Volunteer Efforts to Remove Arundo donax (Giant Reed) from Sabino Canyon

Jim Washburne
UA-SAHRA*-AZrivers
October 8, 2009

Desert splendor or Desert invader?
Tucson Arundo Removal

Mission:
• To coordinate and facilitate the removal of Arundo donax in the Tucson area
• Effectively clear Sabino canyon by 2011

Goals:
• Supervise removal activities
• Educate the public about this threat
• Encourage public participation
• Protect our riparian ecosystems system

Arundo Removal Project
THE PLANT

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Arundo donax L

Giant Cane, Elephant Grass, Spanish Cane, Carrizo Cane

- Monocot, Poaceae (grass)
- Stalk and leaves resemble corn and is sometimes confused with Bamboo
- Rapidly grows to 20 feet (3-4 in/day)

- Originally from Mediterranean/Persian Gulf
- Introduced to area as:
  - landscape plant, wind break, erosion control
Arundo donax L
## Water Use

<table>
<thead>
<tr>
<th>Plant</th>
<th>Water use [af/ac/yr]</th>
<th>Ratio Arundo / Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arundo donax¹</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>Tamarisk²</td>
<td>4-6</td>
<td>~4</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>5</td>
<td>~4</td>
</tr>
<tr>
<td>Cottonwood³</td>
<td>~2</td>
<td>~10</td>
</tr>
<tr>
<td>Mesquite⁴</td>
<td>1-4</td>
<td>5-20</td>
</tr>
</tbody>
</table>

Fast growing ➔ thirsty

**Characteristics of invasive plants:**

Hardy, drought tolerant, rapidly re-colonize disturbed areas, spreads readily, out competes native plants, degrades natural habitat ➔ it will continue to spread unless we take action
HOW BAD CAN IT GET?

The problem:
Giant reed can completely overwhelm native vegetation, which reduces wildlife habitat, increases fire risks and interferes with flood control.

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Southwestern & MX Infestations

- Rio Grande – Big Bend to Del Rio: ~60,000 acres
- California: ~10,000 acres
- Cuatro Cienegas: ~275 acres
- Lower Colo. River: ~5,000 acres

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Tucson Experience

Present in most central neighborhoods

UA area

Sabino Canyon Dr & Rillito

Rillito River

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WHY NOW?

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June 2003 Aspen Fire

July 2006 Debris Flows

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Effects of Scouring & Debris Flows
OUR EXPERIENCE IN SABINO CANYON

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Team leader training

25 leaders trained to lead groups of 5-10 people
Field orientation...getting started

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Removing stalks & roots

Before

After 2 hours of work

Washburne/Rupprecht

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Maintaining the flow

Arundo Removal Project
Volunteers
GPS Mapping

- Started May 2008
- ∼500 stands mapped
Clean-up

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Disposal Strategy?

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Other uses

Pascua Yaqui Tribe
Tucson Permaculture Inst.
Sonoran Kitchen Gardens
Tucson Symphony

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Historical uses

• Erosion control
• Reed instruments
• Paper
• Basketry
• Structures – wind/sun
• Fishing rods
• Arrow shafts
• Ornamental

Ref: plantsforuse.com

Marsh Arab hut
iraqupdate.wordpress.com/2007/07/31/

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# Impact to date

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Volunteers</td>
<td>54</td>
<td>542</td>
</tr>
<tr>
<td>Hours (@4hr/da)</td>
<td>216</td>
<td>2100+850</td>
</tr>
<tr>
<td>Bags</td>
<td>79</td>
<td>740</td>
</tr>
<tr>
<td>Bundles</td>
<td>100 (est)</td>
<td>910</td>
</tr>
<tr>
<td>Stands</td>
<td>~100</td>
<td></td>
</tr>
</tbody>
</table>

**Fun Facts (2008-2009)**

- @ $20/hr, about $42,000 of field volunteer time
- @ 1 bag/4 ft\(^2\), about 3,000 ft\(^2\) => only 55’x55’!!
- @ 20 stalks/bundle, about 18,200 stalks

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Progress as of 9/09 – Thanks!

Arundo Locations in Sabino Canyon Recreation Area

- CPS locations
- Removed/Sprayed

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Can’t rest on our laurels ...

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Danger – it keeps going

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OTHER EFFORTS

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Tucson Arundo Project – Area of Interest

Legend
Work areas
Active
Future

Santa Cruz
3 mi

Sabino Canyon

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Bear Creek – w/RFCD & TNC
Rillito - West of Swan
Craycroft to Sabino Canyon Dr
REMOVAL STRATEGIES

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Tools of the Trade

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Herbicide Application

• After the winter field season, the USFS applied herbicide
• Targets new growth from stands cut & dug by volunteers

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Chemical Control

• Rodeo® (54% Glyphosate)
  - Cut – stump (Oct) (-76%) (-99%)
    • 100% applied to stem soon after cutting
  - Cut – spray (Sept) (-82%) (-50% var)
    • 1.5-2% foliar application (Sabino @ 5%)
  - No cut - spray (-33%)
  - Control (+21%)
More about Glyphosate

• Best applied just after flowering

Toxicity:
• Rana frogs & flathead minnow (Gly)
  – 96-hr LC$_{50}$ ~1200 mg/L
  – Actual values after 1hr ~ 0.1 mg/L
• Bluegill sunfish & Rainbow trout (R-11)
  – 96-hr LC$_{50}$ ~4.0 mg/L
  – Actual values after 1 hr ~ .013 mg/L
• “poses no significant toxicity hazard to non-target fish and frog species”

Teamarundo.org/control_manage/DFG-EPAreport.html
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Biological Control

Arundo wasp
- *Tetramesa romana* lays its eggs in the cane stem, where the larva cause galls to form in the stem and kill the cane.

Arundo fly
- *Cryptonevra sp.* larva kill new plant shoots.

Arundo scale
- *Rhizaspidiotus donacis* feeds on the plant rhizomes.

Un-intended consequences??

WHY IT WORKS

&

CURRENT STATUS

Arundo Removal Project
Collaboration / Leverage

Jim Washburne, time & resources
Candice Rupprecht, time & resources
Stan Helin, time & resources
Rice/Becker, coord.
Sherrie Barfield, coord. & resources
Mark & Jean Hengesbaugh, time²
Phillip Bentley, $1120 tool grant
Kendall Kroesen, time & coord.

...Pascal Yaqui
Why it works

- Compelling problem
- Organizational core & expertise
- Mutual interests
- Access to basic resources
- Strong volunteer network
- Public support because of visible areas
- Long-term focus
- Catching the problem in-time – its doable!

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Future Activities

• Expand efforts to Rillito wash
• Looking for other groups to work with around town
  – Scouts
  – Neighborhood groups
• Join forces with permaculture community
• Assess effectiveness of removal efforts
• Study growth and herbicide factors

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Web site used to:

- Inform public
- Coordinate volunteers
- Share best practices
- Report progress
- Provide additional information
Tucson Arundo: Background

Data and Reports related to this effort
- Bablack Canyon piloted Arundo removal project - Jan 2005-May 2006

Closely related reports and brochures
- Team Arundo: Controlling Arundo in your watershed - a guide for organizations
- Team Arundo: Arundo - Streamside invasion - Great brochure
- SWAN: Great Salt Lake Arundo Invasive Weed Fact Sheet

Other groups involved in Arundo removal
- Lower Rio Grande: NMSU Wetlands and TIPU
- S. California: Santa Ana Watershed Project Authority
- S. California: Santa Margarita & San Luis Rey (SMLR) Management Area
- N. California: Team Arundo del Norte
- N. California: Sacramento Valley Watershed Network
- N. Mexico: Cuatro Corrientes

Related Literature
- Invasive plants and animals
  - USFS: National strategy and implementation plan for invasive species management
  - USFS: Arundo donax - USFS plant database
  - AZ: Arundo invasive species management plan
  - AZ: Native non-native plants Biomass and wetlands in Arizona
  - ADON: invaders of the Sonoran Desert project

Chemical Control
- USFS: Cigarettes: Human health and Ecological risk assessment 2003, 281 pp
- EPA: Control of Arundo in riparian wetland areas of CA 2000
- CA PC: Arundo Handbook: herbicide treatment of small Arundo stands - Plans and description
- CA Forestry: Various herbicides considered for use
- CA Agriculture: Use of glyphosate (Transline) on yellow starthistle (Label)

Biological Control
- TAMU Student Poster: Steward
- ARS Tucson research: search for Arundo

Mechanical Control
- Sustained harvesting

How to reserve an Arundo work date:
- Navigate to the month of interest
- Find a date that is still "open" (green colored)
- Send us an email (washington@arizona.edu) with the following information:
  - Group or individual name
  - Your contact info - email, home phone, cell phone
  - Number of participants
  - Special needs (i.e. wheelchairs available, do not have parking pass)

2008-2009 GOLDEN DAYS (open public participation)
- Leadership training days: Oct 19 and 20, reservations required
- Public participation days: Nov 2 and 5, first Sunday of each following month, lets us know you are coming or just show up
- Contact: tucson.arundo@gmail.com or Tucson Audubon @ (520) 877-2395

Winter 2008-2009 Schedule
October - March only

Arundo Removal Project
Other Local Invasive Grasses

- **Buffelgrass** – *Pennisetum ciliare*
- **Cheatgrass** – *Bromus tectorum*
- **Fountain grass** – *Pennisetum setaceum*

Arundo Removal Project
Bear Canyon / Hidden Valley

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