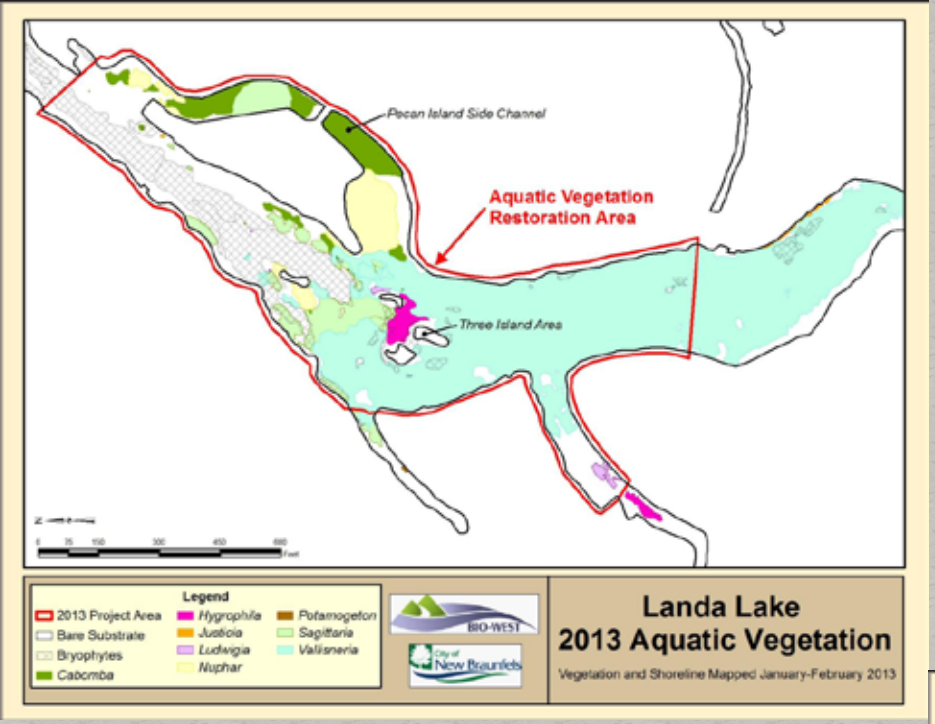

N
April 24, 2003
C1
A2
O2
C2
O1
A1
Shore and Islands
River
Study Area (2,731.9 m²)
Bare Substrate
Drop Net Sample Sites
Meters²
Algae 18.6
Ceratopteris 391.0
Hygrophila 20.5
Ludwigia 2.7
Nuphar 23.3
Nuphar /Ceratopteris 116.7


October 31, 2012
Land
Water
Bare Substrate
Study Area (2,731.9 m²)
Drop Net Sample Sites
L1
L2
H2
H3
H1
R1
0 5 10 20 30 40 Meters
Total Area (m²)
Hygrophila 1,696.6
Ludwigia 20.4
Nuphar 222.4
Bryophytes 280.8

Why is native vegetation important?



1.2013 Full System Mapping Effort



Hygrophila polysperma= 522.9 m²

Ludwigia repens = 191.7 m²

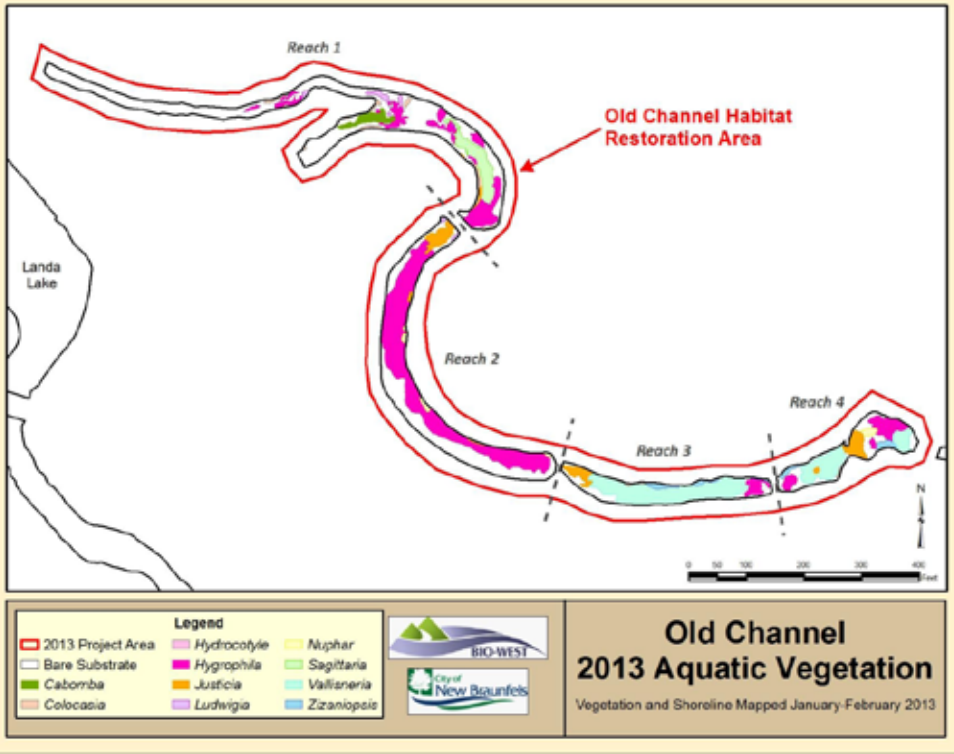
Cabomba caroliniana= 2,713 m²

Hygrophila polysperma= 2,177.4 m²

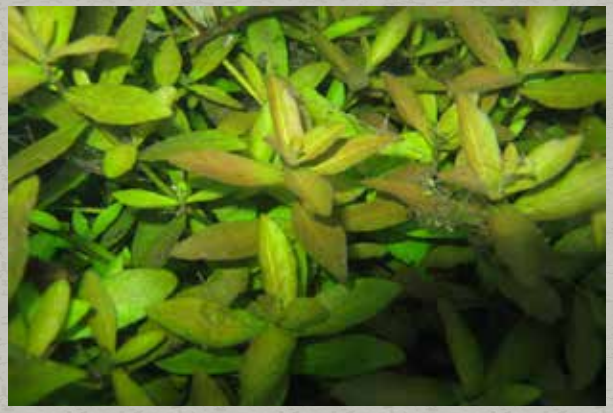
Ludwigia repens coverage = 123.7 m²

Cabomba caroliniana coverage = 117.3 m²

Sagittaria platyphylla coverage = 281.6m²



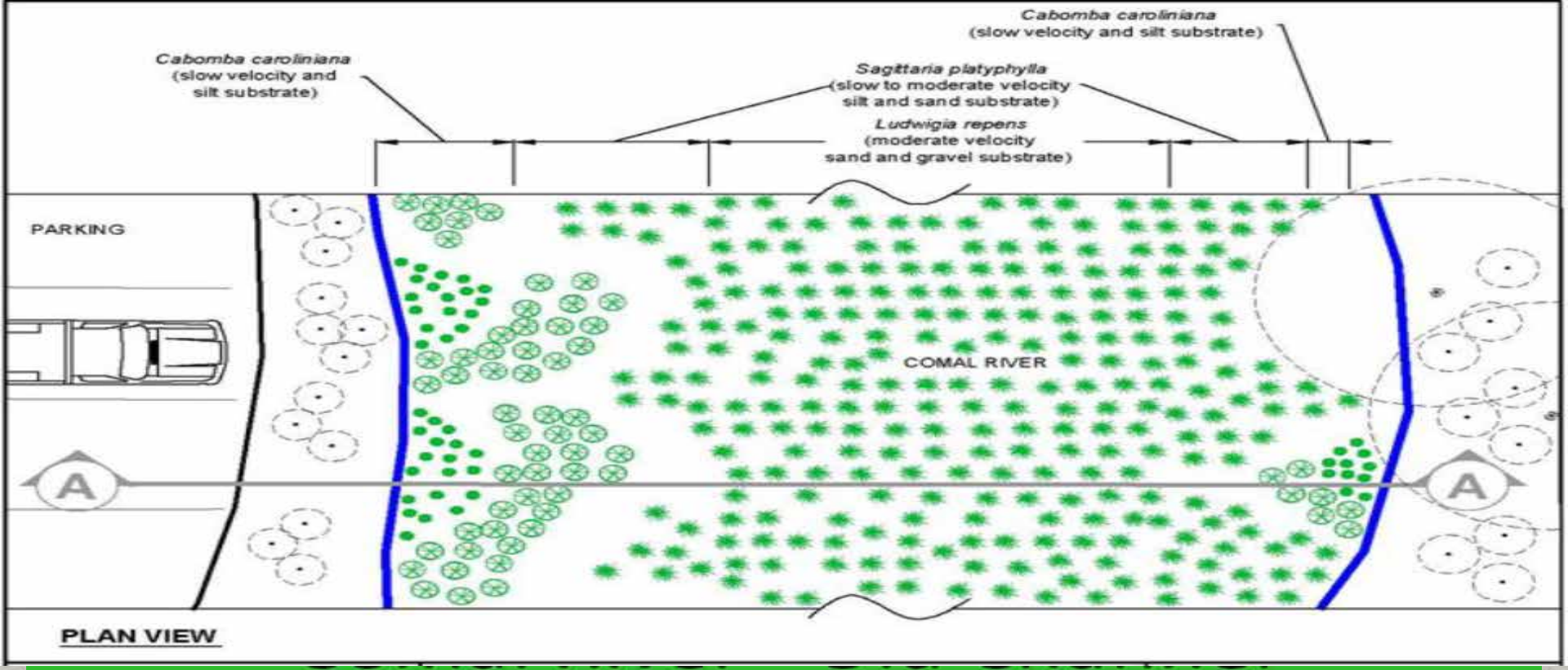
Hygrophila polysperma



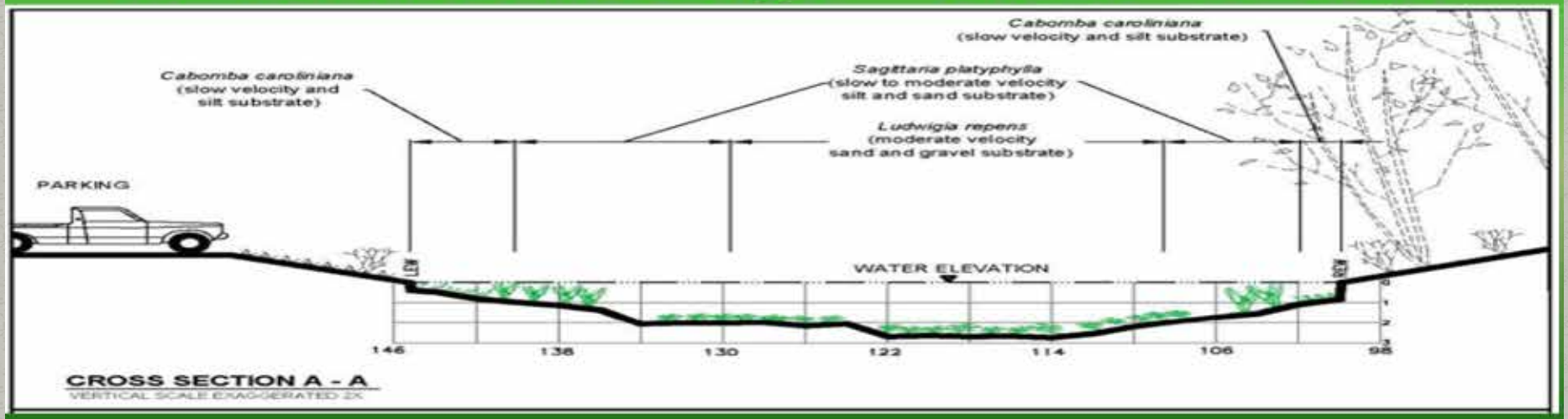
Cabomba caroliniana

Ludwigia repens

Sagittaria platyphylla



Restoration Design – Cross Section



Plant Propagation Methods

§ Nursery Pond / Greenhouse Production

high maintenance/ transportation issues

Require hardening off

§ Transplants

Erratic success rate

§ Field Nursery

(Mobile Underwater Plant Propagation Trays)

MUPPTs

- Sourced material from the Comal River
- Planted in native soil
- Grown at site in Landa Lake
- Provide 1,248 plants each turnover

-Plants are adapted to field conditions (Hardened Off)
-No transport issues
-Bryophytes attach to plants

Ludwigia repens

Cabomba caroliniana

Sediment Island MAY 2013

Hygrophila removal

-Hand pulling

-Raking

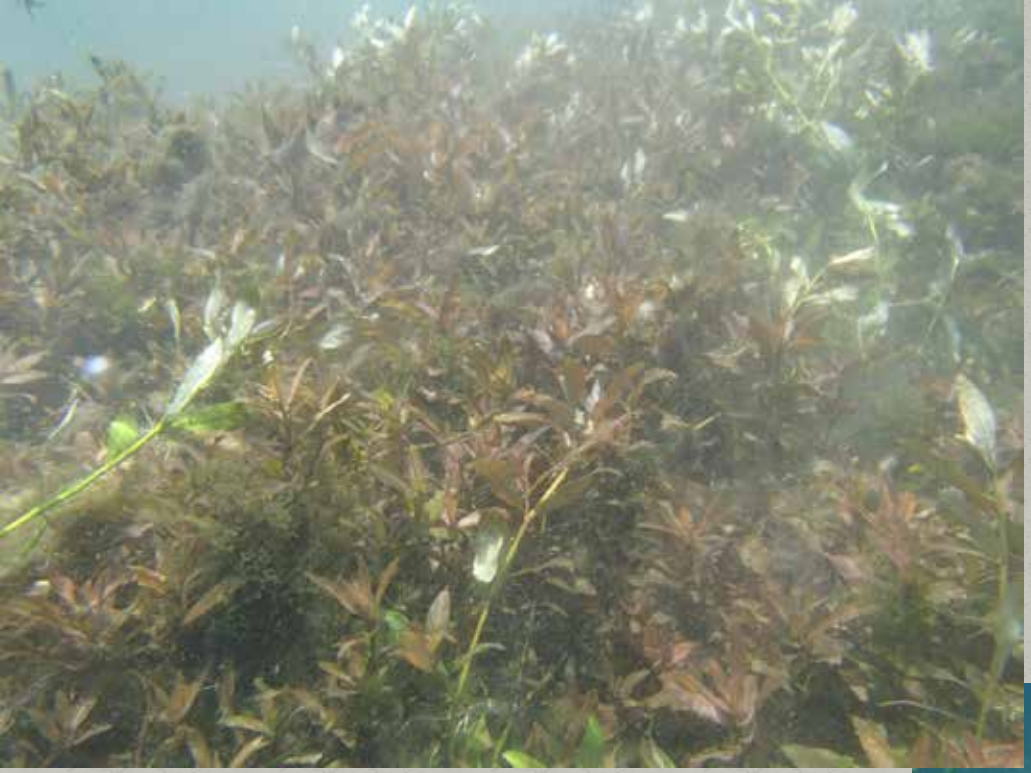
-SCUBA / Snorkel

MUPPT Harvest

Planting *Cabomba caroliniana* in a velocity shelter

Cow lily is a good companion plant for Cabomba!

Planting *Ludwigia repens*



Planting site before Hygrophila removal

Planting site after Hygrophila removal and restoration with *Ludwigia repens*

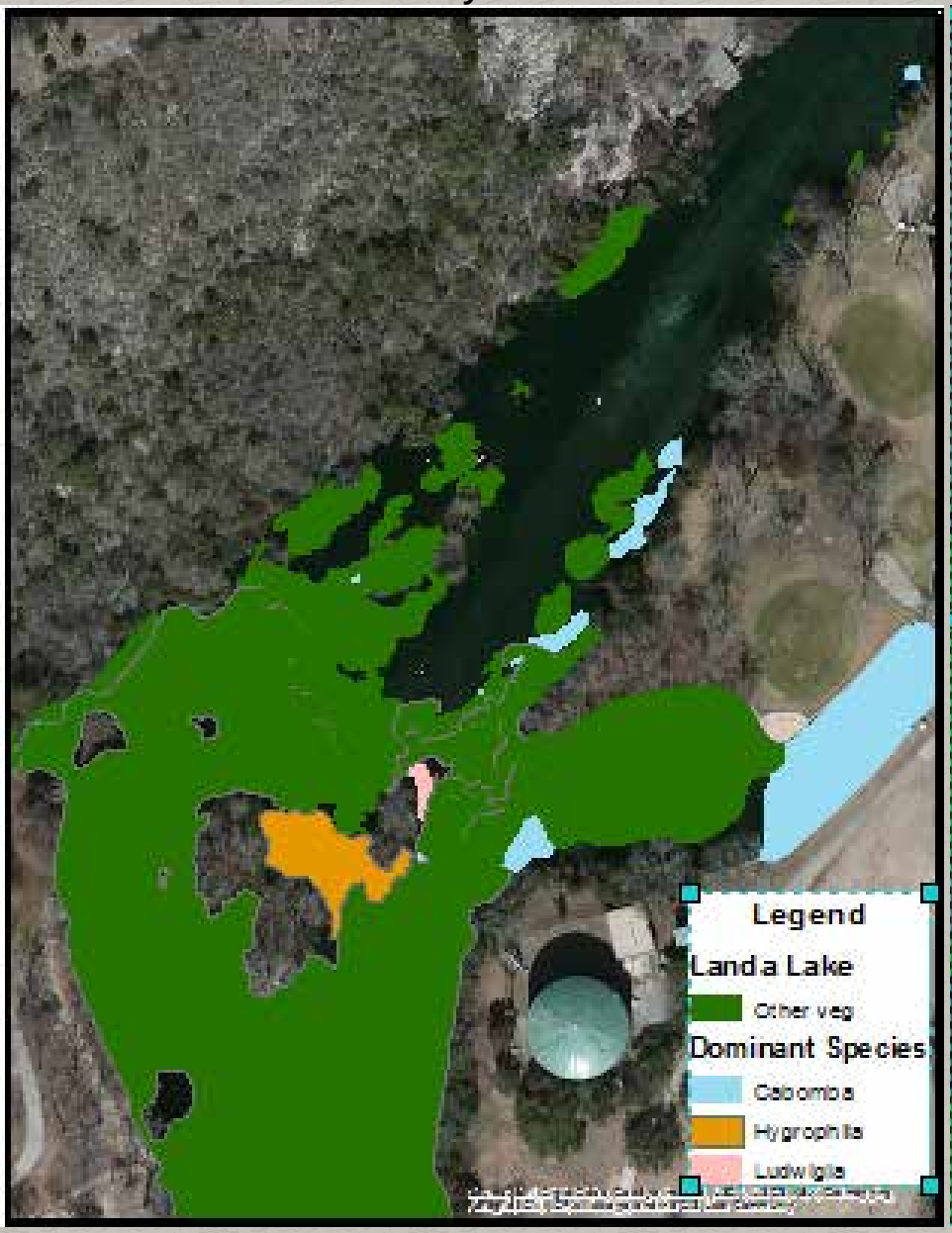

Immediately after planting


Immediately after planting

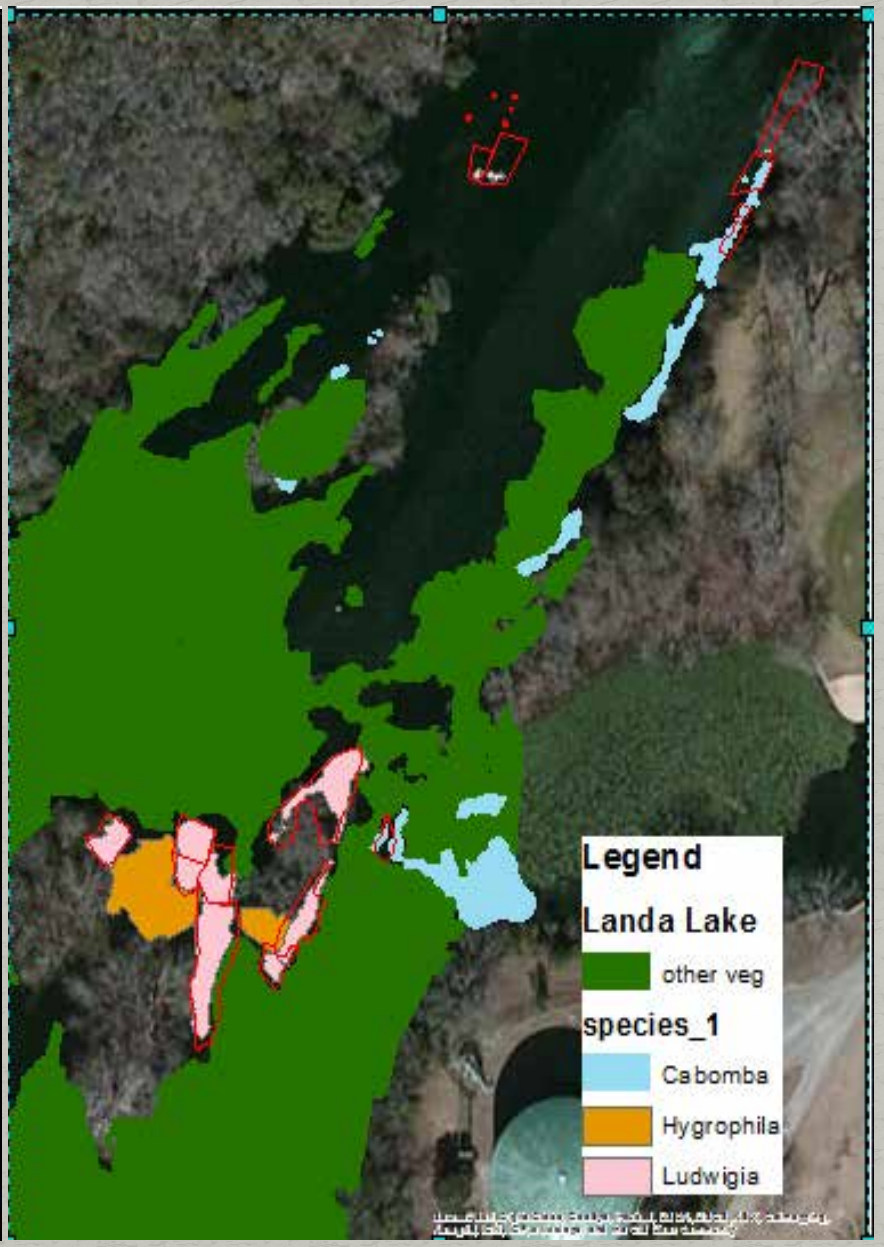

~ 6 weeks after planting


~ 6 weeks after planting

February 2013



October 2013



February 2013

October 2013

By the Numbers: Landa Lake

Area of Hygrophila removed - 348m²

Area planted in Cabomba - 122m²

Area Covered - 36 m²

Area Planted in Ludwigia- 357 m²

Area Covered - 319 m²

By the Numbers
Old Channel

Area of Hygrophila Removed - 1,079 m²

Area Planted - 1366 m²

Area cover of planted Ludwigia - 564m²

Area cover of Cabomba - 61.5m²

Area cover of Sagittaria - 33.61 m²

659.11m²

By the Numbers

Old Channel

Ludwigia repens	4,903
Cabomba caroliniana	767
Sagittaria platyphylla	611

Landa Lake

Ludwigia repens	2,102
Cabomba caroliniana	915

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total plants planted 9,298

Aquatic gardening and monitoring

Take Home Message

- Improved habitat which will in turn increase fountain darter density in these areas.
- Hygrophila is controllable with consistent gardening
- Native plants will grow differently under different conditions.

Questions?