



Research for Restoration and Recovery of a Protected Species

Results of Management Actions for the Southern Western Pond Turtle (*Emys pallida*) in San Diego.

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Introduction

The southern western pond turtle (pond turtle: *Emys pallida*) is covered by the San Diego Multiple Species Conservation Program which aims to conserve 46 plant and 39 animal species since 1997.

Baseline surveys during 2003-2008 found no juvenile pond turtles on conserved lands within the MSCP.

Only one population was observed to have an even sex ratio and a gravid female.



Questions

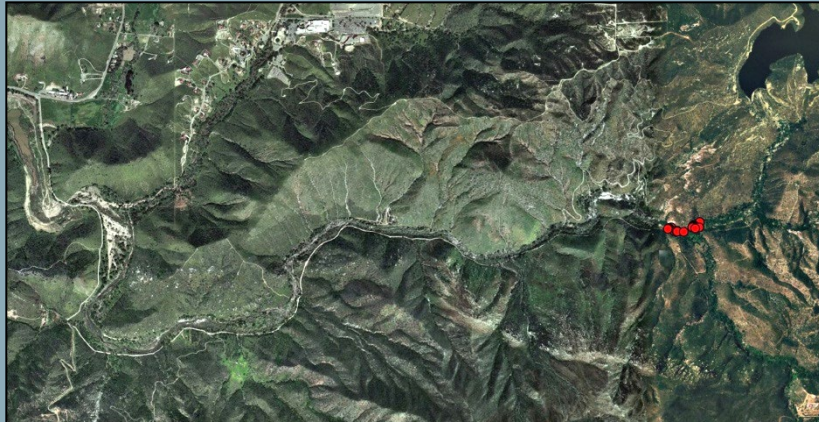
- I. Can we recover an impacted population of pond turtles in San Diego County?
- II. What methods can we use effectively?
- III. How can we measure success?





Sycuan Peak Ecological Reserve

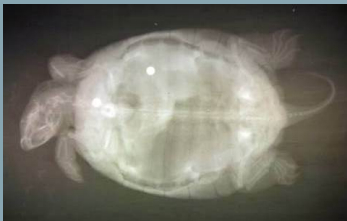
- California Dept. of Fish and Wildlife Reserve
 - No public access
 - No through traffic
 - Multi-agency collaboration
- Discrete ponds—Easier for trapping and exotics control
- At least one gravid female detected during initial surveys



Sycuan Peak Ecological Reserve

Regional Impacts

- Roads
- Access/recreation
- Habitat alteration
- Water availability
- Invasive species



Sycuan Peak ER

•Invasive species

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



Study Design:

- 1. Remove nonnative aquatic species**
 - Intensive trapping/netting**
 - Manual gig/sling and airgun removal surveys**
 - Subsequent visual/trapping maintenance surveys**
- 2. Headstarting juvenile pond turtles**
 - Harvest eggs from wild females**
 - Captive reared at SD Zoo**
 - Released at SPER**
- 3. Pond turtle and nonnative species monitoring**
 - Telemetry of headstarted pond turtles-site fidelity**
 - Annual trapping to monitor growth/health**
 - Visual encounter and camera surveys-detect new juveniles**



Nonnative species removal-SPER 2009

Methods-Six 5-day surveys including:

- Minnow & hoop traps
- Seine and dip nets
- Airguns
- Hand capture
- Polespears



Species removed include:

- American bullfrog (larvae and adults)
- African clawed frog (larvae and adults)
- Green sunfish
- Largemouth bass
- Red swamp crayfish



Headstarting

- Captured females pond turtles were examined to determine reproductive status
- Radiograph/Physical Examination (Palp)
- Gravid females were kept in quarantine at San Diego Zoo for egg harvesting
- Eggs were incubated and hatched at the Zoo



Headstarting

•Headstarting

- Hatchlings were captive reared at the Zo
- 5 juveniles released at SPER in 2013
- 5 more released at SPER in 2014
- Monitored with radio telemetry to determine site fidelity
- Monitored by annual trapping to determine health and document recruitment



Turtle Monitoring by Camera

- Monitoring activity and habitat use:

2018-08-16 6:00:00 PM

0 28°C



- Monitoring for recruitment:





Invasive Species Monitoring by Camera

- Monitoring for nonnative aquatic species re-invasion:

2015-10-30 11:30:00 PM T

11°C



RECON001





Sycuan Peak ER Results

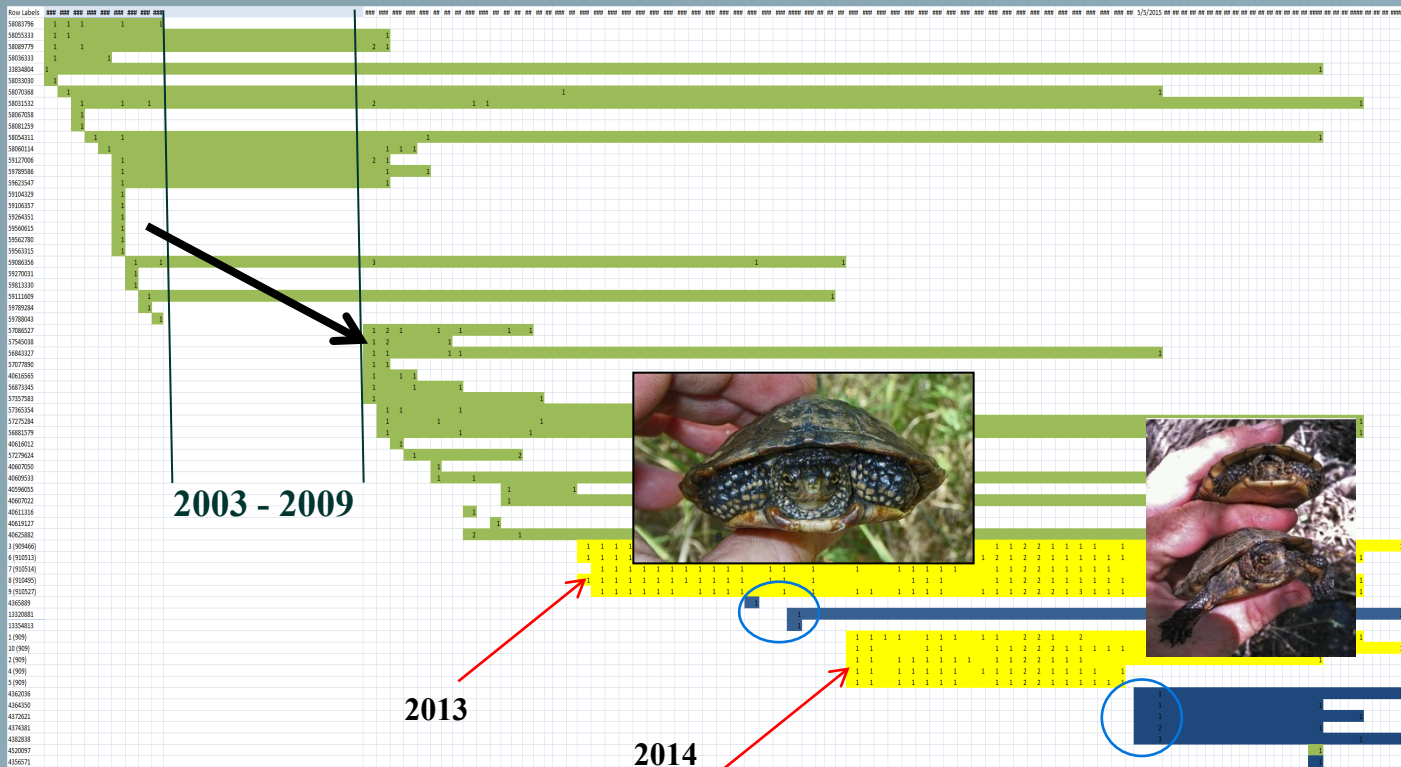
2009-pre treatment-

- 24 adult pond turtle
- 10 females, 14 males
- 16 recaptures from 2002-2003
- No juveniles
- Average carapace length = 133.0mm, SD of 4.4

2010-2019-post treatment-

- New juvenile pond turtles detected as early as 2010
- Three bullfrogs detected and removed (2015 and 2017)
- 57 individual pond turtles
- 18 new juveniles
- Average carapace length = 110.0mm, SD of 20.3
- Pre to post-treatment demography change $p < 0.01$

Recapture data and demography- No young turtles until 2010



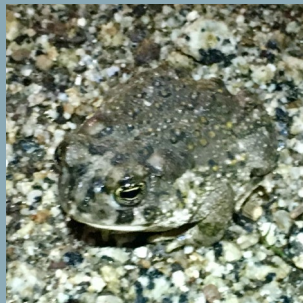


Sycuan Peak ER Captures 2019

11 more new juvenile/young pond turtles



First arroyo toad (*Anaxyrus californicus*) detected at SPER since 1996



Program Expansion

- Apply lessons from Sycuan Peak ER
- Test if we can recover other sites with more or different impacts
- Coordinate with partner agencies to find suitable study sites
- Rancho Jamul Ecological Reserve with CDFW
- TNC's Wheatley Preserve with USFWS Partners Program



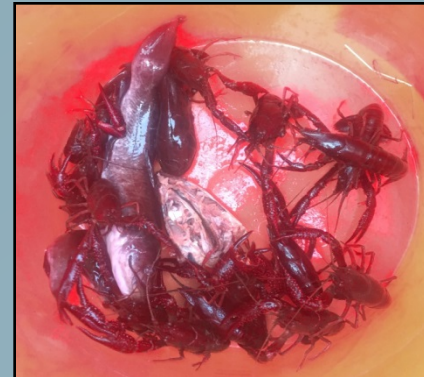
Program Expansion with CDFW at Rancho Jamul ER

- Seine nets, hand capture, traps, and airguns have been used to prepare the site for turtles
- Over 400 African clawed frogs, 60 bullfrogs, and 800 crayfish have been removed prior to translocation
- Turtles were translocated between September and October of 2014 and again in Sept. 2015



Program Expansion with CDFW at Rancho Jamul ER

- Over 4,900 bullfrogs & 3,800 crayfish have been removed in 2017-2019
- In one week-2,441 crayfish, 104 clawed frogs, 22 bullfrogs



Program Expansion with USFWS Partners Program

•TNC's Wheatley Preserve:

- Top of Scholder Creek Watershed
- No public access
- No major roads
- Only one nonnative aquatic species: bullfrog
- Over 3,600 bullfrogs removed 2017-2018



Program Expansion with USFWS Partners Program

- TNC's Wheatley Preserve:
 - 12 Turtles translocated in 2019



Funding and Support From:

SANDAG

SDMMP

CDFW

USFWS Partners Program

US Forest Service

The Nature Conservancy

USGS

San Diego Zoo

