Aquatic Vegetation Restoration in the Comal River: Year 1

Texas Society of Ecological Restoration 2013

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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
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
Why is native vegetation important?

The diagram illustrates the Fountain Darter Density (number/m²) for different vegetation types, comparing native and exotic plants. Native plants are represented by green bars, while exotic plants are represented by yellow bars. The vegetation types include Open, Ceratopteris, Sagittaria, Vallisneria, Hygrophila, Cabomba, Ludwigia, Algae, and Bryophytes. The graph shows that native vegetation generally supports higher densities of Fountain Darters compared to exotic vegetation.
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 = 281.6 m²
Hygrophila polysperma

Cabomba caroliniana

Sagittaria platyphylla

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

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

Ludwigia repens
Sediment Island MAY 2013
Hygrophila removal

- Hand pulling
- Raking
- SCUBA / Snorkel
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

~ 6 weeks after planting
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
Area of Hygrophila Removed - 1,079 m²

Area Planted - 1366 m²

Area cover of planted Ludwigia - 564 m²

Area cover of Cabomba - 61.5 m²

Area cover of Sagittaria - 33.61 m²

659.11 m²
## By the Numbers

<table>
<thead>
<tr>
<th>Location</th>
<th>Species</th>
<th>Plants Planted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old Channel</td>
<td><em>Ludwigia repens</em></td>
<td>4,903</td>
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<tr>
<td></td>
<td><em>Cabomba caroliniana</em></td>
<td>767</td>
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<tr>
<td></td>
<td><em>Sagittaria platyphylla</em></td>
<td>611</td>
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<tr>
<td>Landa Lake</td>
<td><em>Ludwigia repens</em></td>
<td>2,102</td>
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<tr>
<td></td>
<td><em>Cabomba caroliniana</em></td>
<td>915</td>
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</tbody>
</table>

**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?