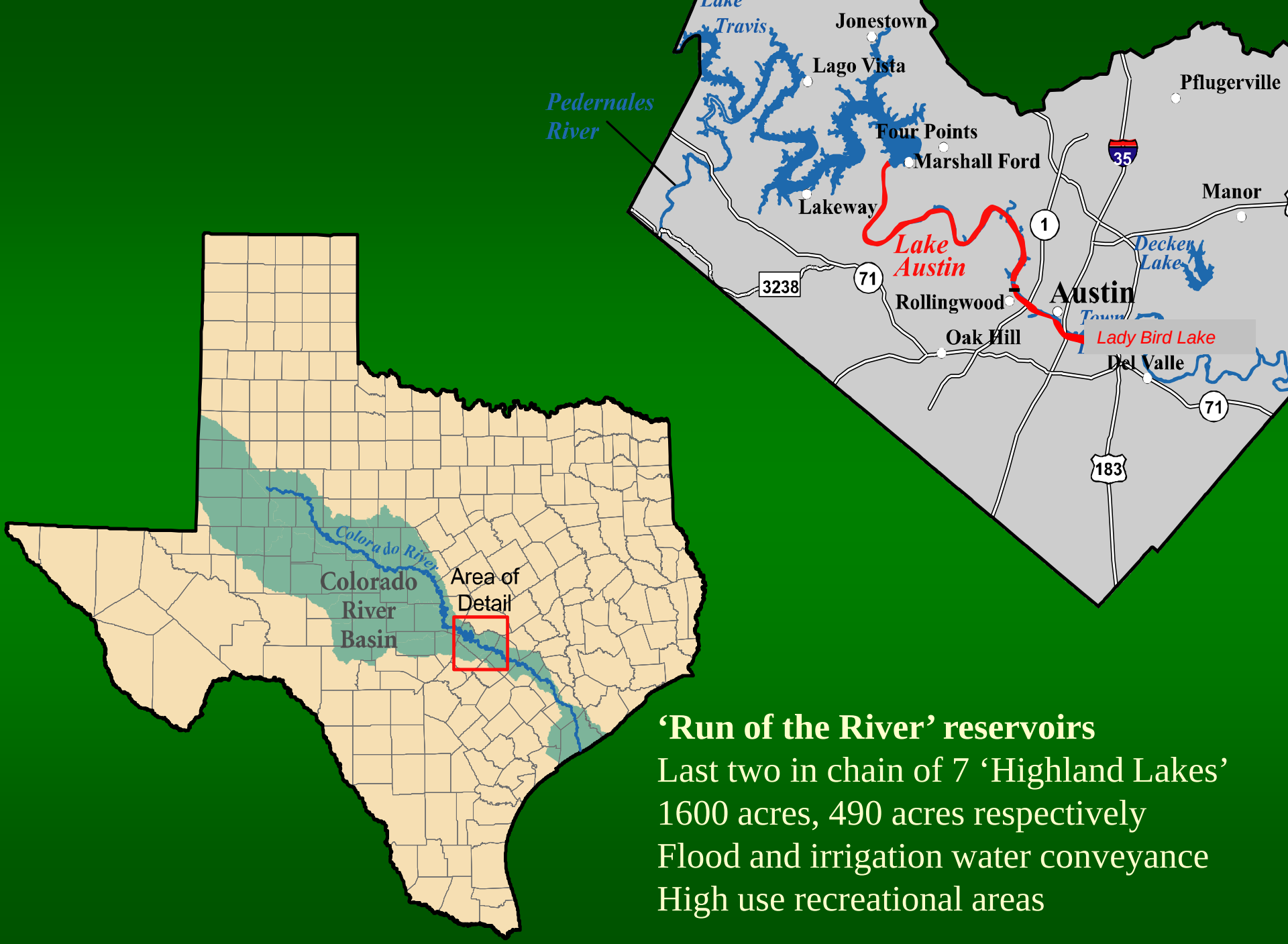
Aquatic Invasive Species Control Efforts in Austin, Texas

Gulf & South Atlantic Regional Panel on Aquatic Invasive Species

Austin TX

October 4, 2011



‘Run of the River’ reservoirs

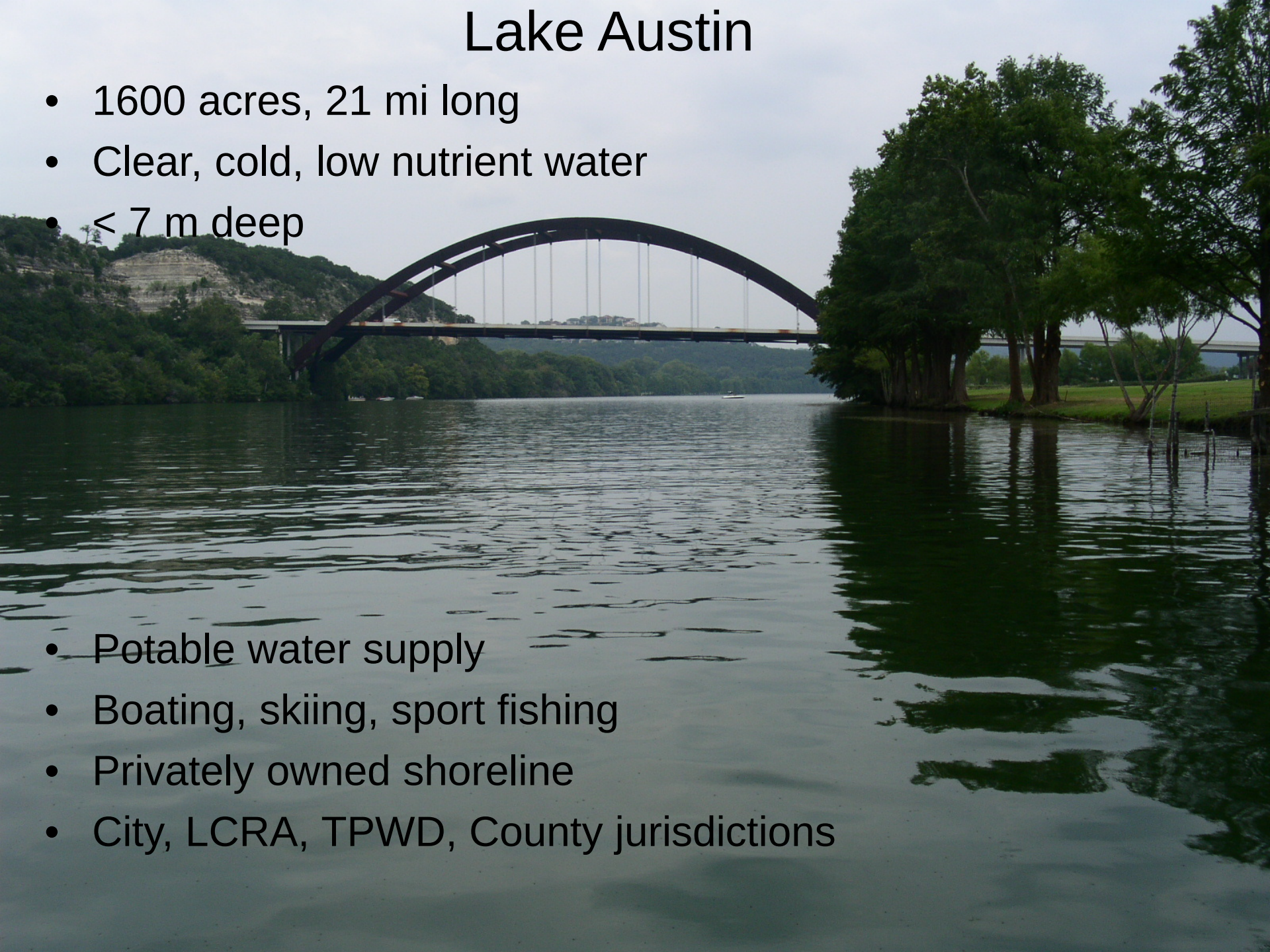
Last two in chain of 7 ‘Highland Lakes’

1600 acres, 490 acres respectively

Flood and irrigation water conveyance

High use recreational areas

Lake Austin



- 1600 acres, 21 mi long
- Clear, cold, low nutrient water
- < 7 m deep

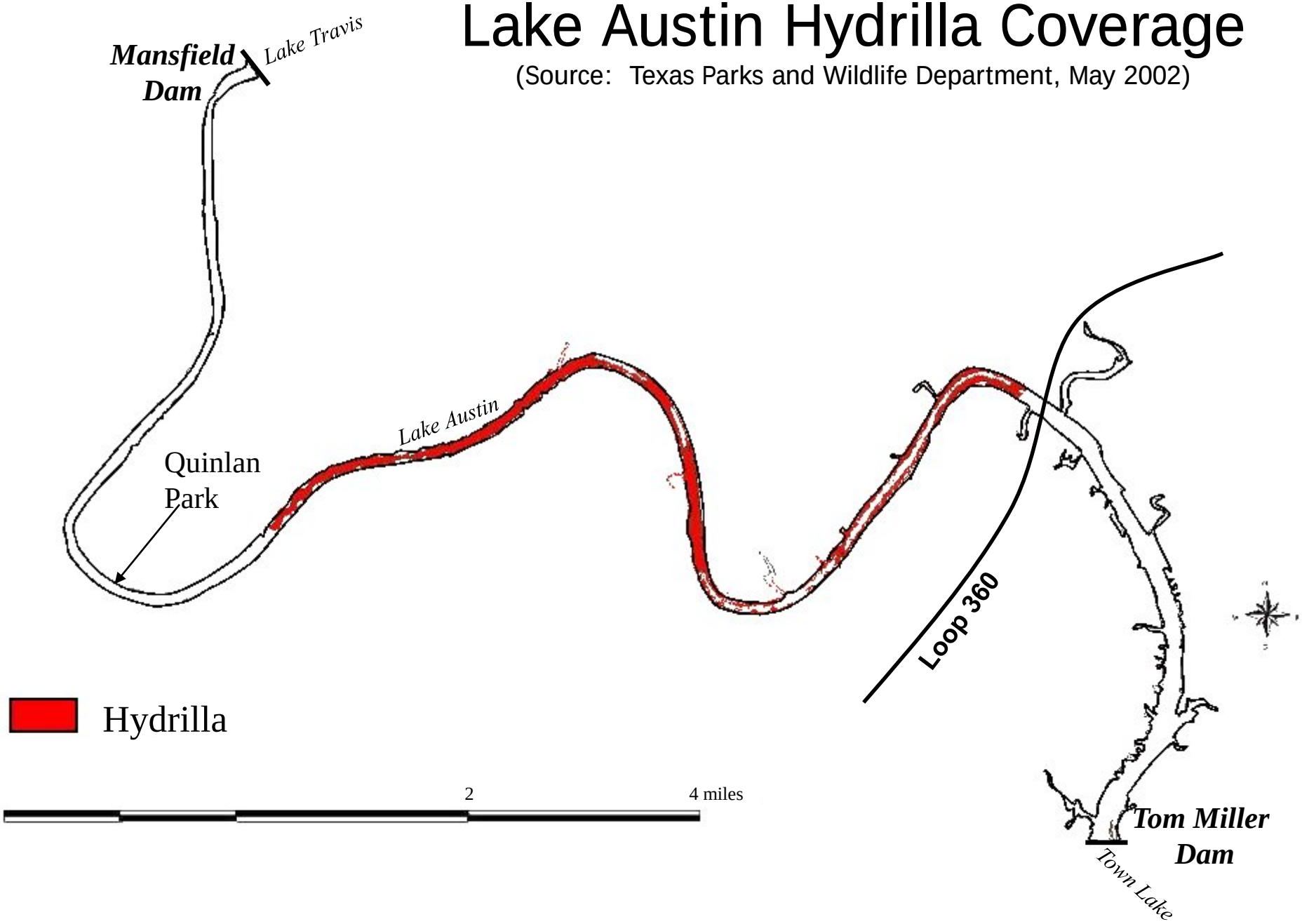
- Potable water supply
- Boating, skiing, sport fishing
- Privately owned shoreline
- City, LCRA, TPWD, County jurisdictions

Lake Austin Aquatic Vegetation

- Eurasian watermilfoil (*Myriophyllum spicatum*) dominant
  - Controlled by biennial winter drawdowns
  - In less than 12 ft
- July 1999
  - 23 acres Hydrilla (*Hydrilla verticillata*), 10 % of total veg
  - First found at boat ramps
- July 2000
  - 200 acres, 40% of total veg
  - Up to 20 ft deep
- July 2002
  - 320 acres, bank to bank

Lake Austin Hydrilla Coverage

(Source: Texas Parks and Wildlife Department, May 2002)



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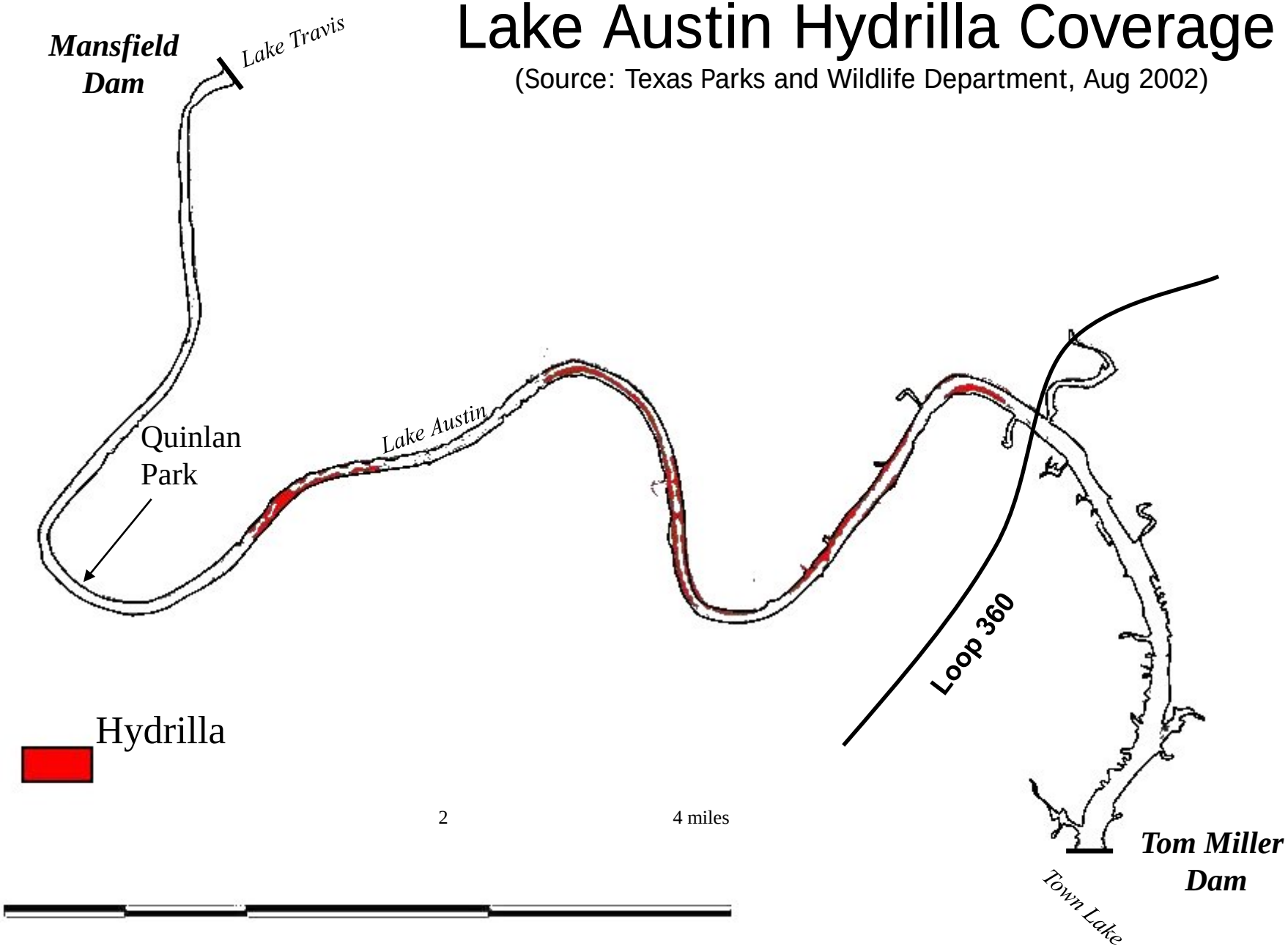


Lake Austin
Hydrilla Management Plan

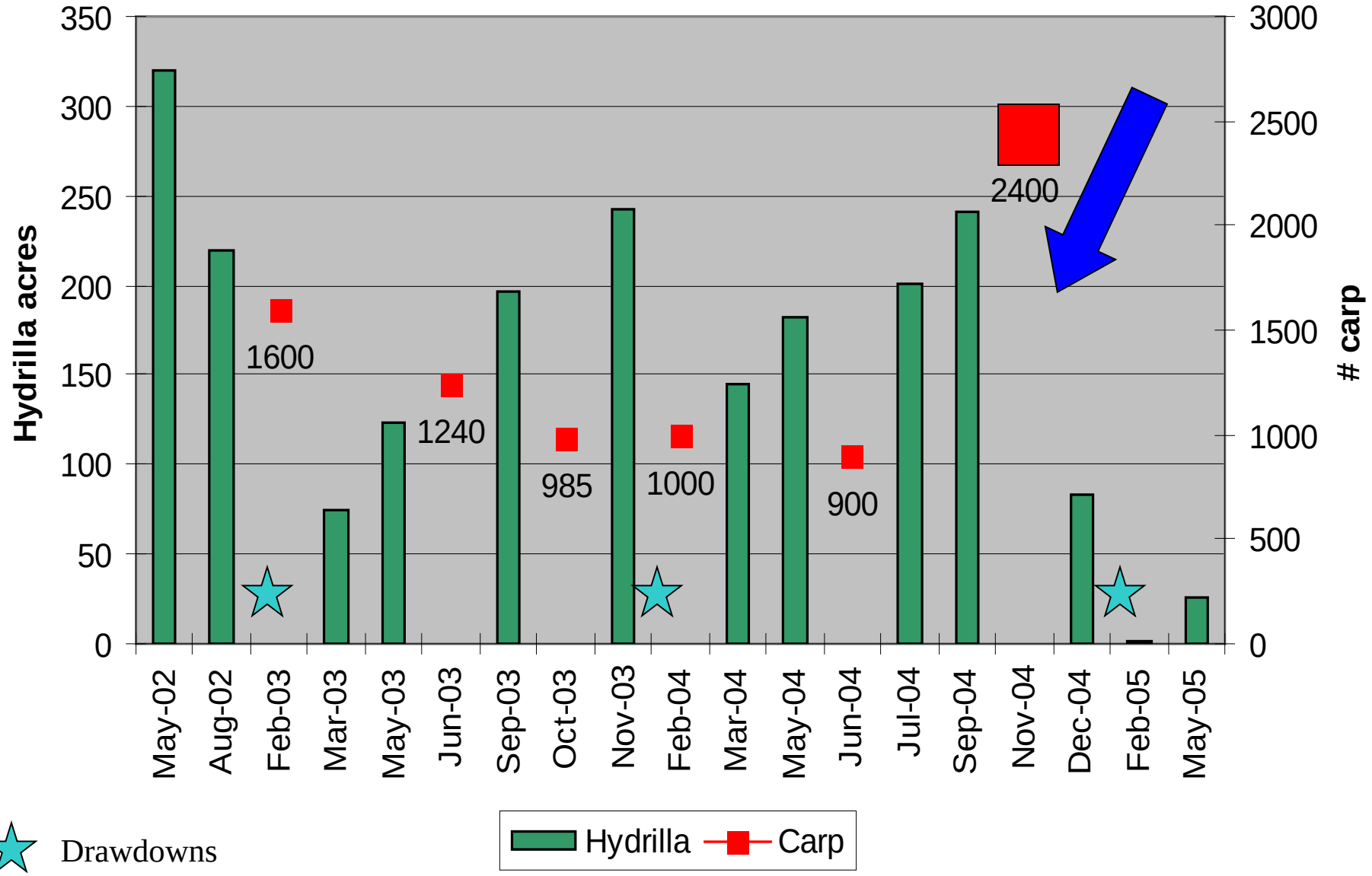
- Partners:
  - COA, TPWD, LCRA, FOLA
- Objectives:
  - Pre-hydrilla condition
  - Maintain lake ecosystem

- Integrated Efforts:
  - Winter drawdown
  - Harvesting/herbicides on mats
  - Incremental grass carp stocking
  - Stocking based on veg surveys

Initial obstacles to grass carp

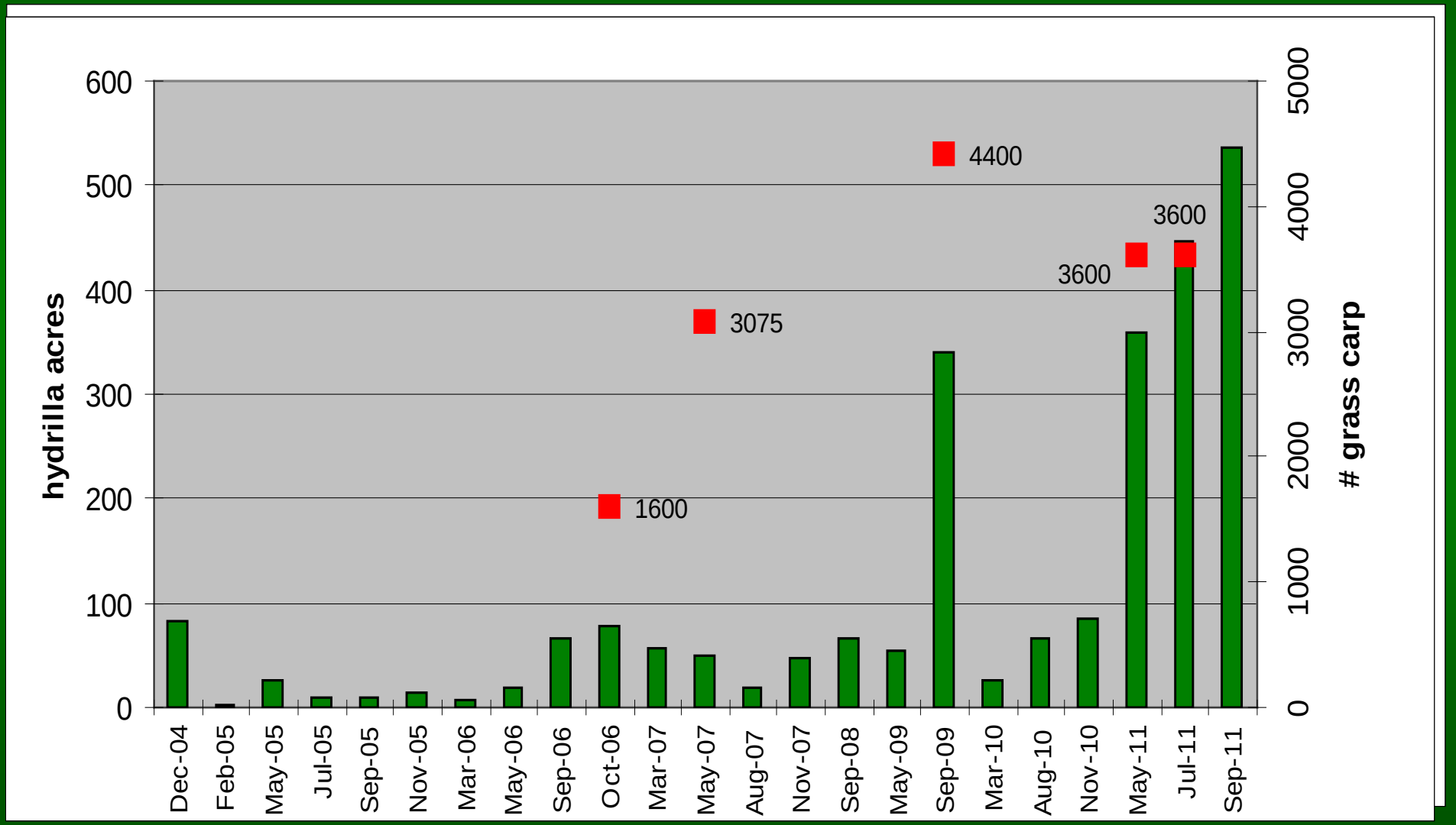
Plan Implementation

8125 fish stocked before significant change

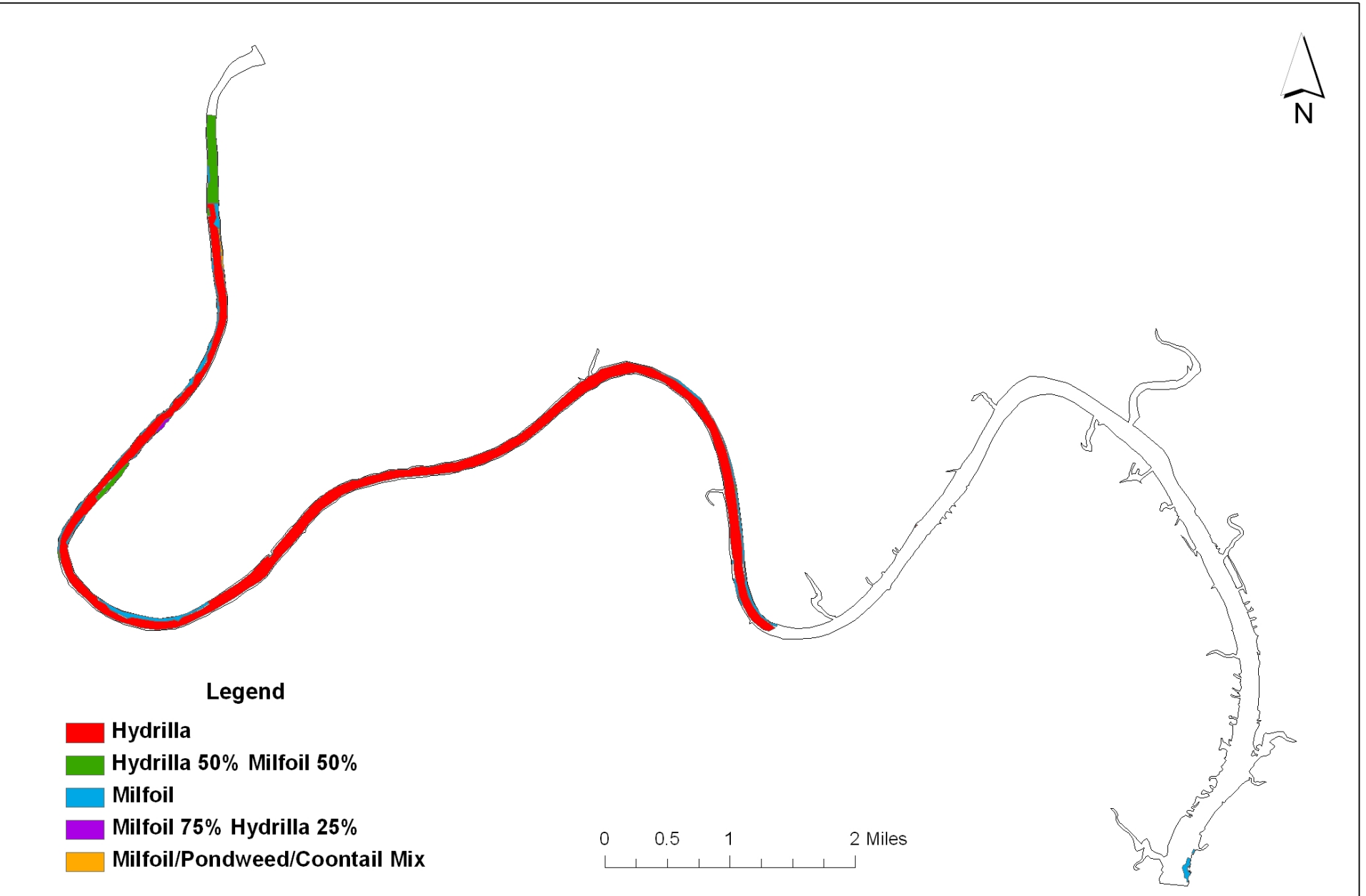


And life was good…

Until 2011 23,400 fish…still 536 acres

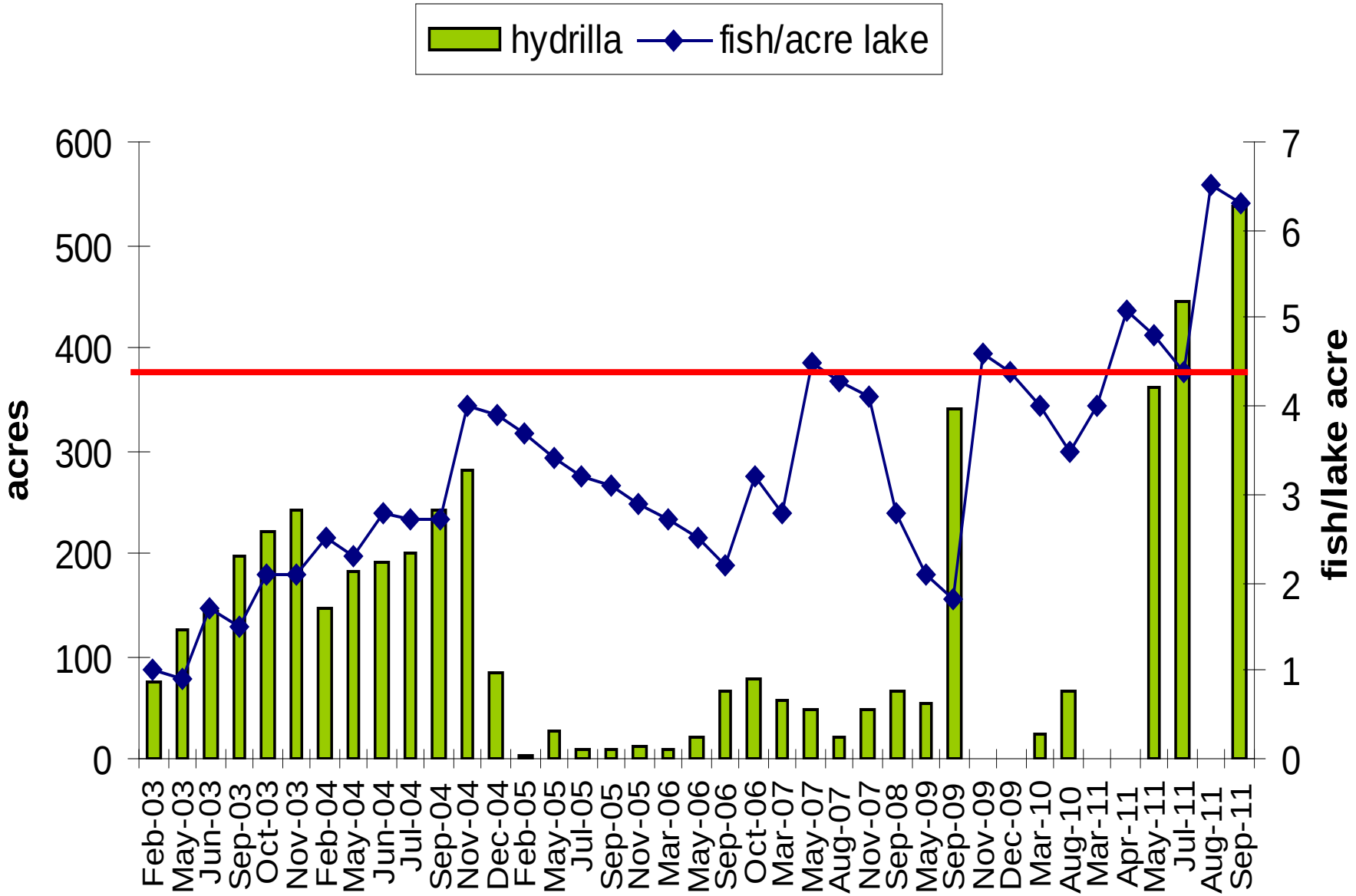


Lake Austin Vegetation Survey September 2011



Stocking Rate

by lake acre or hydrilla acre?



Taking Stock

- Grass carp play critical role in hydrilla control
- Other factors:
  - Non-palatable vegetation
  - Floods and drawdowns

Why the recent increase?

- Drought means warmer water, more nutrients…no end in sight
- 2007 Last scouring flood
- Migration
- Mortality – 23,400 stocked,
  est 10,000 alive

Lady Bird Lake

- 6 mile long, 7 urban tributaries
- Increased turbidity, temp, nutrients
- Highly used public shoreline

- Urban refuge for wildlife
- At least 7 invasive species

Lady Bird Riparian Restoration

- Improve habitat, water quality
  - Remove invasives
  - Plant natives

- Provide a model for wider effort
- City-wide Invasive Species Mgmt Plan

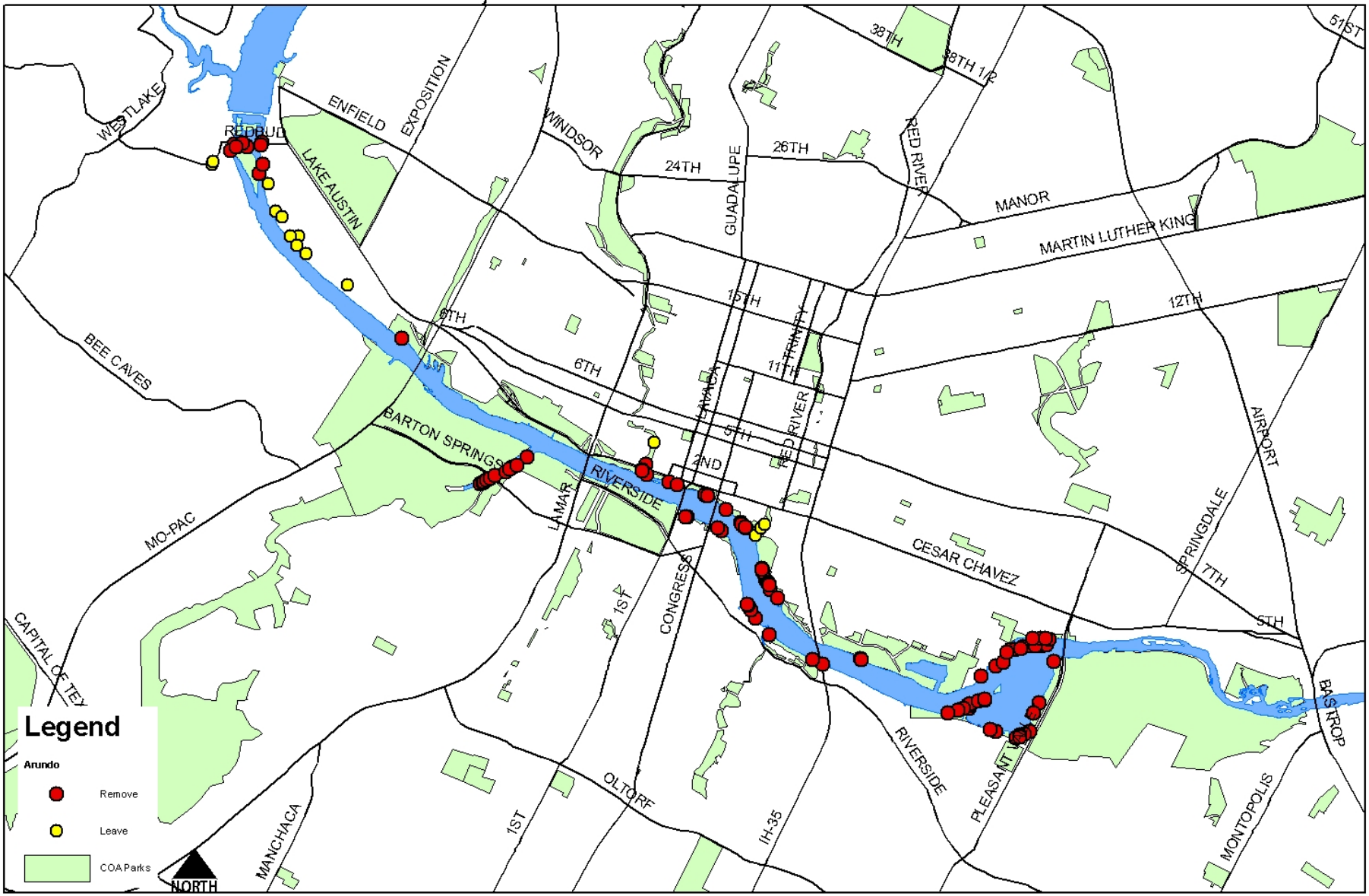
Arundo donax
Giant cane

- 20 ft tall, spreads by fragments, rhizomes
- Monoculture, pushes out natives
- Uses 3 X water
- Limited wildlife habitat and public benefit
- Increases fire danger
- Hiding place for transients and trash

Lady Bird Lake Arundo

- 3.4 acres
- Spread along entire 5 mile shoreline
- Typically on steep slopes
- Size range- single plant to 150 ft long patch
- Monoculture or in mixed stands of hardwoods

Lady Bird Arundo Removal Areas



Arundo control efforts

Mid-summer

- Cut plants to decrease biomass, limit impacts
  - non-target plants
  - lake and trail users
- Compost material at City facility

Early fall

- 4 ft of re-growth
- Apply herbicide
  - 5% Imazamox + 1 % MSO
  - 2% Imazamox
    +
    1 % Glyphosate
    +
    1 % MSO

Next spring

- Re-treat as needed

Elephant ear, wild taro
Colocasia esculenta

- Covers at least 50 % of shoreline
- Shades out native grasses
- Little to no wildlife or public benefit
- Traps trash and debris
- Provides some erosion control

Pilot project

- Three replicates of each treatment
- Two herbicides
  - Imazamox (Clearcast), with MSO
  - Glyphosate (Refuge) with NIS
- Three application techniques
  - Cut and paint
  - Wick or glove-in-glove (cotton on top neoprene)
  - Foliar spray
- 1 m^2 plots, with .5 m buffer zone
- Mid-August treatment
- Evaluation 4 weeks after treatment (WAT) and 8 WAT

Treatment Details

- Cut and Paint:
  - 100% glyphosate
  - 100% imazamox
- Foliar Spray:
  - 1.6% glyphosate + 0.25% NIS
  - 5% imazamox + 0.5% MSO
- Wicking
  - 50% glyphosate + 0.25% NIS
  - 50% wick imazamox + 0.5% MSO

(Very) Preliminary Results

- At 4 WAT, there was slightly better control (visually) in the wicked plots than foliar plots.
- For both the wicked and foliar plots, glyphosate appeared to provide better control
- Cut and paint plots showed signs of new growth
- Mid-October evaluation may show more control for imazamox, it is slower acting

Austin Lakes
Aquatic Plant Restoration Project

City of Austin
Lewisville Aquatic Ecosystem Research Facility (LAERF)

GOAL

- Increase native plant diversity and cover on both lakes

LIMITS

- Funding
- Size of lakes
- Private property

WHY?

- Provide habitat and water quality benefits w/o invasives
- Reduce niches for hydrilla
- Reduce impacts from grass carp

HOW?

- Founder colony approach
  - Provide propagules
  - Natural spread in lake

Founder Colonies

- Small protected plant colonies
- Diverse mix of species
  - multiple depths and growth habits
- Develop sufficient biomass (fragments, propagules) to overcome herbivore pressure

Benchmarks of success:

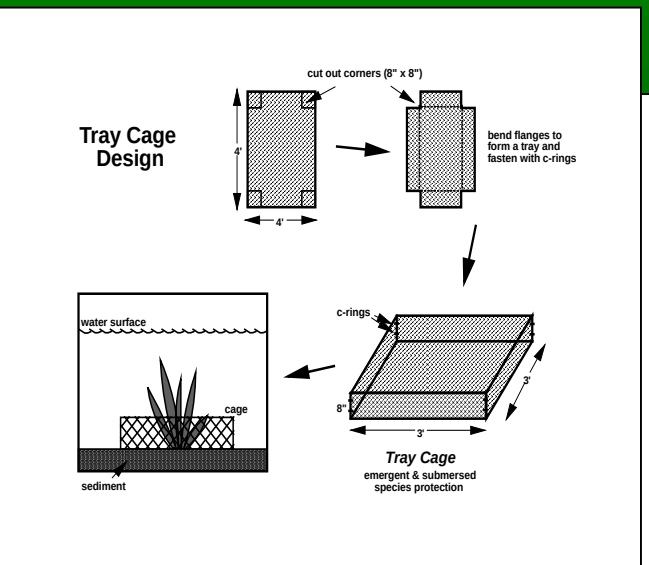
1. Survival and spread inside cages
2. Spread outside cages
3. Spread beyond / between sites

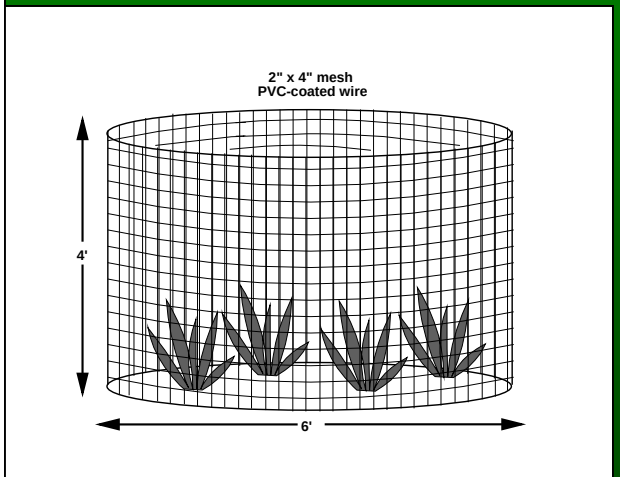
Project Design

- 10 sites on each lake, now 20
- 7 species, two growth habits
  - emergent, submersed
- 1-2 ft depths
- Herbivore exclosures
  - Tray and ring cages

Built on-site

PVC coated wire

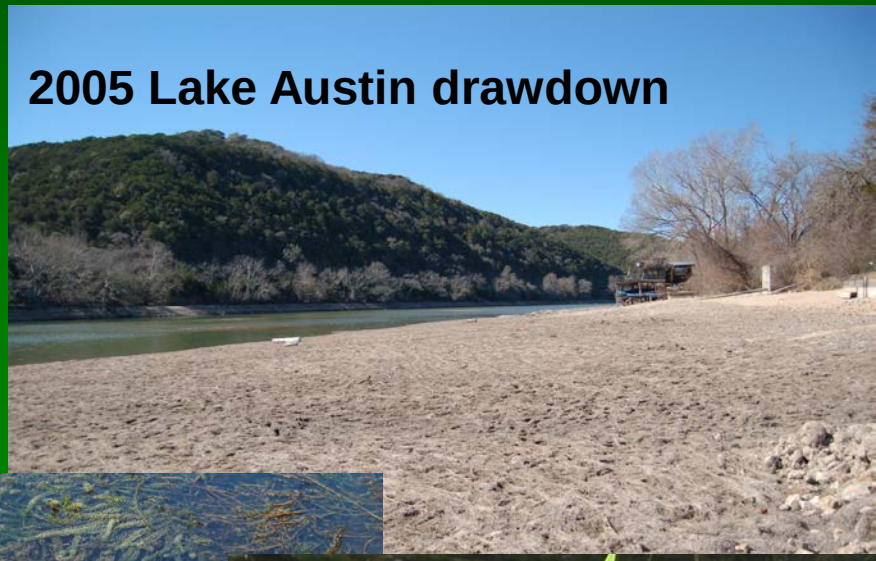




Challenges

Two major floods

2005 Lake Austin drawdown



2004- 2008

- Five species survived and spread
  - *Pontederia, Sagittaria, Justicia*
  - *Vallisneria, Heteranthera*
- Cages damaged by flooding, vandalism
- Herbivore pressure

2009- Large Pens

Increased growth and propagule production

Lake Austin before and after

Lake Austin 2009-2010

- *Sagittaria* spread 20 m beyond cages

Lady Bird Lake

- Increased diversity and cover
- Spread outside cages

Lake Austin

- Herbivory, drawdowns, floods, human impacts
- Invasives limit spread
  - Faster drawdowns recovery
  - Less palatable to herbivores
  - Dense canopy limits light

Lady Bird

- Natives overcome limits to invasive plants
- Large pens are key to overcome herbivores

Current Status

- ☑ Well established founder colonies
- ☑ Mix of 12 diverse species

- ☑ Significant spread outside exclosures
- ☐ Spread well beyond and between sites

‘Free’ colonies on Lady Bird Lake

- No single “end point”
- Overcoming herbivory varies by species
- 2011 New pens, new techniques


Questions?