El Rio SR 85 Pilot Project

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Spencer Bolen

Presentation Agenda

- **Background**
  - **River Characteristics**
  - **Floodplain Changes**
  - **Vegetation Management Plan**

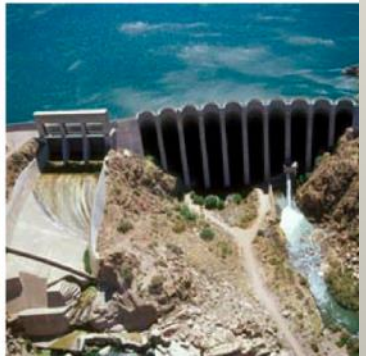
- **El Rio Pilot Project**
  - **Planning and Compliance**
  - **Clearing and Grubbing**
  - **Planting**
  - **Survivability**
  - **Costs**
  - **Next Steps**

Gila River

- Second Largest River in AZ
- River is 600 miles
- Watershed is 58,000 square miles
- 12 Major Dams on Gila & Tributaries
  - Not all flood control

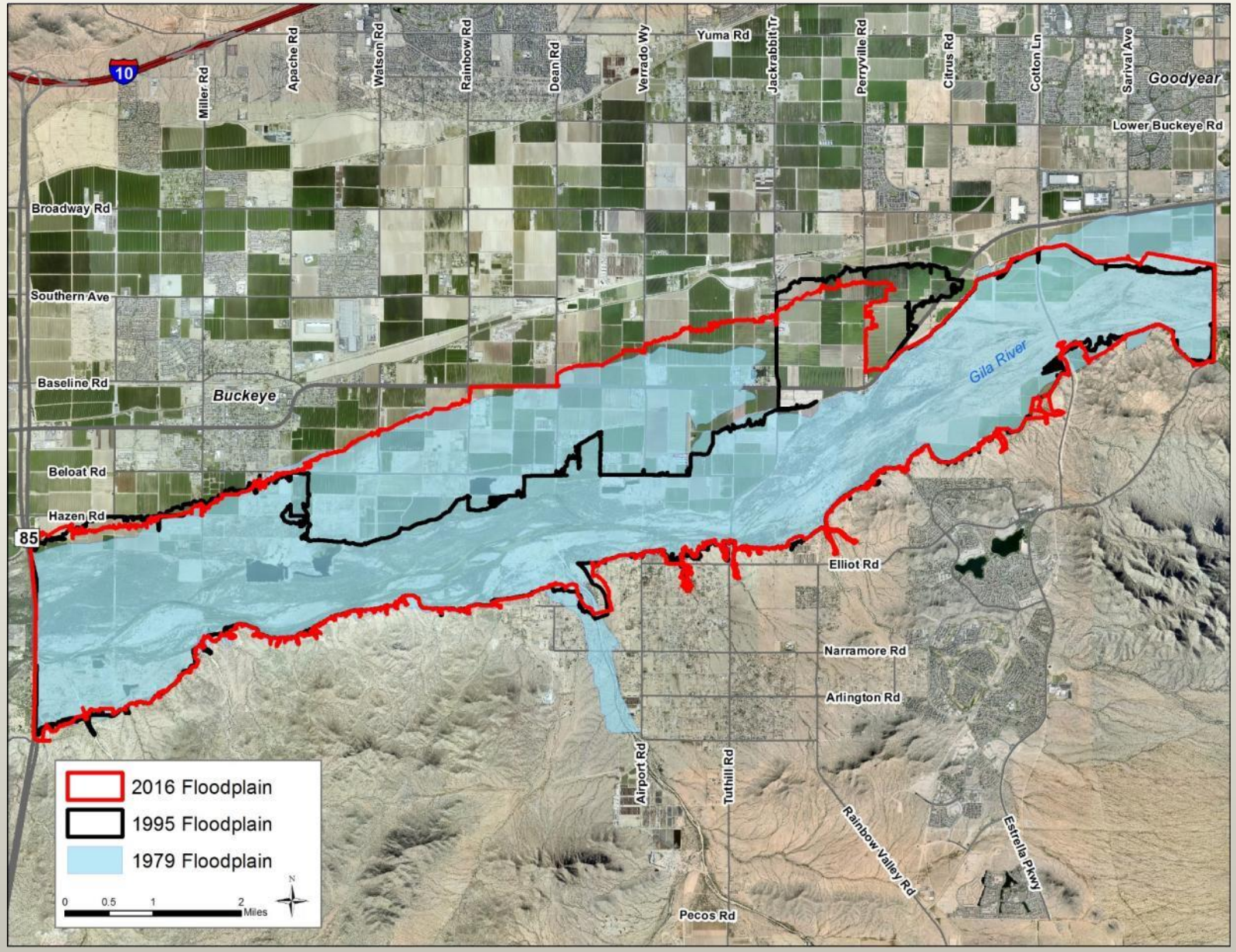
Lower Gila River

- Ephemeral but wastewater effluent and tailwater at some locations
- Water table depth varies
- Wide Floodplain; 100-year Flow 220,000 cfs



The Gila River at State Route 85. A peak flow of 162,000 cfs was recorded on the Gila River at Estrella Parkway, near Goodyear, on January 9, 1993. Two kayakers died and over 200 families were evacuated.

Lower Gila River Floodplain: Changes over Time

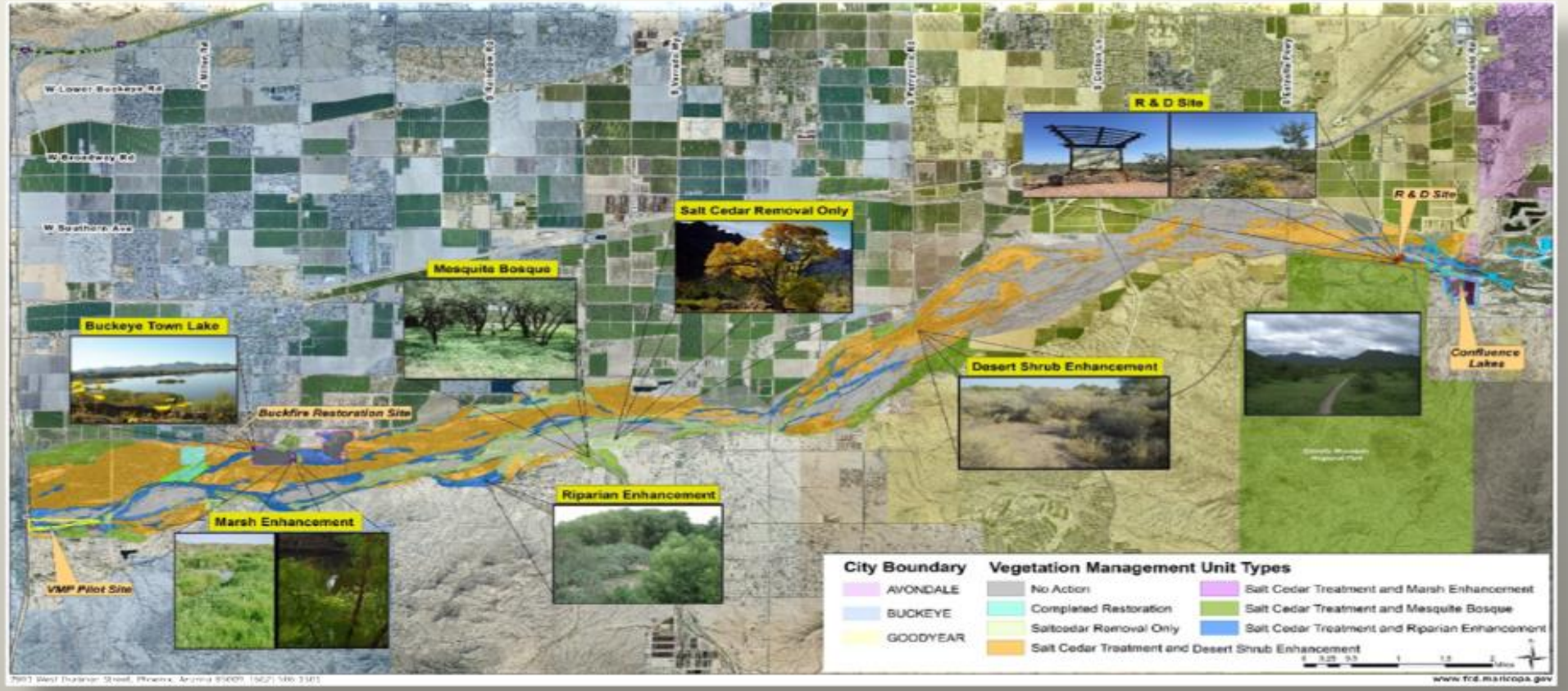


El Rio Vegetation Management Plan

Goal: Reduce the floodplain through salt cedar removal and replanting with native vegetation

- **Increase hydraulic efficiency**
- **Maintain or enhance wildlife habitat**
- **Reduce flood and fire risks**
- **Low-maintenance**

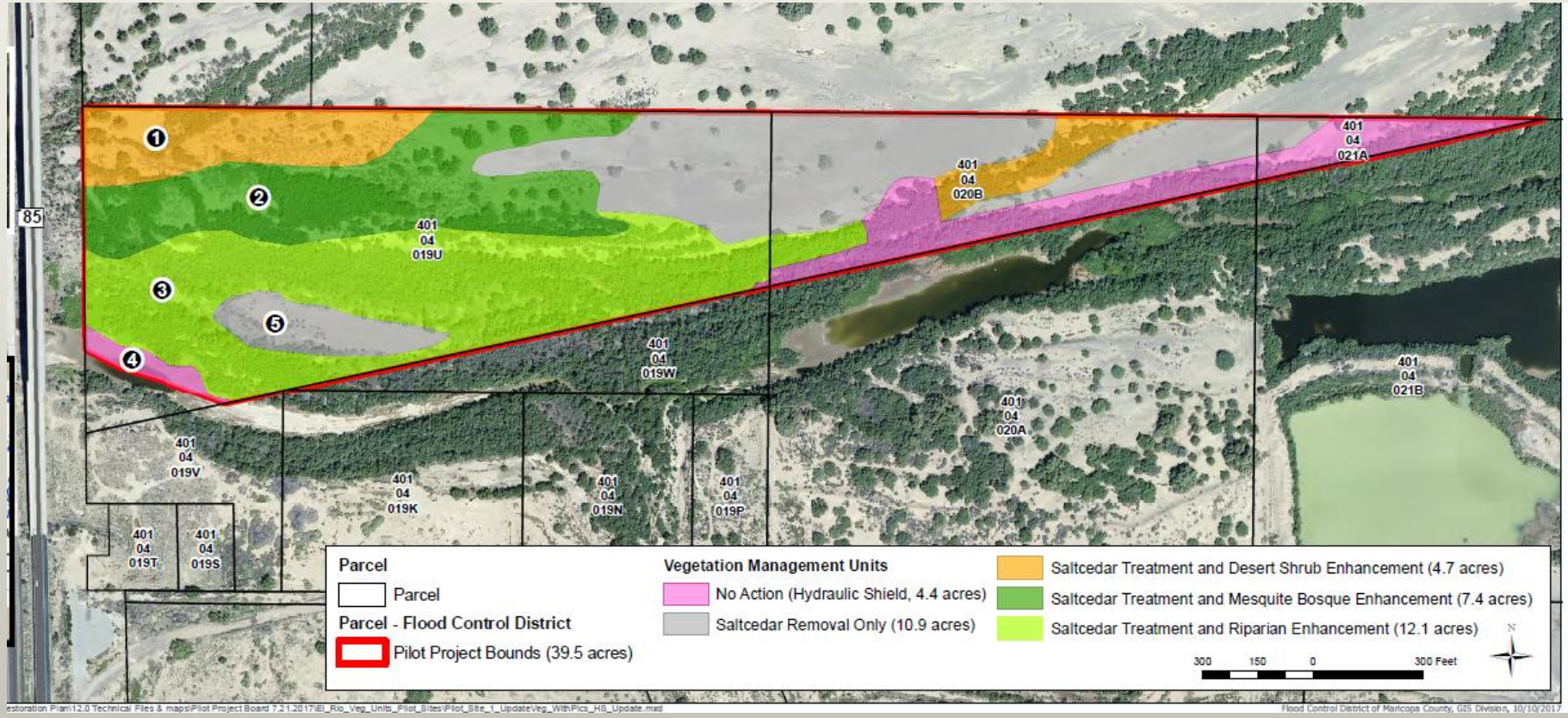
No Action	**3040 acres**	**35%**
Desert Shrubs	**3630 acres**	**41%**
Riparian	**750 acres**	**9%**
Xeroriparian	**570 acres**	**6%**
Marsh	**77 acres**	**1%**



El Rio SR 85 Pilot Project

Project Goals: Document effective techniques, lessons learned, and costs

- 40 acre site
- FCD property
- Easy to access
- Mostly in-house project



Planning & Compliance

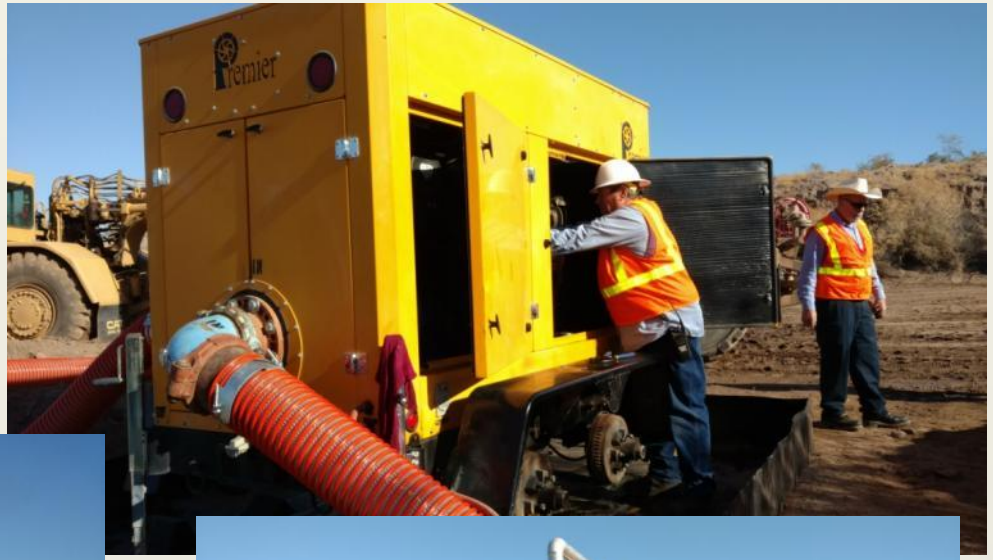
- Site selection
- Budget and schedule
- Permits
  - 404 permit
  - SWPPP permit
  - Dust control
  - Floodplain use permit
  - Engineering permit
- Right of entries
- Soil sampling
- Survey
- Blue stake
- Cultural resources
- T&E species surveys
- Migratory Bird Treaty Act
- Water source for dust control
  - Needed about 32K gpd
  - Water quality

Equipment Used:

- Barko 930 Forestry Machine with Masticator Implement
- Excavator with rake to remove roots
- 8,000 gallon water wagon for dust control
- Pump for water pull
- D8 for pushing equipment

Pros/Cons:

- Very efficient
- Use mulch on site; no disposal needed
- High rental cost
- Stumps are pulverized
  - Stump treatment more difficult
  - Easier to miss root balls

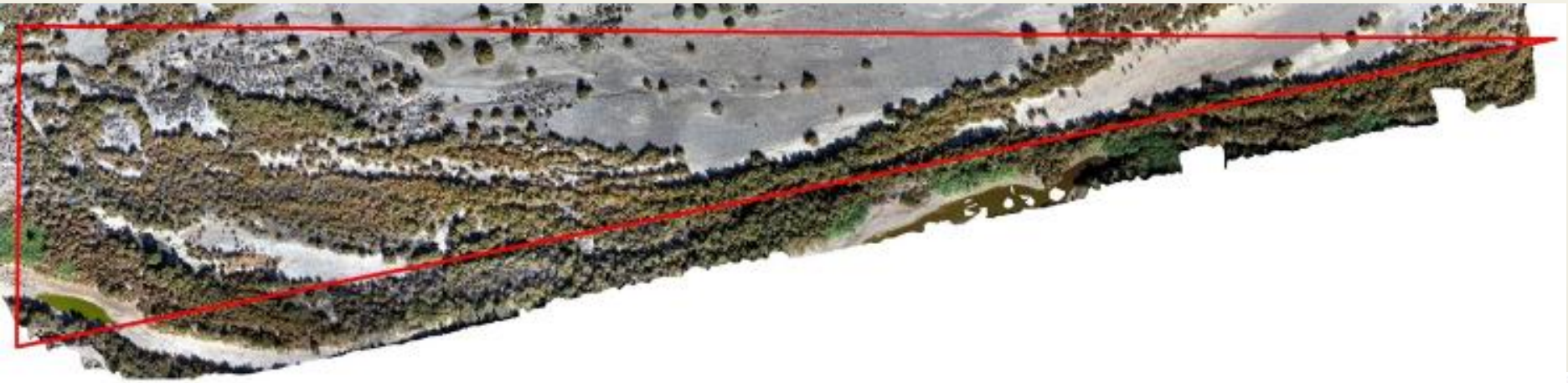

Premier


CAT
621G


950
CAT


DEERE

Before & After Clearing & Grubbing

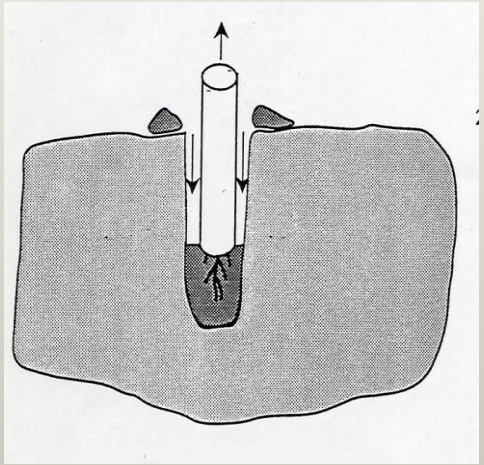


Harvesting Cottonwood & Willow Poles Jan. 2018

Planting Cottonwood & Willow Poles January 2018

- Groundwater: 30” below ground
- Used 8 ` stinger bar 6” in diameter
- Tried to plant poles 42” or deeper
  - Pole length
  - Eliminating air pockets
- Soil texture & cobbles
- Unexpected tail water in planting areas

Tall Pot Plants



Tall Pot Planting: February 2018

Salt Cedar Regrowth & Treatment

March & May 2018

- Used Arsenal; 2 concentrations
- Worked ok on small seedlings but not on re-growth > 1’
- Too early to spray

July 2018

- Significant re-growth 2’ to 3’ high
- Used 3% Garlon with a surfactant

September 2018

- > 95% mortality

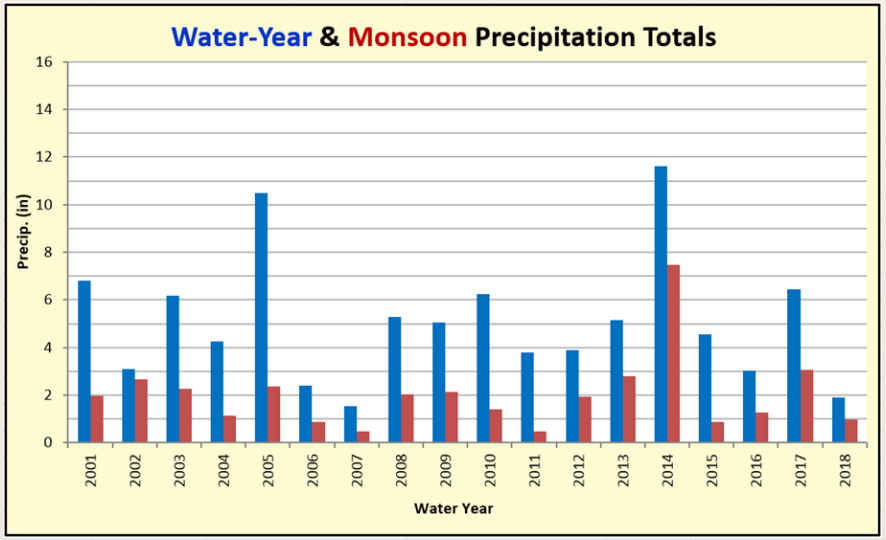
September 2018 Monitoring Results:

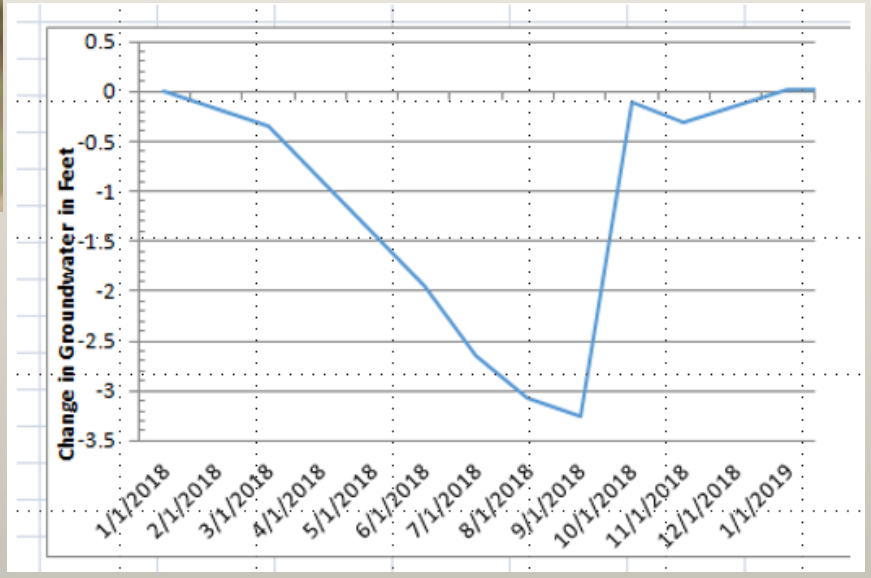
- Cottonwood and willow: 14% survival
- Tall pot plants: 56% survival

Species	Total #	# Alive	Percent Survivability
Salix Gooddingii Goodding Willow	152	28	18%
Populus fremontii Freemont Cottonwood	228	24	11%
Prosopis velutina Velvet Mesquite	126	104	83%
Chilopsis linearis Desert Willow	39	9	23%
Celtis pallida Desert Hackberry	30	11	37%
Parkinsonia florida Blue Palo Verde	10	7	70%
Prosopis pubescens Screwbean Mesquite	47	11*	23%

Site Conditions & Potential Factors

- No supplemental irrigation
- Tall pot installation
- Precipitation:
  - 0.39" rain between mid Jan. & mid-June
  - < 1.4" rain after planting)
- Groundwater fluctuations of 3.2'
- Soil analysis (n=21)
  - Texture: 95% Sand
  - Salinity range 0.4 to 3.1 dS/m
  - pH: 7.8 to 9.5
- Tailwater salinity: 9.68 dS/m (n=1)



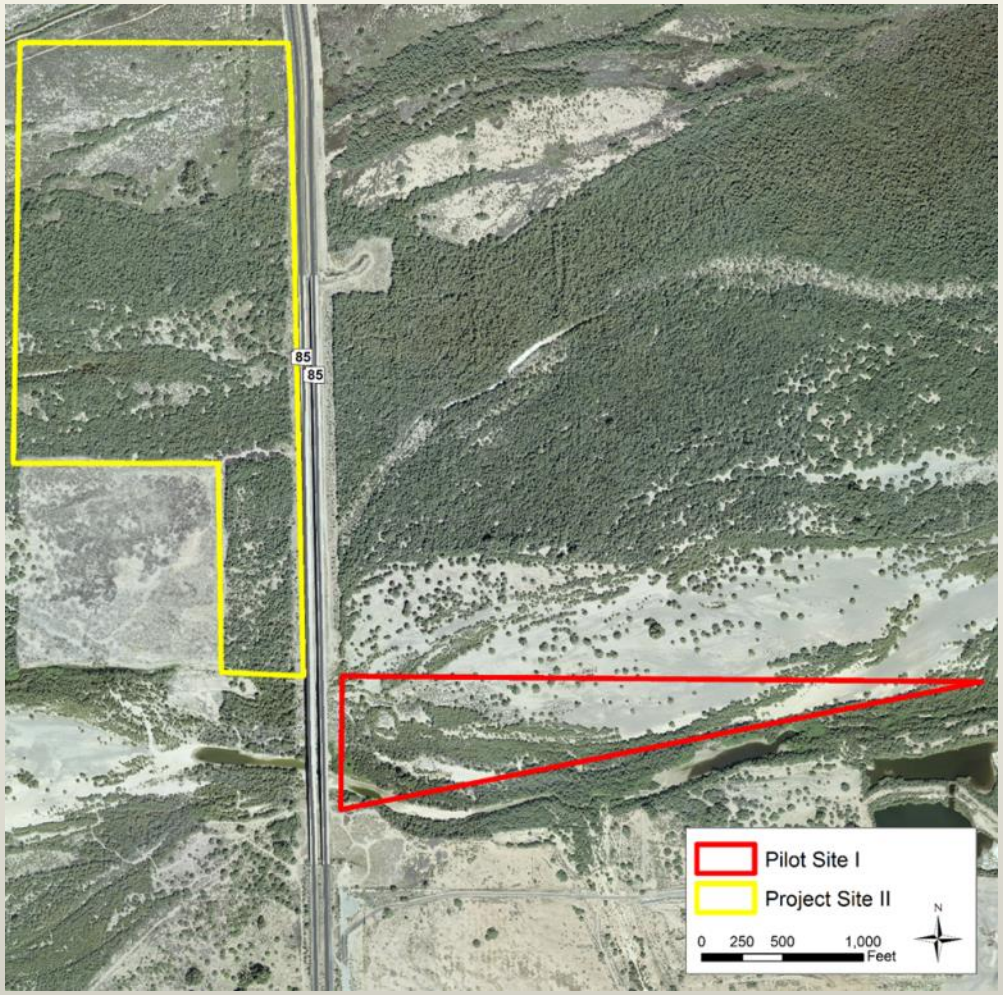


Labor and Equipment Costs

Phase	Labor		Equipment		Totals	Other Metrics
	Hours	Costs (loaded)	Types	Costs		
Salt Cedar Removal: Dec. 4 - Dec. 19 (8 working days for clearing)	910	$32.3K	• Barko 930B Mulcher • D-8 Dozer with rake • Excavator • 8000 gallon Water Wagon	$65.0K	$ 97.3K	$3600 per acre
Cottonwood and Willow Harvesting Jan. 4 – Jan. 9 (4 working days)	415	$13.2K	• Dump truck • Trailer • Work Trucks • Chainsaws and clippers	$1.3K	$14.5K	$24/pole
Planting Poles Jan. 23 – Jan. 31 (5 working days)	390	$12.2K	• Excavator • Utility Vehicle	$3.9K	$16.1K	$26/pole
Planting Tall Pots Feb. 7 – Feb. 15 (6 working days)	460	$14.7K	• Excavator • Utility Vehicle	$5.9K	$20.6K	$70 per plant
First Year Maintenance (10 working days)	205	$6.9K	• Backpack Sprayers • Utility Vehicle	$8.1K	$15.0K	$555/acre
Totals	2380	$79.2K		$92.4K	$163.5k	

Next Steps

- Monitor
  - Treat new salt cedar growth
  - Survivability of plants
  - Tailwater flows and salinity
  - GW depths
- Planting in Sept. 2019
  - Primarily velvet mesquite
  - Follow specs on tall pot planting
  - No cottonwood and willow planting
- Planting in 2020 and 2021
  - Mostly tall pot plants
  - Potentially cottonwoods and willow
- Hydroseed site after planting is completed
  - Timing & access issues
- Additional Project Site



Acknowledgements

- Gila River Indian Community
- FCD Staff
  - Planning Branch Colleagues
  - Operations and Maintenance Division
  - Landscape Architecture Branch
  - Mapping and Surveying Branch
  - Real Estate Division
  - Finance & Contracting Division
  - Project Management Branch
  - Floodplain Permitting Branch
- Arizona Materials
- ADOT, AGFD, & other ROE property owners
- Consultant support
  - Stillwater
  - Woods
  - AGFD

Questions

Contact: Theresa Pinto
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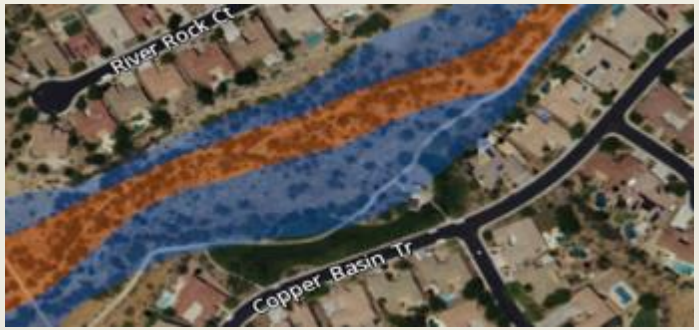
Flood Control District of Maricopa County

- Identify Flood Hazards and Risks
  - Floodplain Delineations
  - Watershed/Area Drainage Master Studies
  - Watercourse Masterplans



- Permit Development
  - Safe
  - No Adverse Impacts

- Mitigate Flood Hazards
  - Non-structural Mitigation
  - Structural Mitigation Focus