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Environment**

University of Massachusetts

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Impacts of Urbanization on the Western Pond Turtle in Southern California

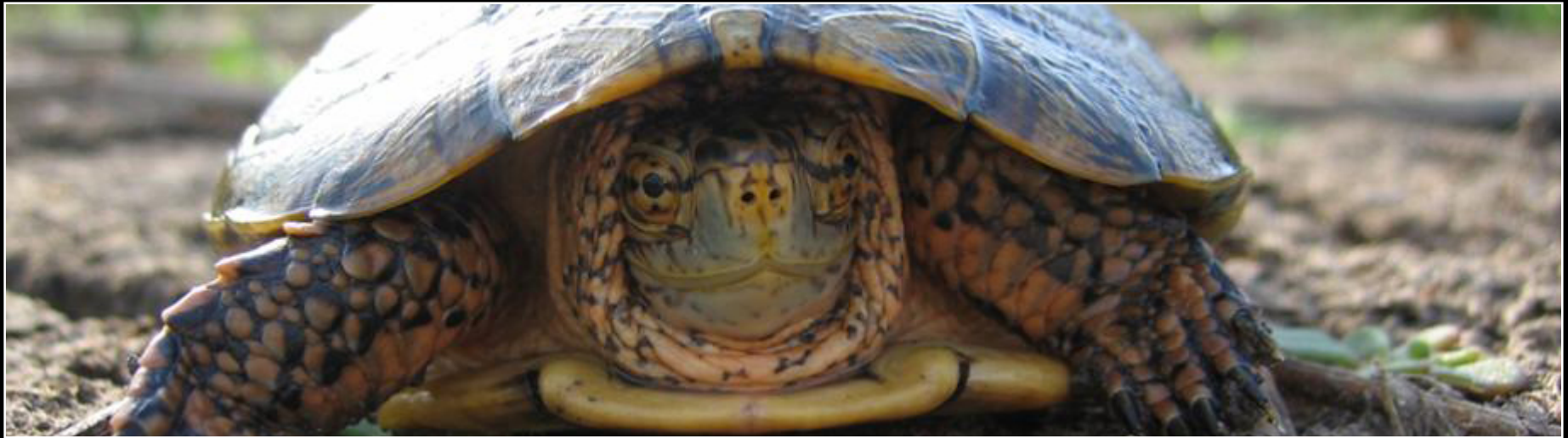


By: Sara Schuster, Robert Fisher, and Melanie Madden – Smith

Introduction

Western Pond Turtle (*Actinemys marmorata*)

- Only aquatic freshwater turtle native to California
- Once widespread and common from Washington to northern Baja California
 - Declined from 95% – 99% of it's range (Bury, in press)



Background

USGS began intensive surveys for the pond turtle in 2002

Objectives:

- Determine historic & current distribution of the pond turtle in southern California
- Evaluate the general health of individual pond turtles & turtle populations as a whole
- Develop threat assessment evaluations for potential pond turtle habitat



Study Area

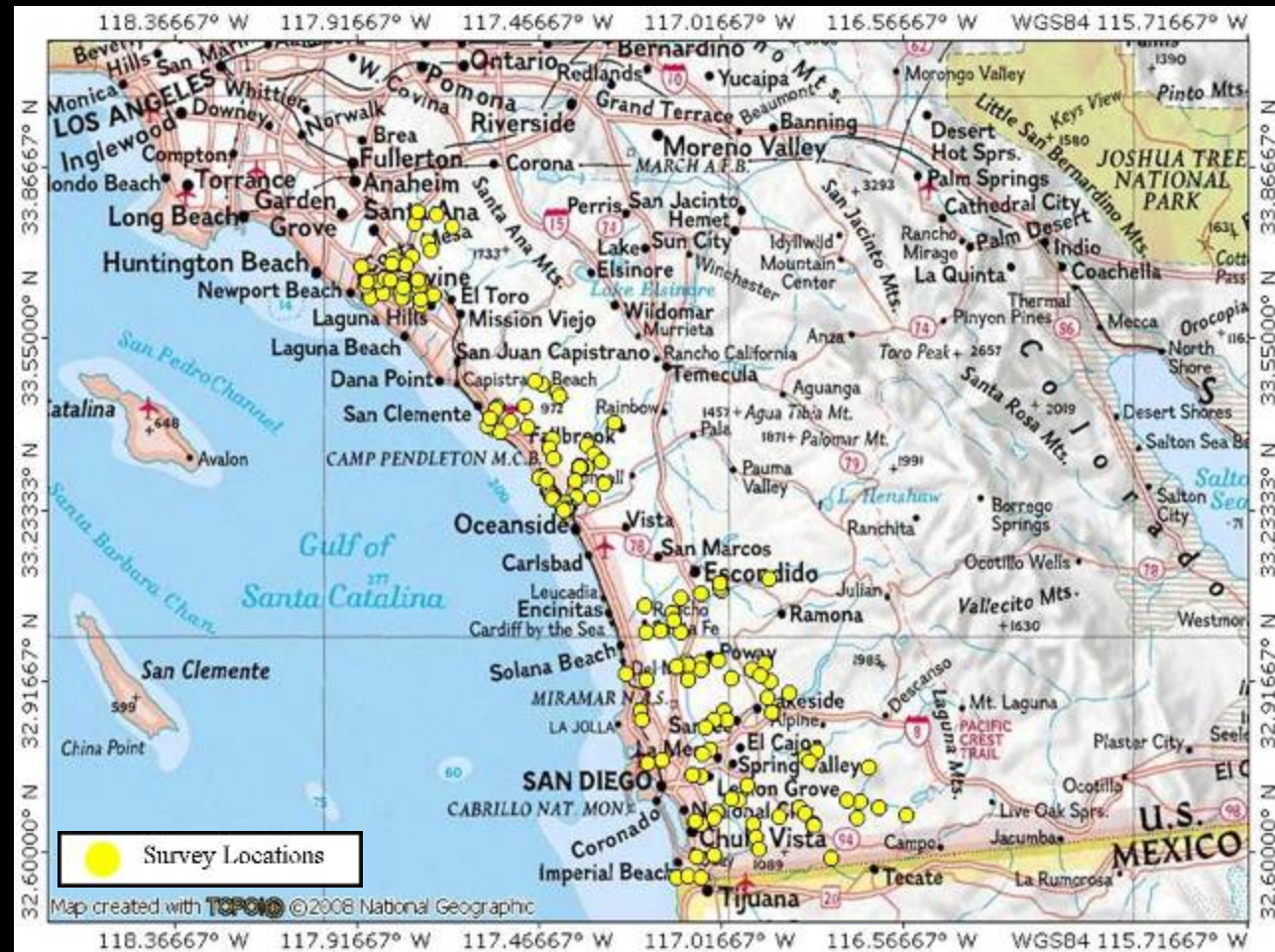
Orange and San Diego Counties in southern California

- Orange County Surveys
 - Irvine Ranch Wildlands
2003 & 2006
- San Diego County Surveys
 - Multiple Species Habitat
Conservation Program boundaries
(MSHCP)
2002, 2003, 2008, 2009
 - Marine Corps Base Camp Pendleton
2004 - 2009



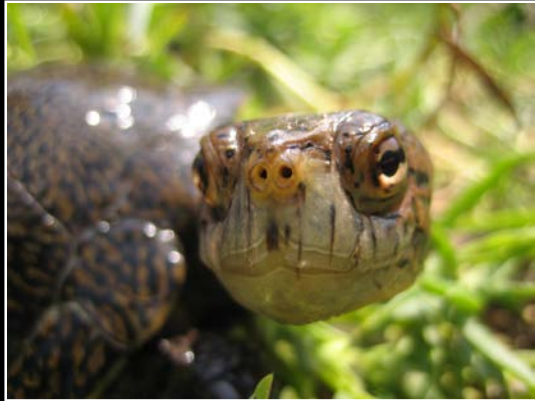
Results

- Visual surveys = 152
- Trapping surveys = 92



Results

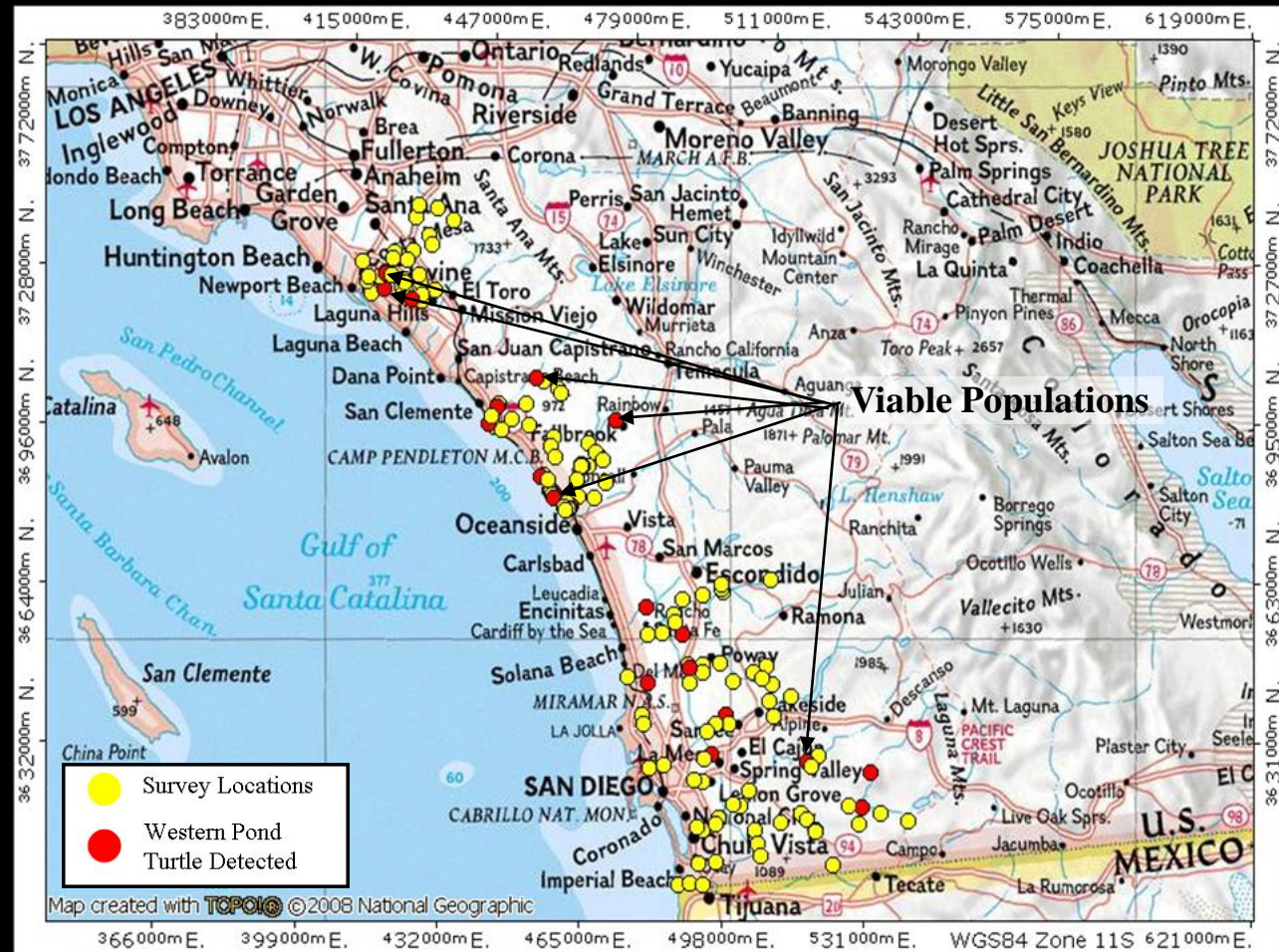
- Pond turtles detected at 22 sites



Results

< 20 viable populations remain in southern California

- Most populations are adult/male biased with little to no recruitment
- Urbanization has impacted the pond turtles in southern California



Impacts of Urbanization

- Habitat Loss
- Habitat Fragmentation
- Habitat Alteration
- Human Access
- Fire/Debris Flows



Impacts of Urbanization

- **Habitat Loss**
- Habitat Fragmentation
- Habitat Alteration
- Human Access
- Fire/Debris Flow



Habitat Loss

- California leads the nation in habitat loss
- 90 – 95% of southern California ecosystems have been eliminated



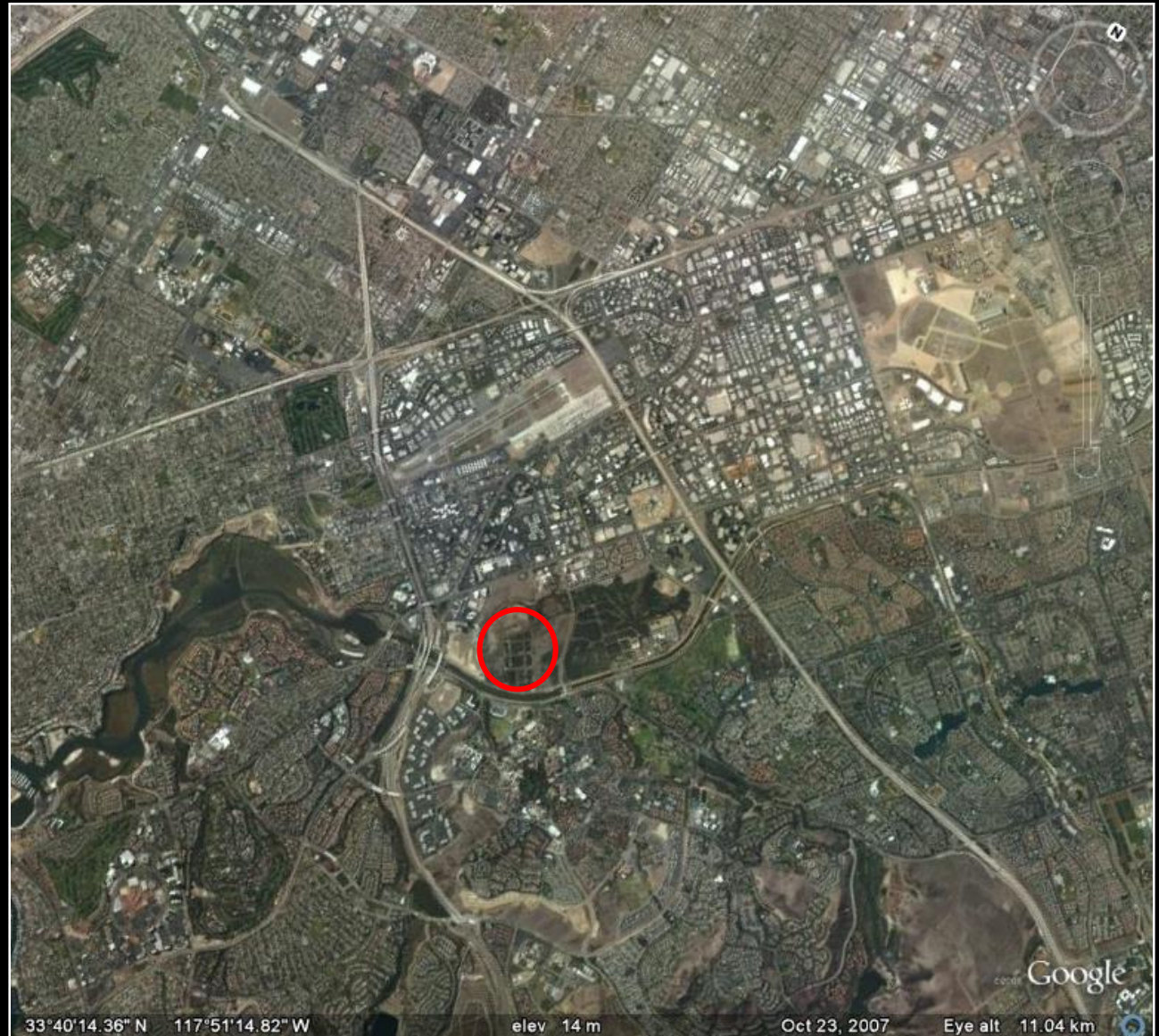
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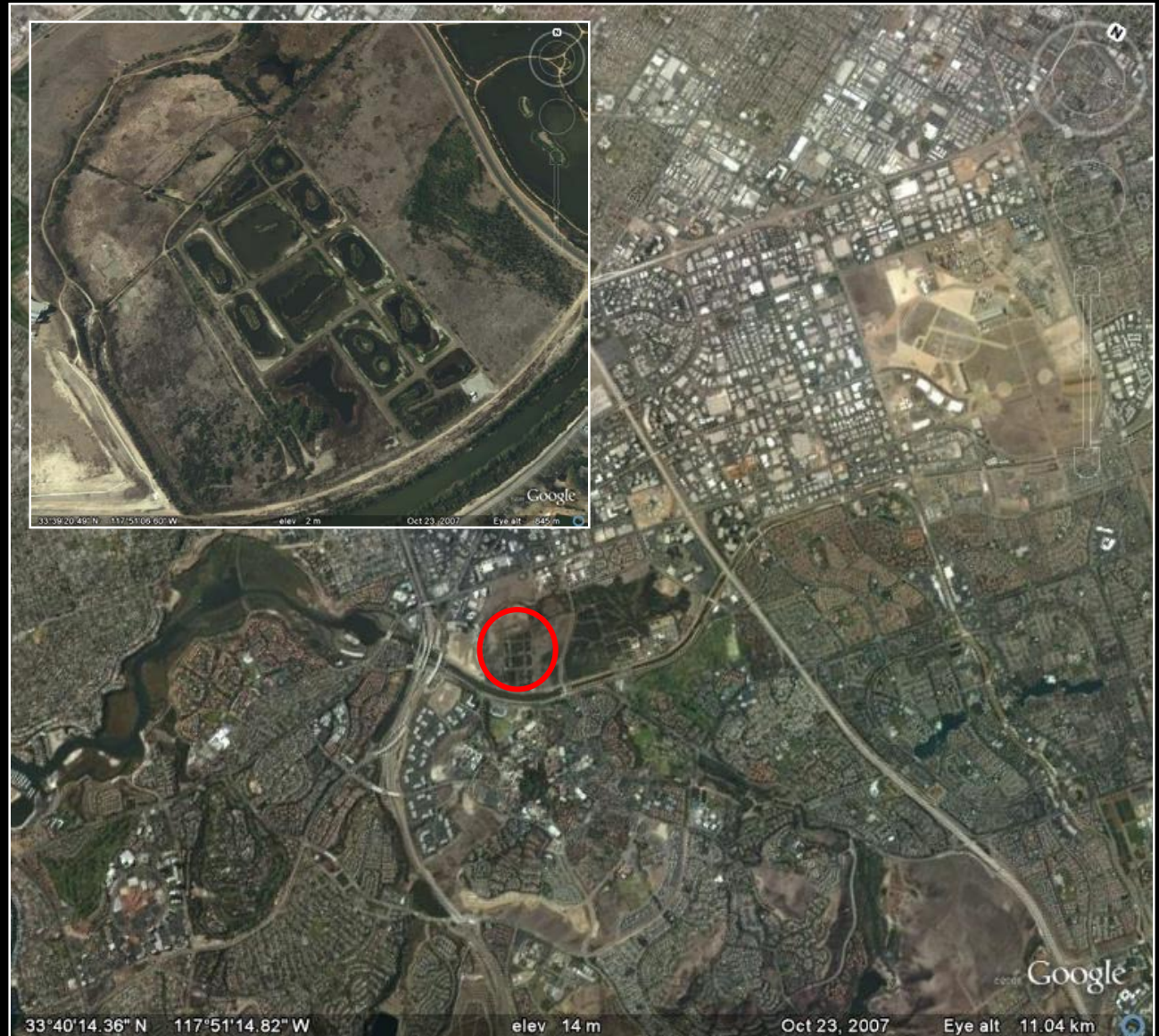
Habitat Fragmentation

- ↓ terrestrial habitat
- ↑ roads
- ↑ predation
- ↑ human interaction
- ↑ contaminates



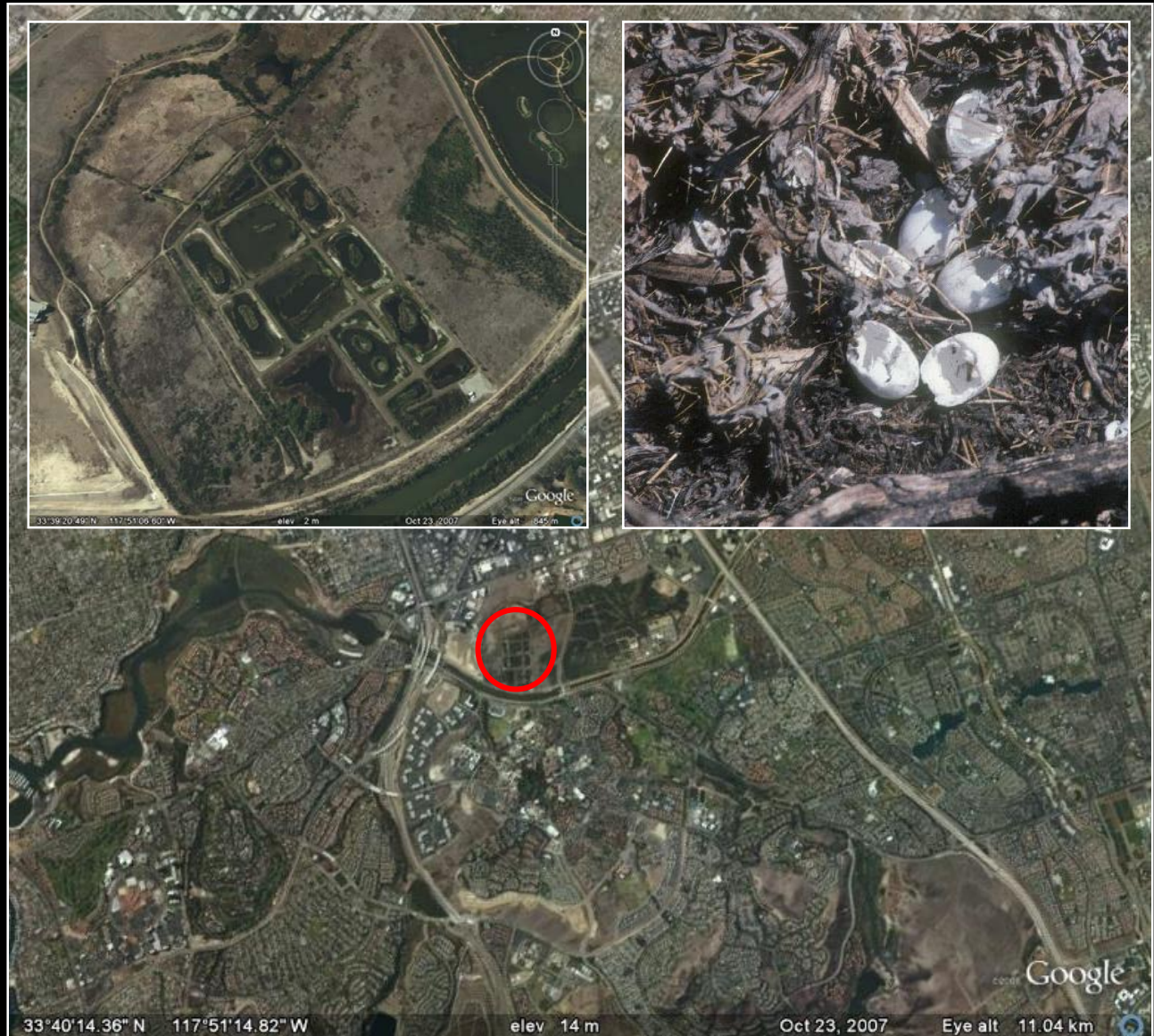
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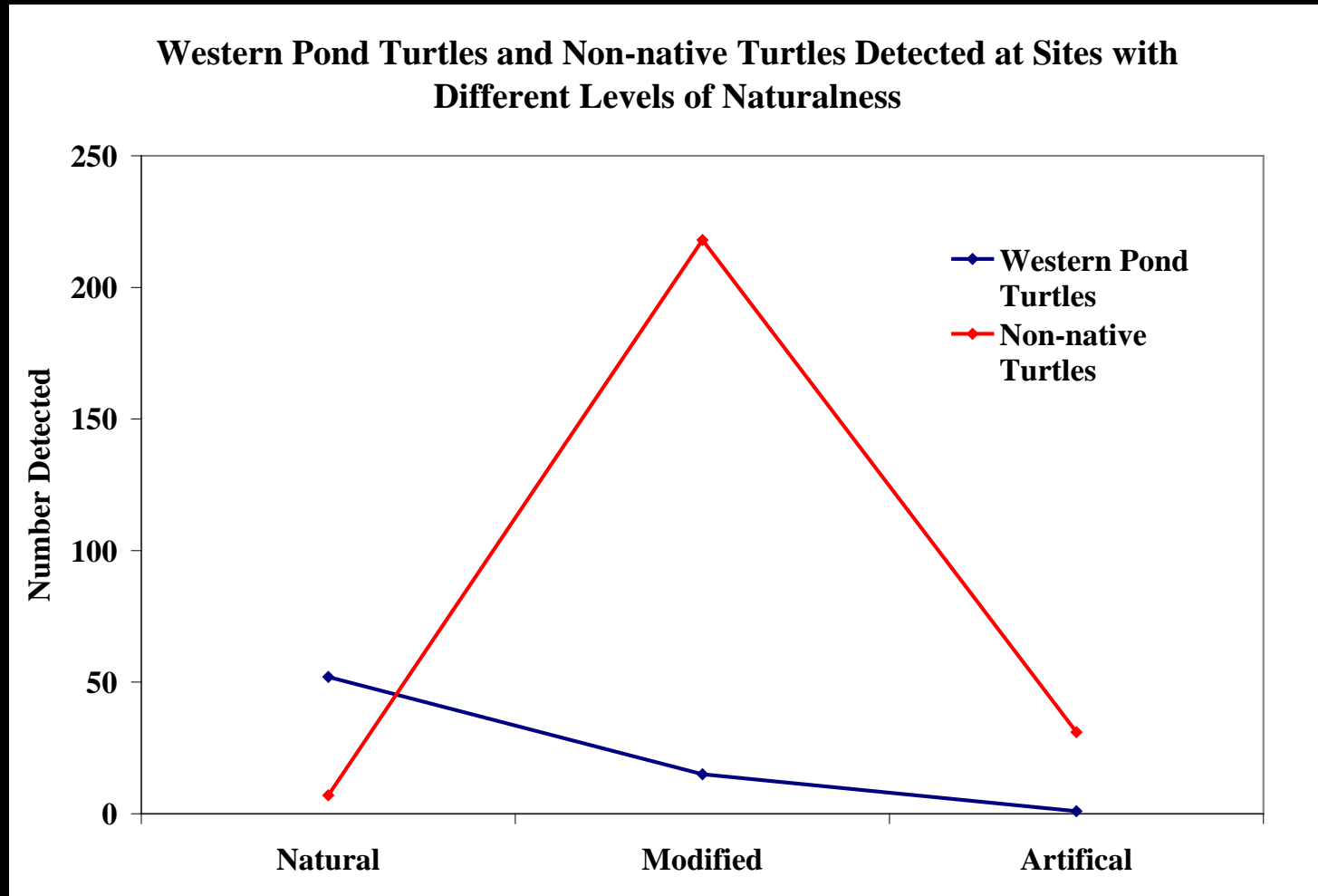


Impacts of Urbanization

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- **Habitat Alteration**
- Human Access
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Habitat Alteration



Impacts of Urbanization

- Habitat Loss
- Habitat Fragmentation
- Habitat Alteration
- **Human Access**
- Fires/Debris Flows



Human Access

- Collection of pond turtles
- Human Recreation
 - Fish hooks
 - Road/trail mortality
- Introduction of Non-native species



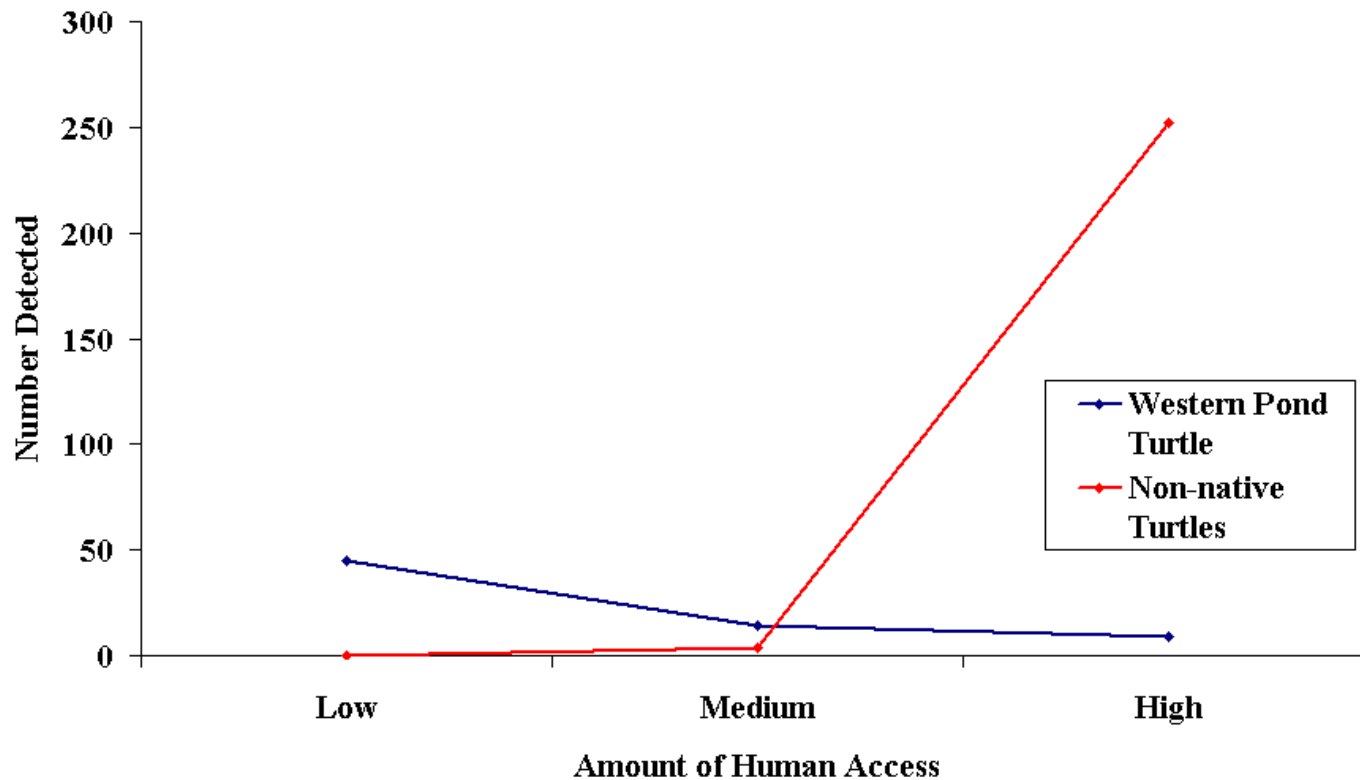
Non-native Animal Species

- Competition
- Disease/Parasites
- Predation



Human Access

Number of Western Pond Turtles & Non-native Turtles Detected at Sites with Varying Human Access



Habitat Alteration

Naturalness of a Site

		Natural	Moderate	Artificial
Human Access	Low	Pond Turtle ↑↑ Non-native 0	Pond Turtle ↑ Non-native 0	Pond Turtle 0 Non-native 0
	Medium	Pond Turtle ↑↓ Non-native ↑	Pond Turtle ↓↓ Non-native ↑	Pond Turtle 0 Non-native ↑
	High	Pond Turtle ↓↓ Non-native ↑↑	Pond Turtle 0 Non-native ↑↑	Pond Turtle 0 Non-native ↑↑

Habitat Alteration

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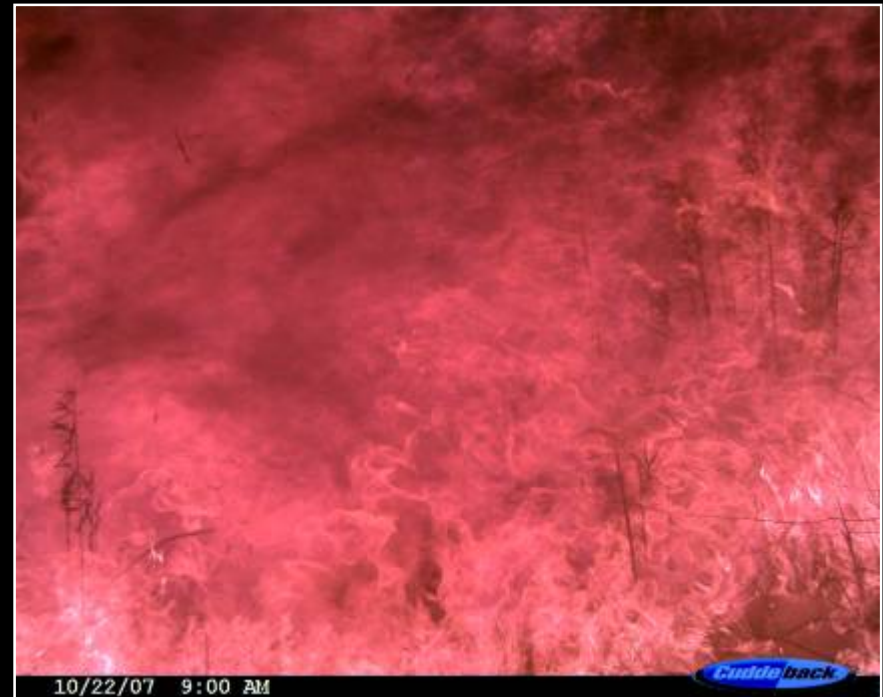
Impacts of Urbanization

- Habitat Loss
- Habitat Fragmentation
- Habitat Alteration
- Human Access
- **Fire/Debris Flow**



Fire & Debris Flows

- Impacts of fire
 - direct mortality
 - habitat loss
 - habitat conversion
- Fire frequency is increasing and appears to be a result of urbanization
- ↑ in fire frequency disrupts the ability of
 - more sensitive species to reestablish
 - the habitat to recover



Fire & Debris Flows

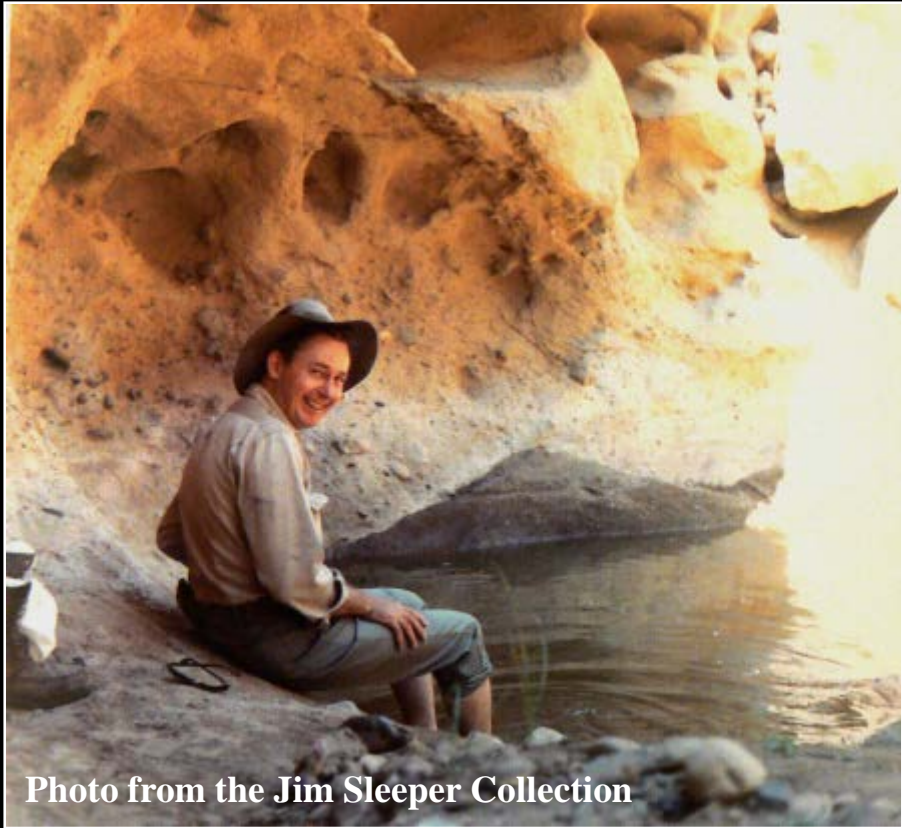


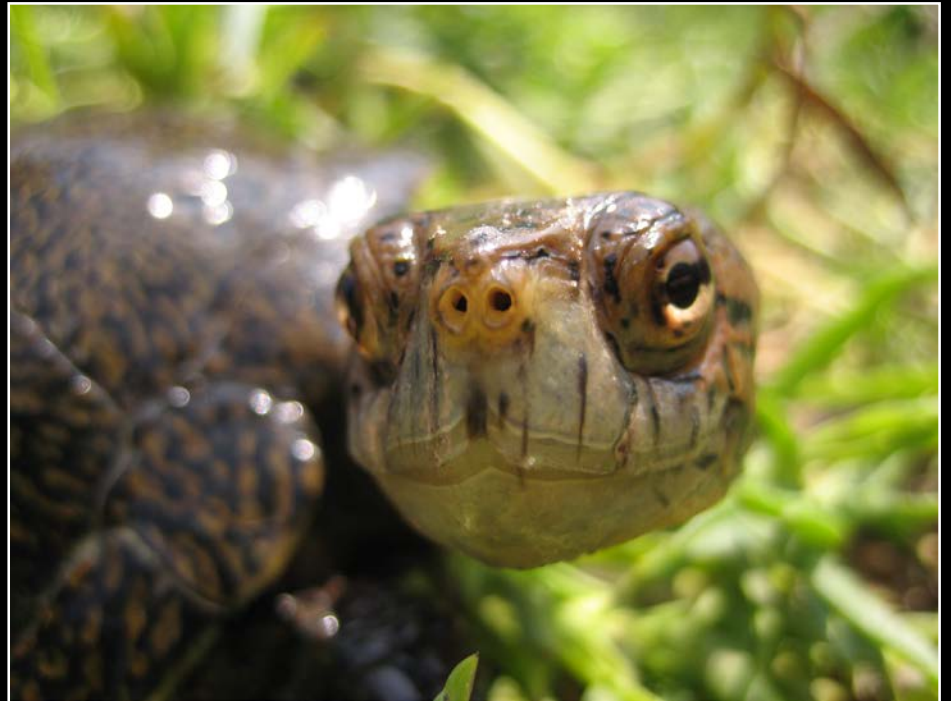
Photo from the Jim Sleeper Collection



Conclusions

Programs need to be developed as tools to promote and re-establish populations

- Long term monitoring
- Genetics
- Habitat suitability assessment
- Habitat restoration/creation
- Translocation, headstarting and captive breeding



Acknowledgements



Any Questions?

