



USGS Riparian Herpetofaunal Studies in Coastal San Diego, CA

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San Diego Multi-Species Conservation Plan

- Adopted March 18, 1997
- Plan to conserve nearly 40 animal species (and even more plants)
- Includes arroyo toad and western pond turtle
- USGS science support including monitoring strategy, baseline data, terrestrial studies AND... riparian studies...



Arroyo Toad...
Fire impacts



Pond Turtle...
Restoration

Post Fire Arroyo Toad:

- Catastrophic Wildfires in 2003 and 2007
- ~1,500 km² burned in 2003 in San Diego County
- ~1,200 km² burned in 2007 in San Diego County
- Huge impacts on riparian systems
- Four occupied watersheds in MSCP region of San Diego

Post Fire Arroyo Toad:

- Began monitoring following 2007 wildfires using design developed for MCBCP (Atkinson et al., 2003; Brehme et al., 2006)
- Occupancy based on detection of larval arroyo toads
- Adult presence still noted, especially in excessively dry conditions
- Data uploaded to BIOS quarterly (immediately useful for DFG and FWS)
- Surveys completed August 2009




Arroyo Toad Survey Locations

● 2008 AT Observations

 Harris Fire

 Witch Fire

 Otay Fire

 Cedar Fire

2008 Surveys

- 164 Sites
- 270 Surveys
- 96 Surveys w/AT
- 47 Sites w/AT


San Dieguito River

San Diego River

Sweetwater River

Tijuana River

San Diego, CA

2.5 0 2.5 5 7.5 10
 Miles

Arroyo Toad Survey Locations

• 2009 AT Observations

 Harris Fire


 Witch Fire

 Otay Fire

 Cedar Fire

2009 Surveys

- 127 Sites
- 270 Surveys
- 89 Surveys w/AT
- 45 Sites w/AT

2.5 0 2.5 5 7.5 10
 Miles

San Dieguito River

San Diego River

San Diego, CA

Sweetwater River

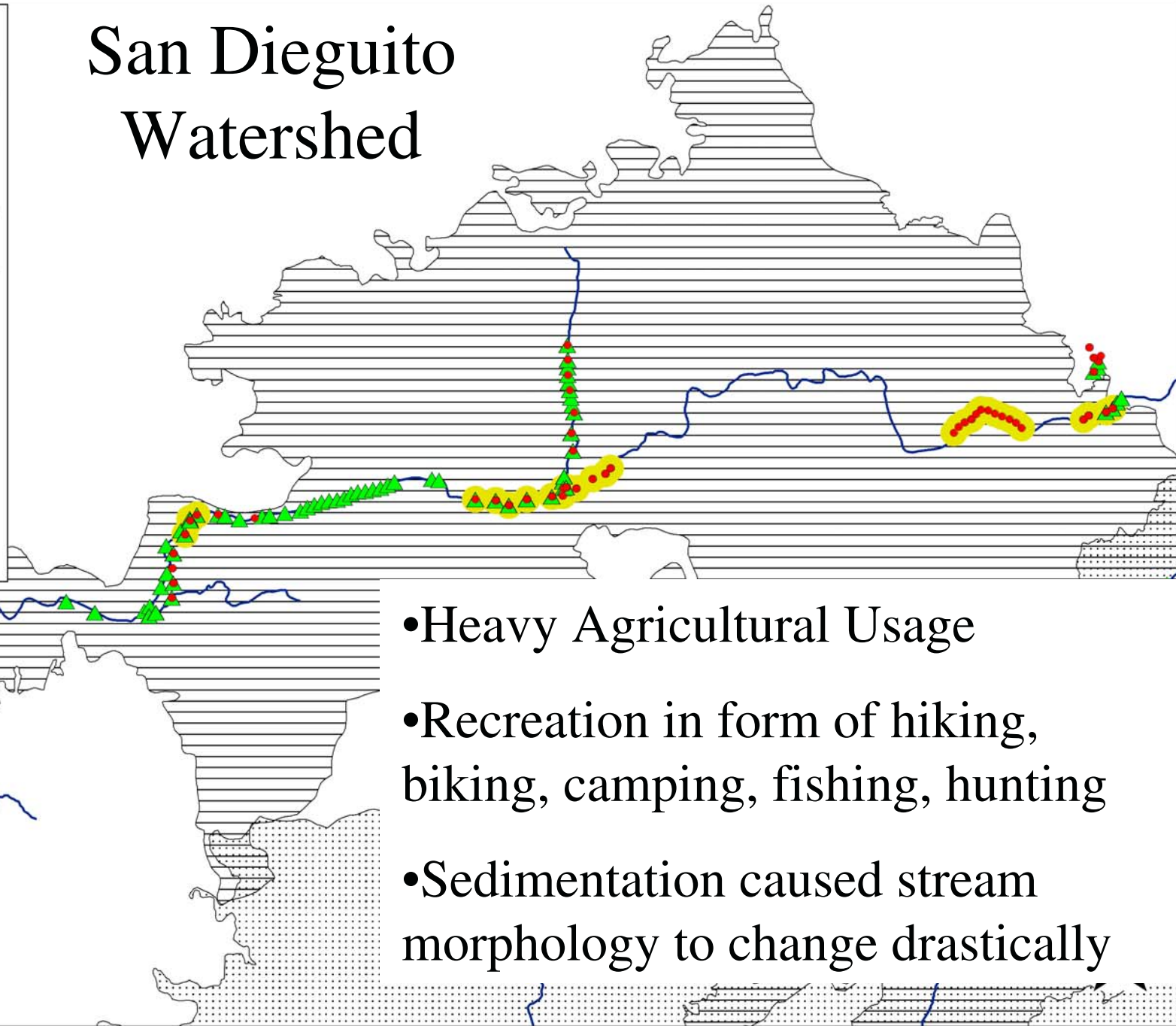
Tijuana River

Arroyo Toad Survey Locations 2008-2009

- 2009 Survey Sites
- ▲ 2008 Survey Sites
- AT Detected

- Harris Fire
- Witch Fire
- Otay Fire
- Cedar Fire

San Dieguito Watershed



San Dieguito River

1 0 1 2 3 4
Miles

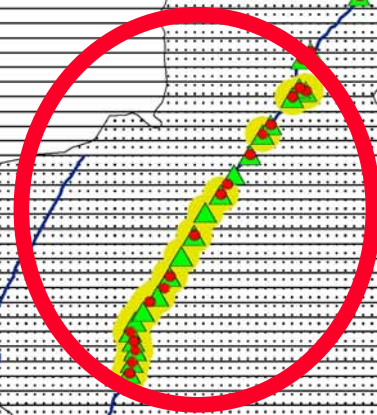
- Heavy Agricultural Usage
- Recreation in form of hiking, biking, camping, fishing, hunting
- Sedimentation caused stream morphology to change drastically



Arroyo Toad Survey Locations 2008-2009

San Diego Watershed

- 2009 Survey Sites
- ▲ 2008 Survey Sites
- AT Detected
- ▨ Harris Fire
- ▨ Witch Fire
- ▨ Otay Fire
- ▨ Cedar Fire



1 0 1 2 3 4 Miles

- Study area fairly remote, mostly USFS land, only moderate grazing
- Recreation in form of hiking, swimming



Arroyo Toad Survey Locations 2008-2009

Sweetwater Watershed

- 2009 Survey Sites
- ▲ 2008 Survey Sites
- AT Detected

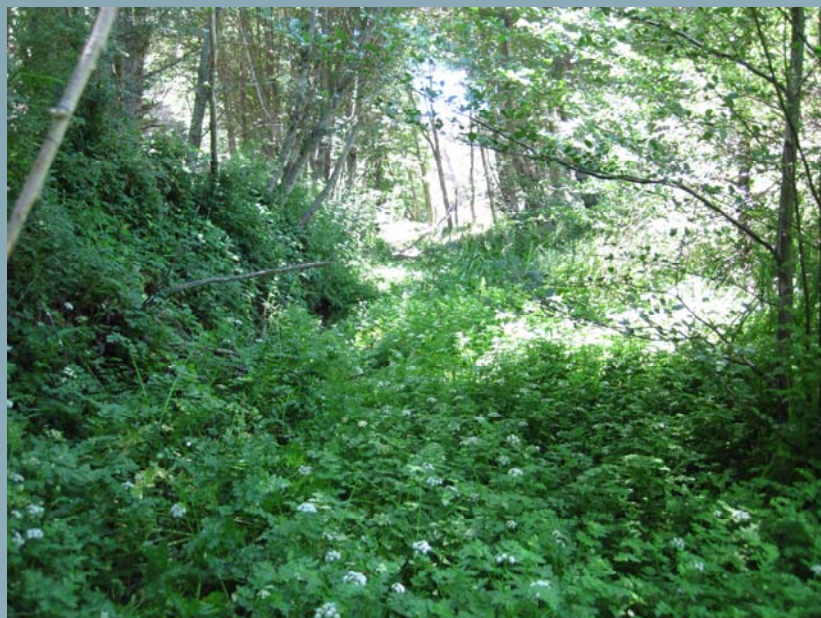
- Harris Fire
- Witch Fire
- Otay Fire
- Cedar Fire

0.5 0 0.5 1 1.5 2
Miles

- Recreation: hiking, biking, camping, fishing, swimming
- Burned in 2003 only, watercress, rushes and cattails prominent



*Burned
only in
2003*



Arroyo Toad Survey Locations 2008-2009

Tijuana Watershed

• 2009 Survey Sites

▲ 2008 Survey Sites

● AT Detected

▨ Harris Fire

▨ Witch Fire

▨ Otay Fire

▨ Cedar Fire

0.2 0 0.2 0.4 0.6 0.8
Miles

- Grazing at site, upstream ag.
- Indust. pollution downstream
- Dist. from border activities



What's next?

- Data QA and reporting
- Explore PAO models
- Will PAO be an effective tool for monitoring post fire recovery of the arroyo toad?

TURTLES



Western Pond Turtles in San Diego MSCP Region:

- Began monitoring in 2002
- No detectable recruitment at all study sites
- Gravid females at only one site: Sycuan Peak Ecological Reserve
- Why so dire?
 - Exotics
 - Roads
 - Fishing/Hunting
 - Public Access (dogs, traffic, etc.)



Potential for WPT vs Non-native Turtles
From Madden-Smith, et al., 2005

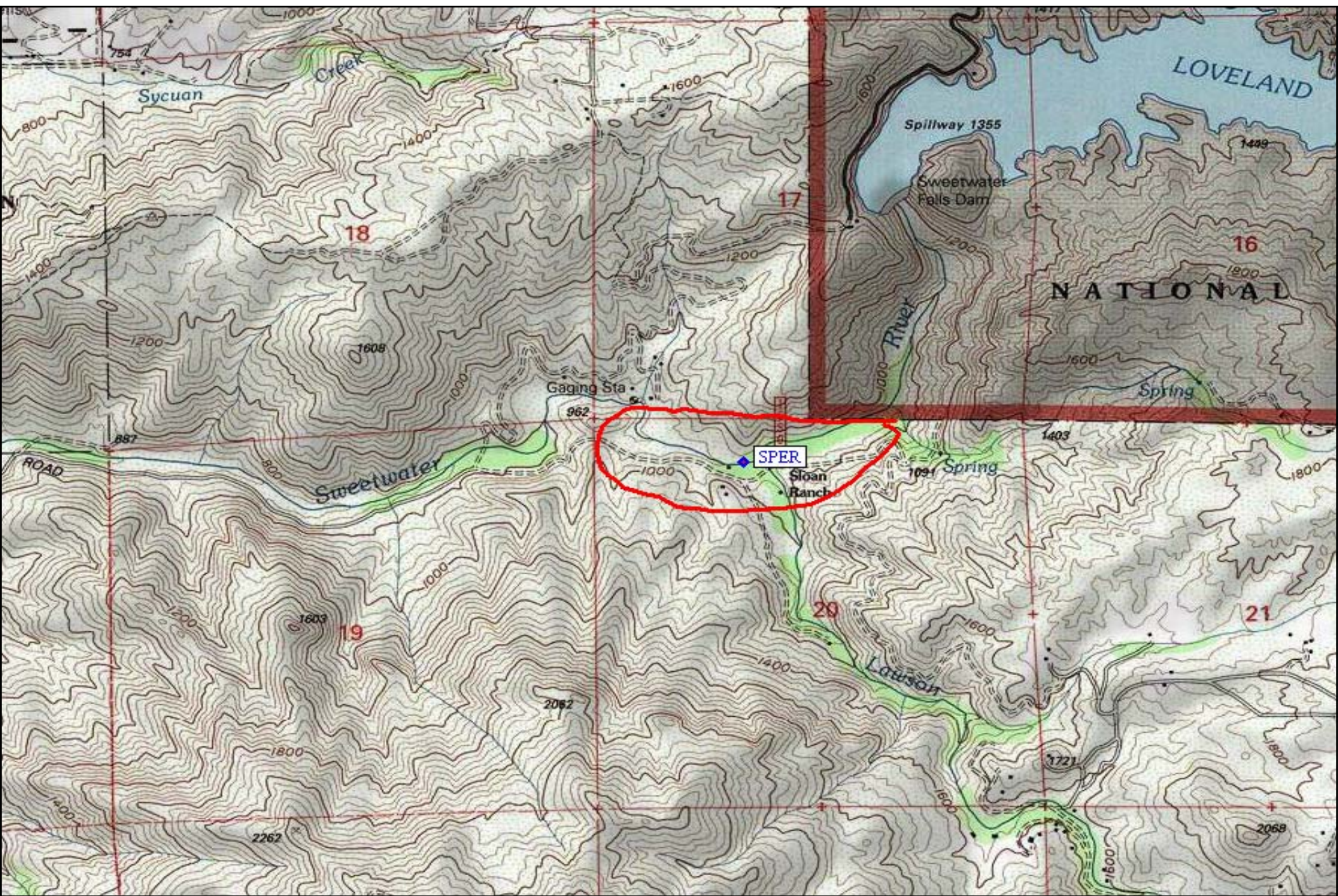
		Naturalness of Site		
		Natural	Modified Natural	Artificial
Human Access	High	Pond Turtle ↓↓ Non-native ↑↑	Pond Turtle ↓↓ Non-native ↑↑	Pond Turtle 0 Non-native ↑↑
	Medium	Pond Turtle ↓ Non-native ↑	Pond Turtle ↓ Non-native ↑	Pond Turtle 0 Non-native ↑
	Low	Pond Turtle ↑ Non-native 0	Pond Turtle ↑ Non-native 0	Pond Turtle 0 Non-native 0

Can We Restore WPT in Urban San Diego?

--Sycuan Peak Ecological Reserve--

- Only site we have documented successful breeding since 2002
- CDFG Reserve—Restricted access
- Discrete ponds—Easier for trapping and exotics control
- Excellent opportunity for multi-agency collaboration

“Natural” and “Low Access”



Western Pond Turtle Trapping

- 4 main ponds
- 20 hoop traps
- 6 Surveys (5 day trapping sessions)
- 41 WPT captures of 24 individuals
- All adults, 10:14 females : males
- Only 8 new WPT
(16 from 2002-3)
- 2 gravid females



At San Diego Zoo

- 2 captive laid clutches
- Currently 5 healthy eggs incubating
- Extensive facility to raise turtles for release



Exotics Removed

- Crayfish
- Sunfish
- Bullfrogs
- African Clawed Frogs
- Use of seines, hoop traps, minnow traps and manual capture



What's next?

- Intensive removal efforts this fall and winter
- Additional surveys to detect juvenile WPT in the spring 2010
- Additional surveys for gravid female WPT late spring and summer 2010



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County of San Diego

