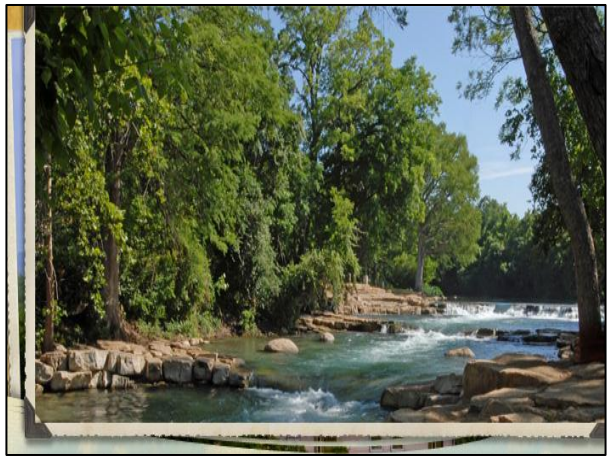
RPS

Urban Riparian Symposium, Austin, 2015

Flood Control Dams/Construction Runoff Impacts On Endangered Species Habitat in the San Marcos River



Feb 13, 2015

Tom Hegemier, P.E.

San Marcos River Circa 1970

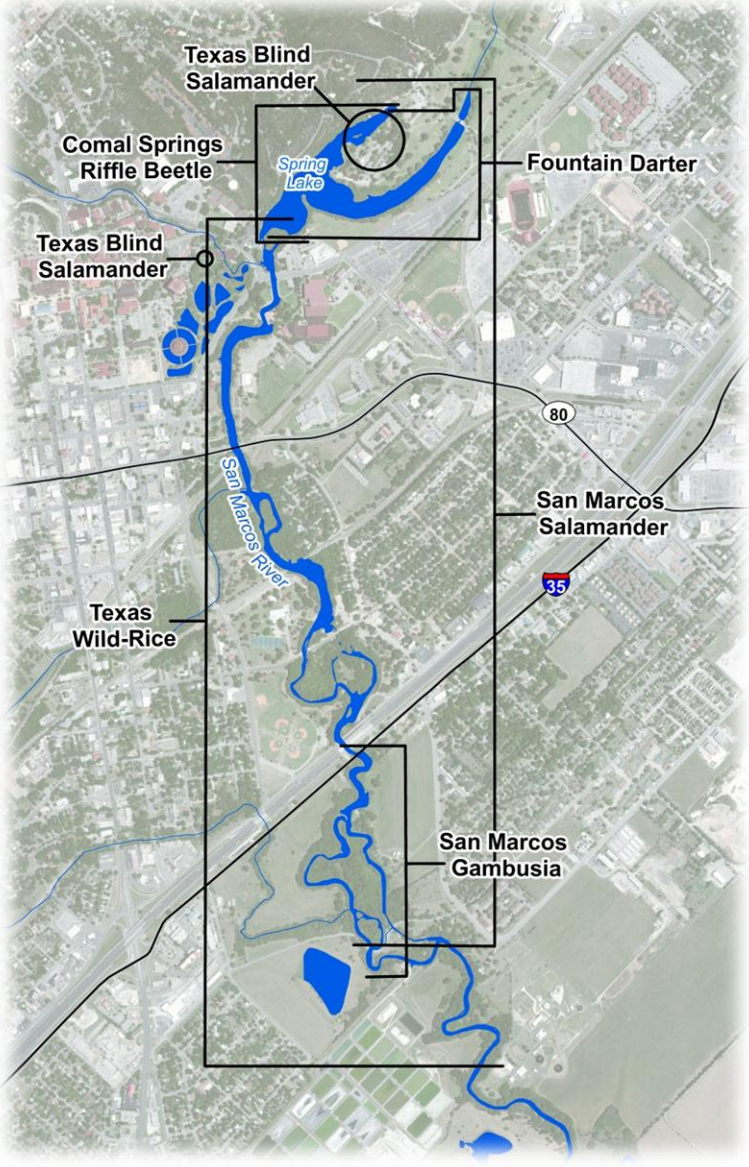
- Much smaller City and Tx State
- Aquarena Springs
  - Ralph the swimming pig
  - Underwater shows
- Deep river
  - 3 meter diving board
- Recreation area
- ~ 150 cfs springflow
- Edwards Aquifer supply

San Marcos River Today

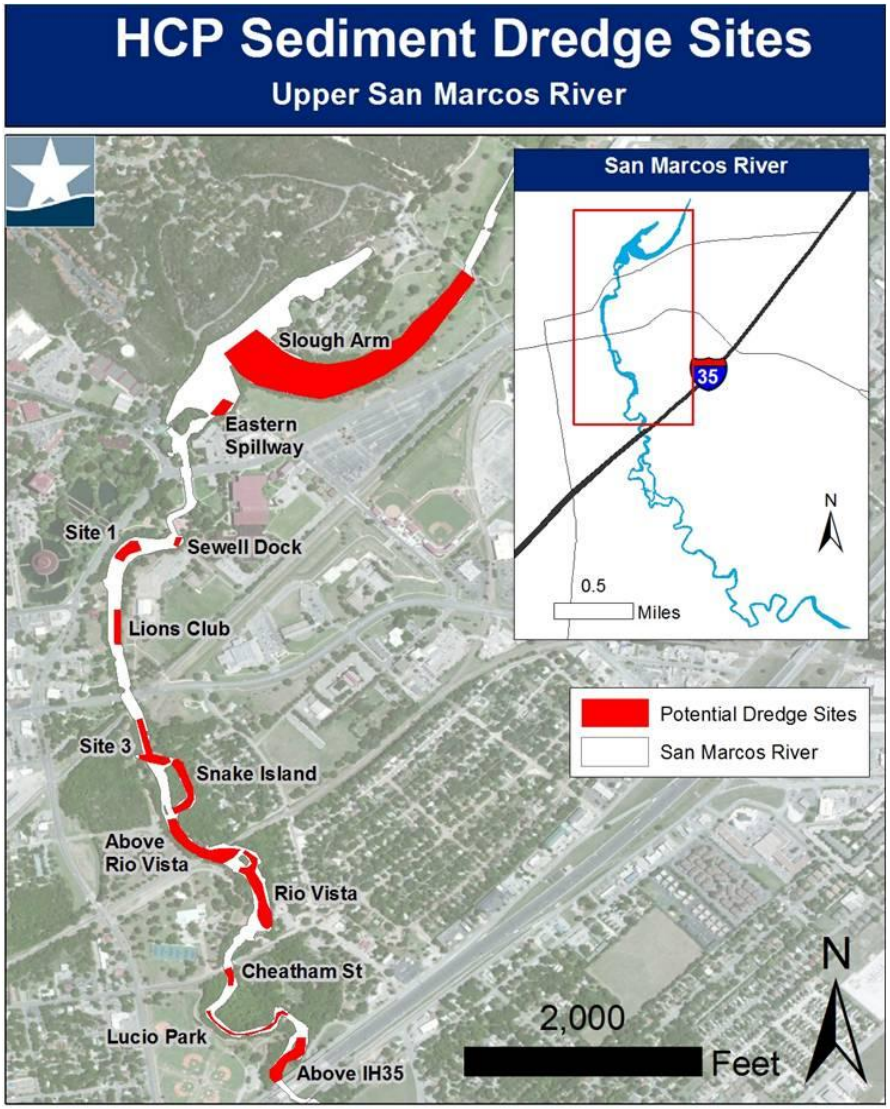
Shallow river system

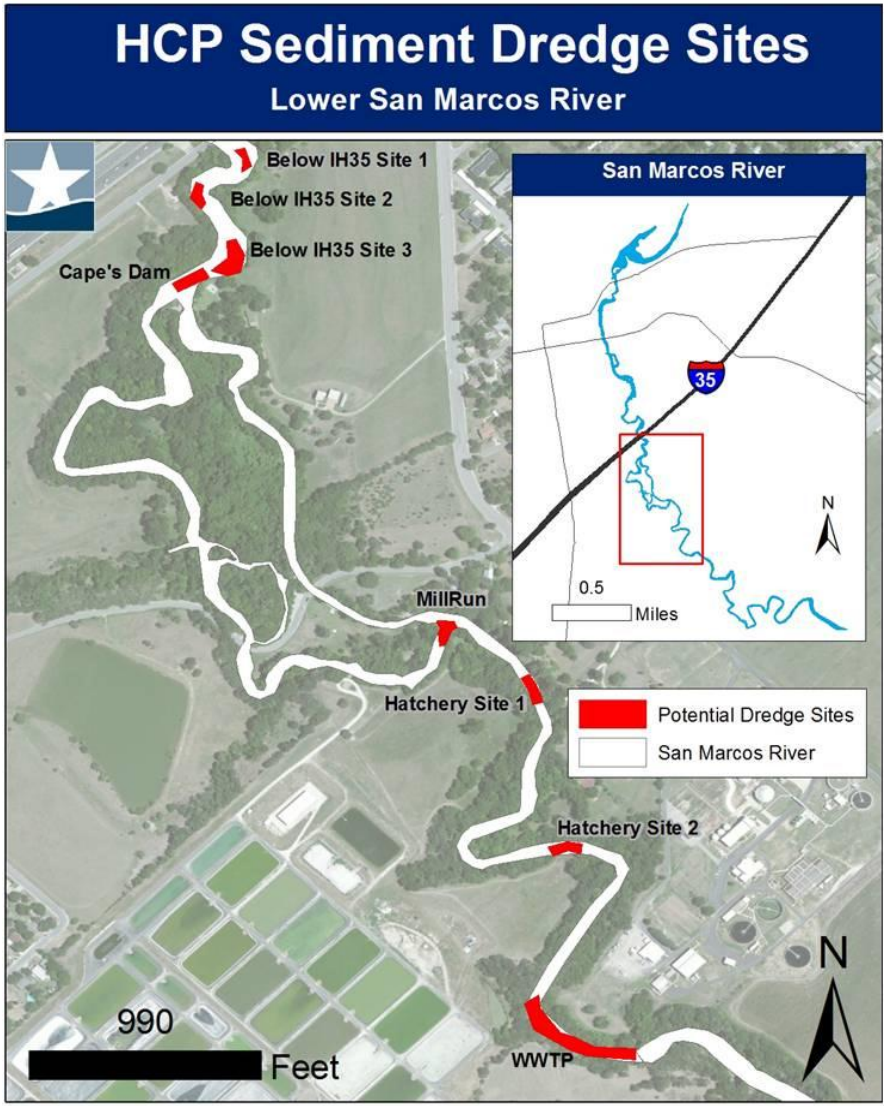
- < 2 feet deep
- Fine silts on bottom
- Impacts critical habitat
- Cloudy water on summer days
- Habitat Conservation Plan in effect

Edwards Aquifer Habitat Conservation Plan



Potential Future Sediment Removal Sites





San Marcos River Dredging

~$220,00 / year

10-year program

What Happened?

1970 flood killed two, flooded 405 buildings and 15 miles of roadways. Spurred flood control project.

Rapid Southwest Texas State and City growth, increased construction runoff

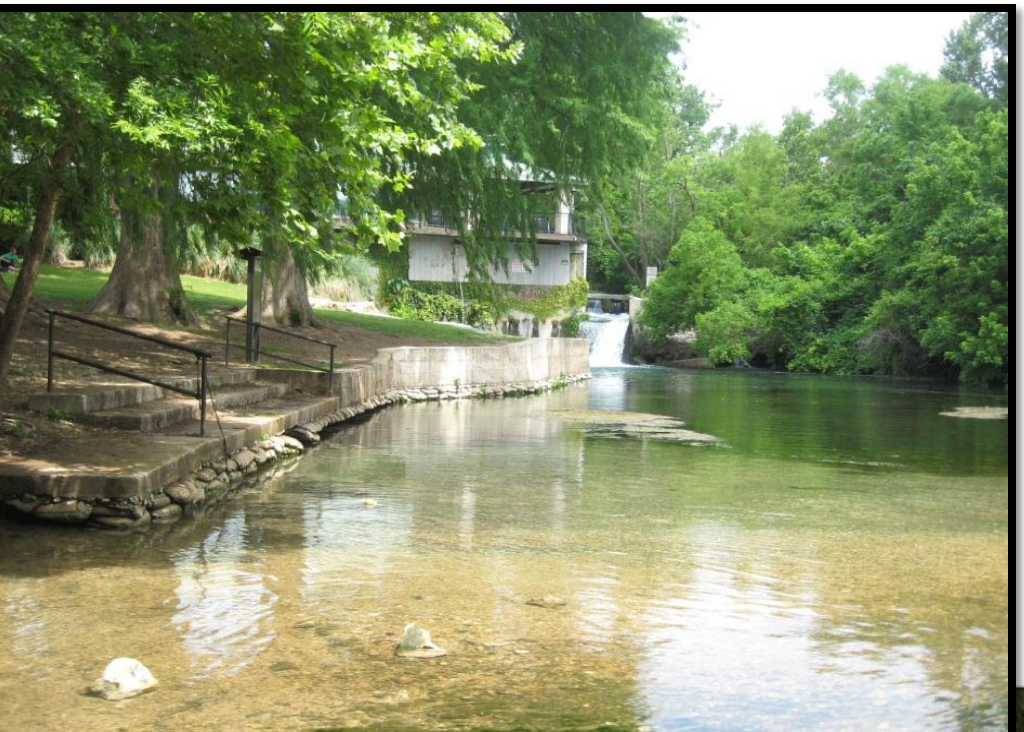
Urbanization of Sessom Creek watershed before stormwater control measures, degrading creek

Aggradation Recipe

Degrading tributaries

+ construction runoff

- lower annual flood flows



= River deposition

Flood Control Dams

Managed by the Upper San Marcos Flood Control District

Soil Conservation Service Dams

- Low flow outlets
- 4’ to 5’ culverts in dams
- 50’ to 100’ in height
- Emergency spillways – 300 feet

- 2013 Halloween Flood protection
- Reduced City 1998 flood damages
- Slight emergency spillway damage

Flow Summary

Location	1-YR		2-YR	
	Pre-Dams (cfs)	Existing (cfs)	Pre-Dams (cfs)	Existing (cfs)
At Aquarena Springs Rd.	12,489	444	18,578	833
At Purgatory Creek	14,181	1,811	21,173	2,725
Downstream of IH-35	17,279	2,501	24,469	3,799

Location	25-YR		100-YR	
	Pre-Dams (cfs)	Existing (cfs)	Pre-Dams (cfs)	Existing (cfs)
At Aquarena Springs Rd.	47,899	2,836	68,833	11,285
At Purgatory Creek	62,755	10,571	86,062	15,740
Downstream of IH-35	72,320	15,176	104,418	21,933

100-year event today is less than a 2-year event pre-dam construction

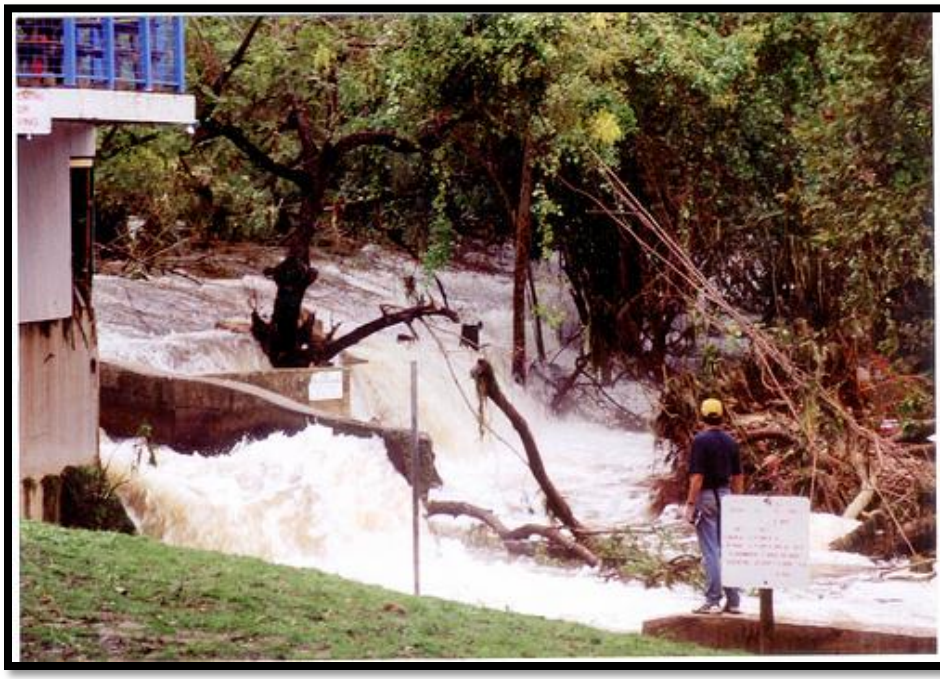
Velocity Summary

Location	1-YR		2-YR	
	Pre-Dams (ft/sec)	Existing (ft/sec)	Pre-Dams (ft/sec)	Existing (ft/sec)
At Aquarena Springs Rd.	2.84	0.92	3.49	1.26
At Purgatory Creek	7.26	2.33	8.29	3.10
Downstream of IH-35	4.76	0.99	5.91	2.81

Location	25-YR		100-YR	
	Pre-Dams (ft/sec)	Existing (ft/sec)	Pre-Dams (ft/sec)	Existing (ft/sec)
At Aquarena Springs Rd.	4.82	1.61	5.59	2.7
At Purgatory Creek	11.51	6.33	11.3	7.59
Downstream of IH-35	8.63	4.87	8.01	5.41

Potential modification goal – increase discharge for frequent events and maintain flood control benefits for the 25- and 100-year storms

1998 Flood



- Emergency spillway flows about 6 feet deep
- Significant river flooding
- River was not scoured

- Why? 12+ years limited flow, river deposition, deep rooted plants??

Other Protective Measures

City of San Marcos Regulatory Revisions

- 4’ cut and fill limitations for development
- 2-year detention added
- Recent erosion control training event
- Revised Land Development Code, late 2015

Texas State Habitat Conservation Plan Participation

- Focus on construction erosion control practices
- River sediment/invasive species removal

Sessom Creek Erosion Assessment (City)

- Erosion repair projects, two recently designed
- Planned wastewater line project

Summary

- Design dams to maximize flood and habitat goals
- Conceptual dam modifications increase annual peak flows and reduces 100-year flow rate, is it enough? Need additional study
- Ensure development regulations manage creek erosion
  - Mimic frequent storm events
  - Maximize recharge
  - Minimize creek degradation
- Effective, enforced construction erosion controls
  - City of San Marcos
  - Texas State University

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