

Rethinking Recovery:

Using science, technology and collaboration
for recovery of the Mojave Desert Tortoise

Cat Darst

Biologist
Desert Tortoise
Recovery Office
USFWS



Philip Murphy

Senior Research
Analyst & Founder
U. of Redlands &
InfoHarvest



In a nutshell...our partnership story

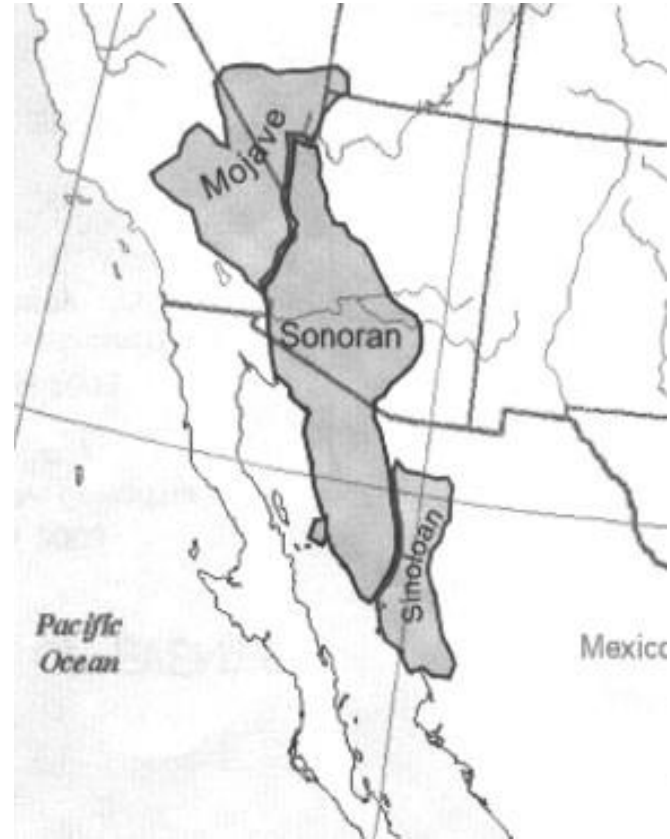
CHALLENGES

- Complex, wicked problem
- Many partners with historic lack of trust
- High degree of conflict

RESPONSES

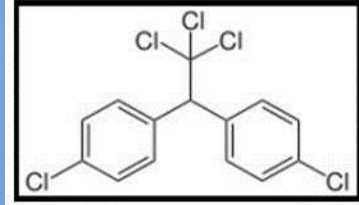
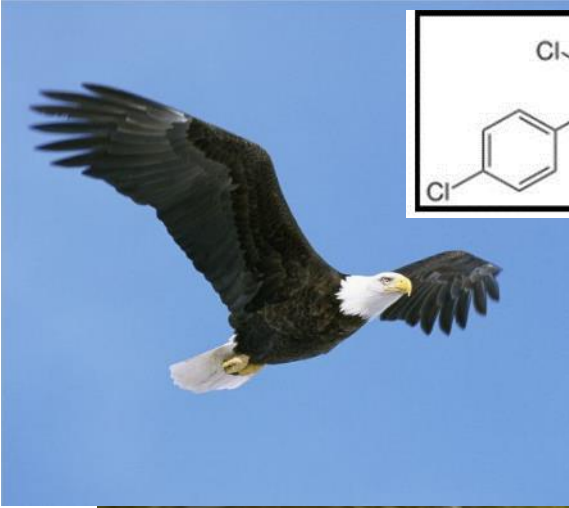
- Multi-partner collaborative process
- Science and technology to support that process
- Advocacy and outreach

Mojave Desert Tortoise



Listed as Federally Threatened in 1990
Critical Habitat designated in 1994
Recovery Plan published in 1994

What makes a species easily “recoverable”?



- Declines are primarily result of specific, remediable threat
- Preventing recurrence of the threat can happen through existing management or regulatory mechanisms

Challenges to Tortoise Recovery



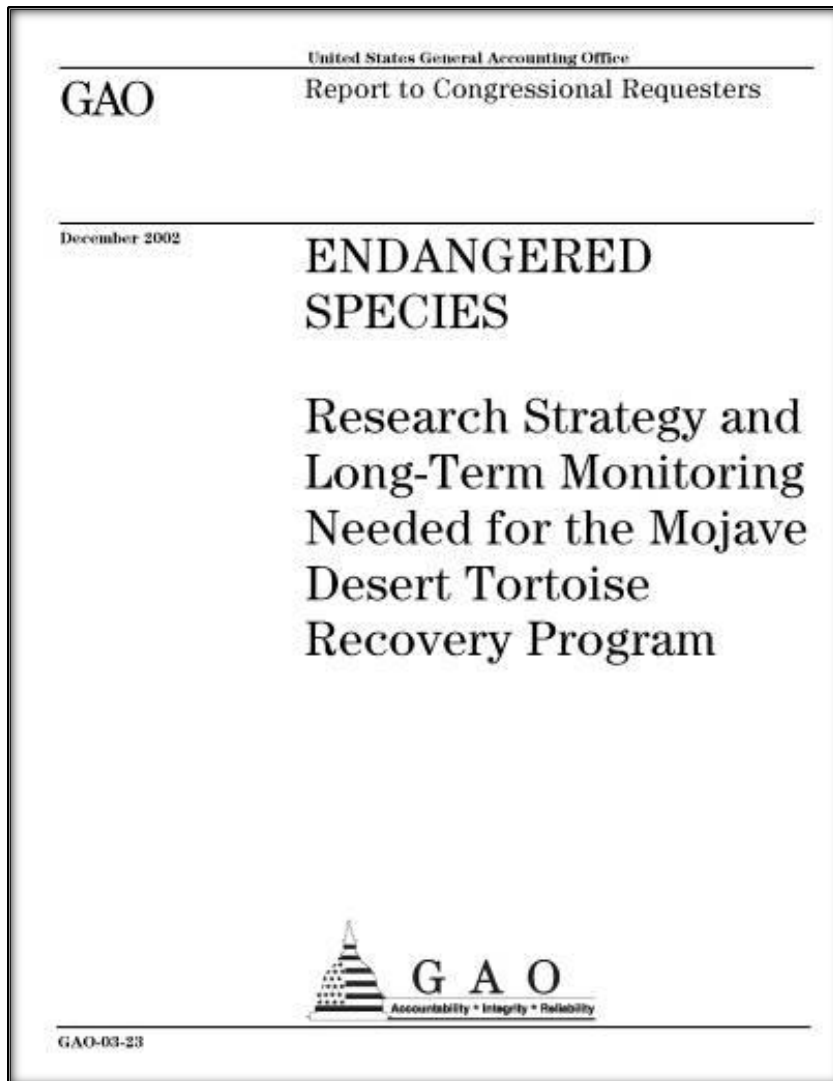
- Observed population declines result from numerous, diverse threats that vary spatially and temporally
- Not all individuals, or even all populations, are affected by every threat
- Most populations likely are affected by several of these threats simultaneously

Challenges to Tortoise Recovery



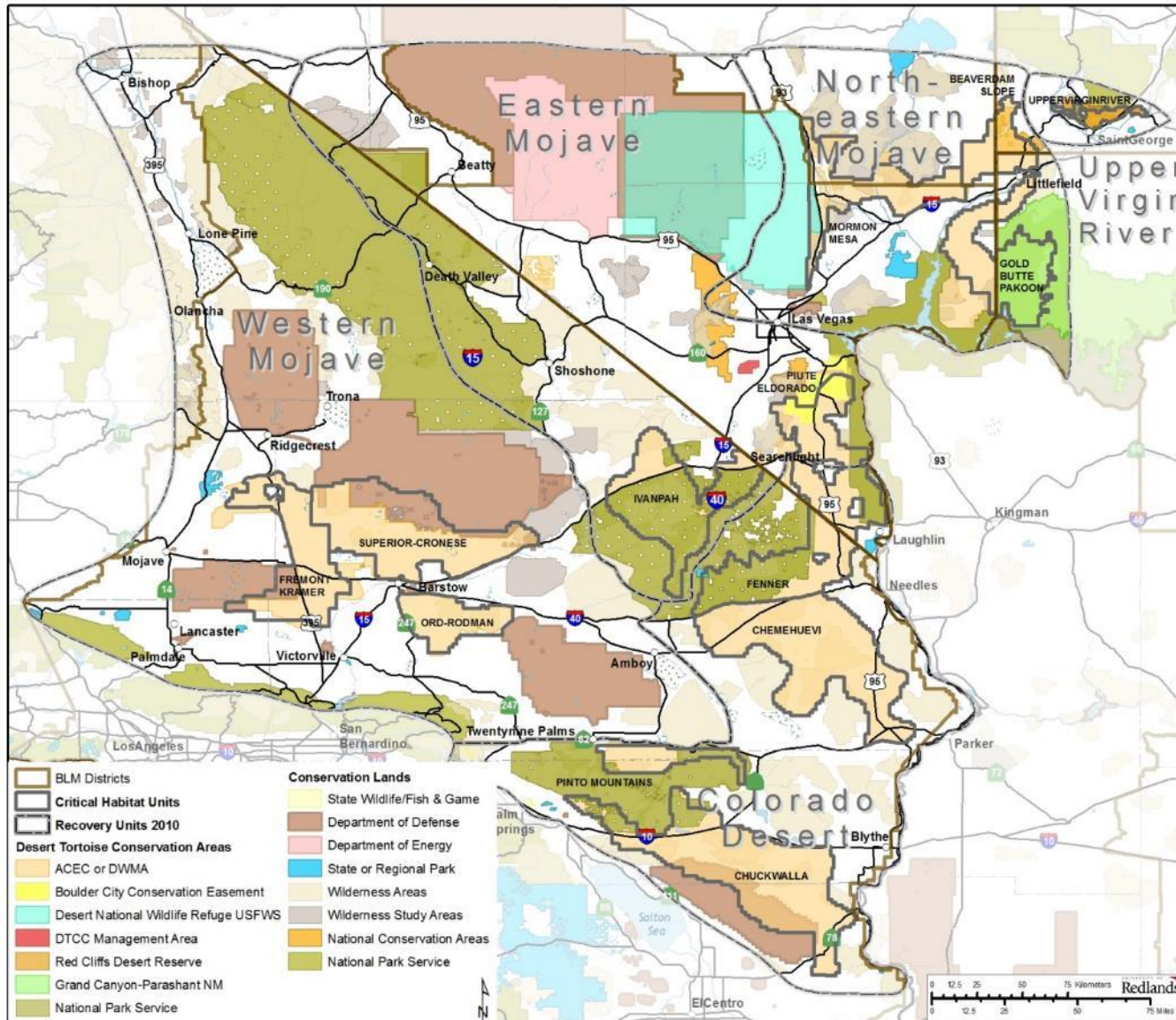
- While some threats result in direct mortality of individuals, many affect the *habitat* upon which the species depends
- Multiple threats may interact synergistically
- Many significant threats will return if there is not a sustained management effort

Challenges to Tortoise Recovery



- >\$100M on recovery
- Recovery action effectiveness unknown
- Tragedy of Fragmentation (Goble 2009)

Challenges to Tortoise Recovery



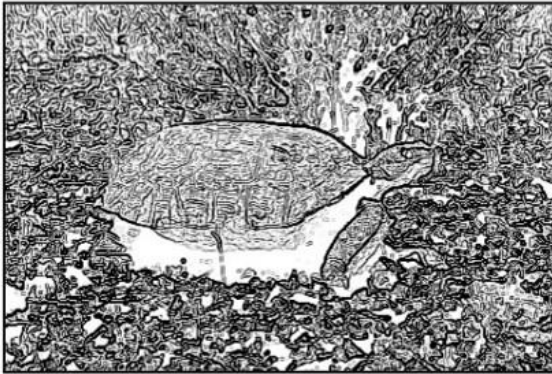
Challenges to Tortoise Recovery

U.S. Institute for **Environmental Conflict Resolution**

Morris K. Udall Foundation

FEASIBILITY ASSESSMENT REPORT

for
Collaborative Desert Tortoise Recovery Planning Process
Proposed by U.S. Fish and Wildlife Service



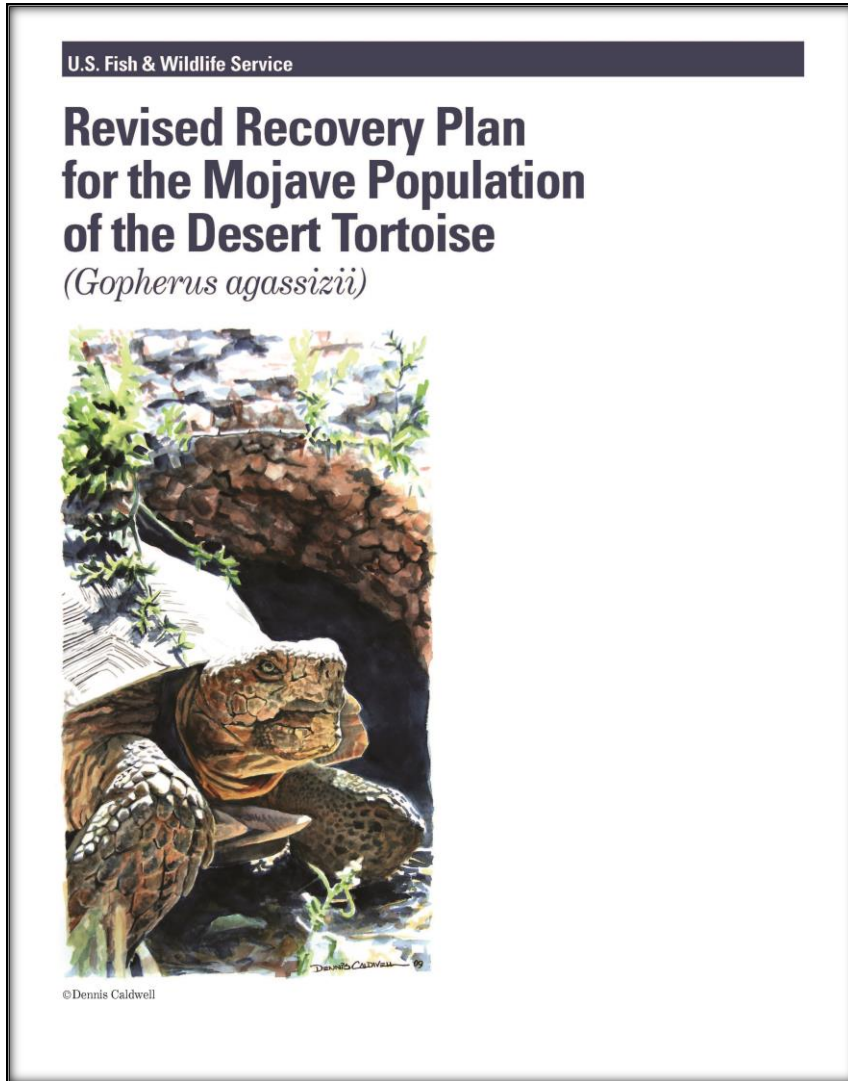
September 26, 2006

Prepared by:

U.S. Institute for Environmental Conflict Resolution
and
Center for Collaborative Policy
California State University, Sacramento

- Long history of controversy and conflict among stakeholders
- Lack of trust amongst agencies
- Complete collaborative overhaul of recovery planning and implementation process necessary to progress
- Build scientific credibility and confirm the availability of resources for implementation

New Approach



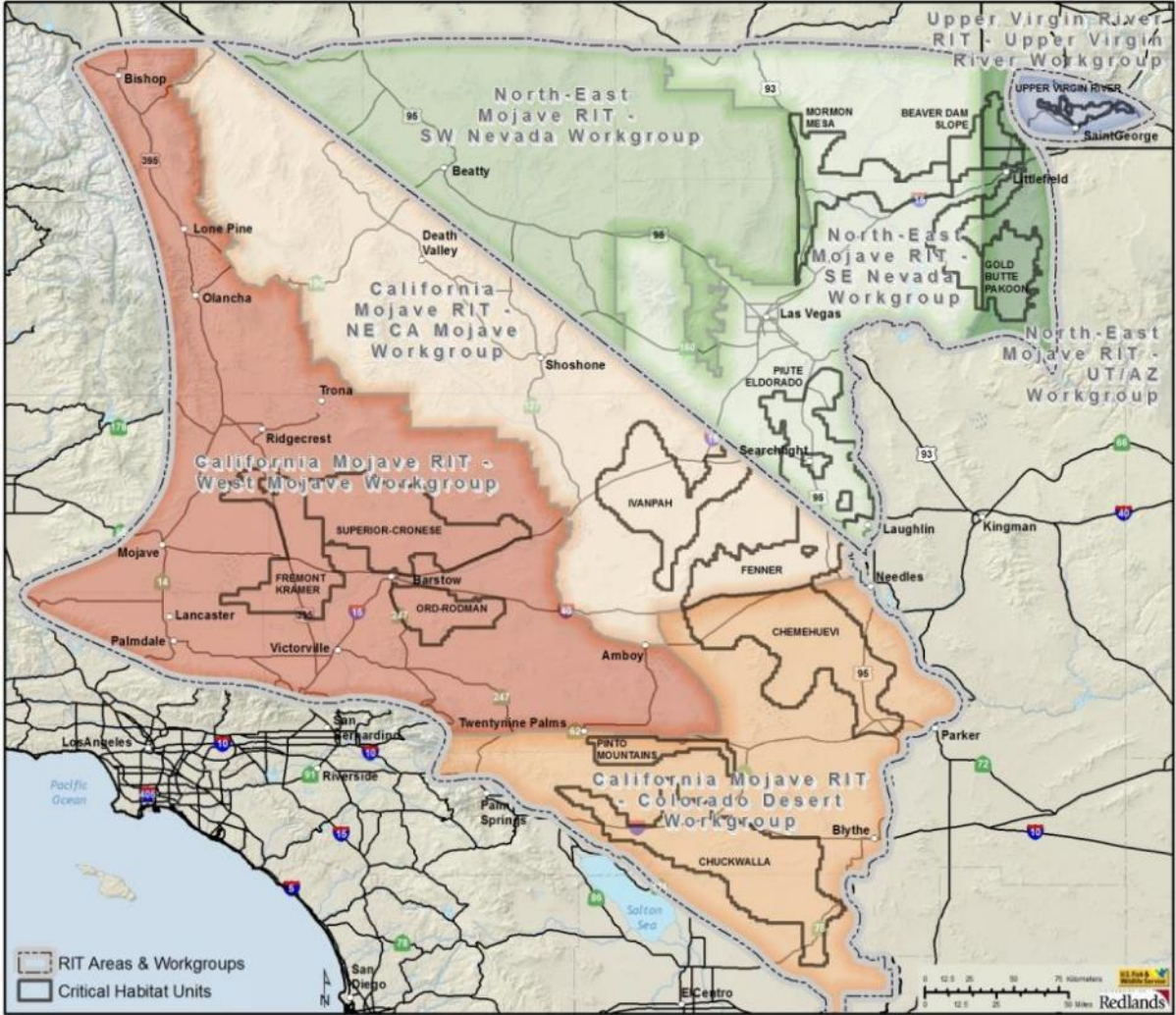
To address complexities that have prevented recovery progress to date:

- Coordinated, structured recovery program
- Broad participation



*Recovery Implementation Teams
&
Spatial Decision Support System*

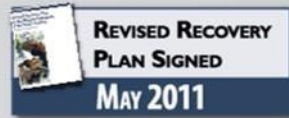
Recovery Implementation Teams



Seven workgroups each composed of 10-14 individuals including:

- Land managers
- Wildlife managers
- Local governments
- Environmental groups
- User groups
- Scientists

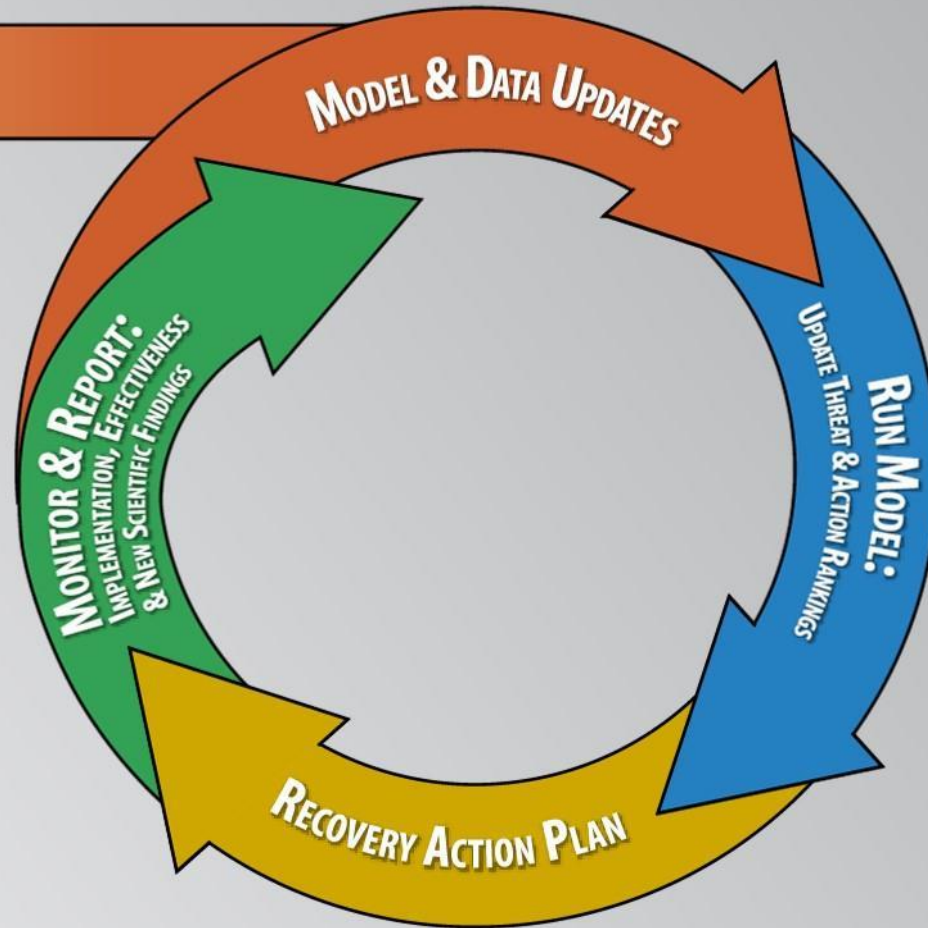
OVERALL RECOVERY IMPLEMENTATION TEAM (RIT) PROCESS



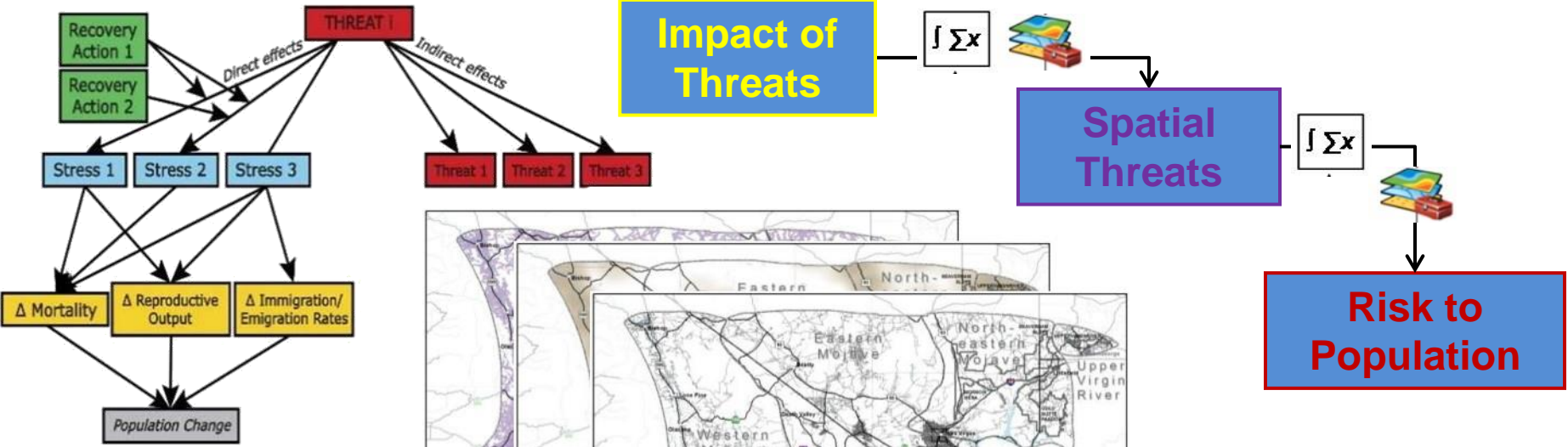
2007

INITIAL SDSS DATASETS
& MODELS DEVELOPED

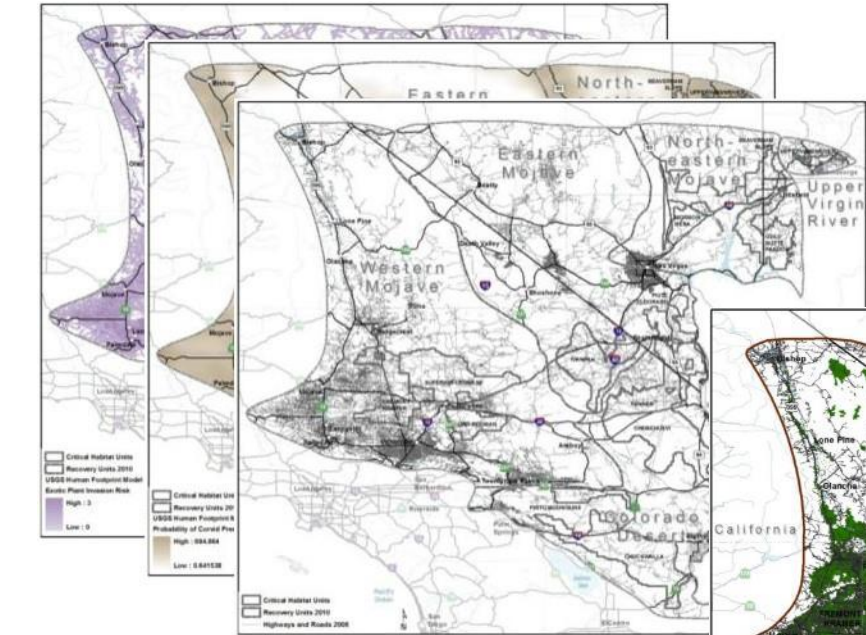
*Recommended establishment of regional
Recovery Implementation Teams to prioritize
actions and track recovery progress*



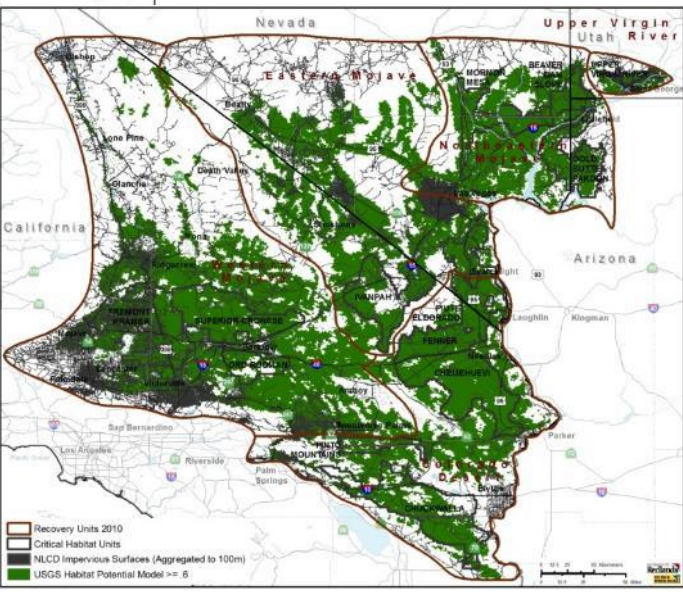
Spatial Decision Support System (SDSS)



Model of how threats and recovery actions affect tortoises

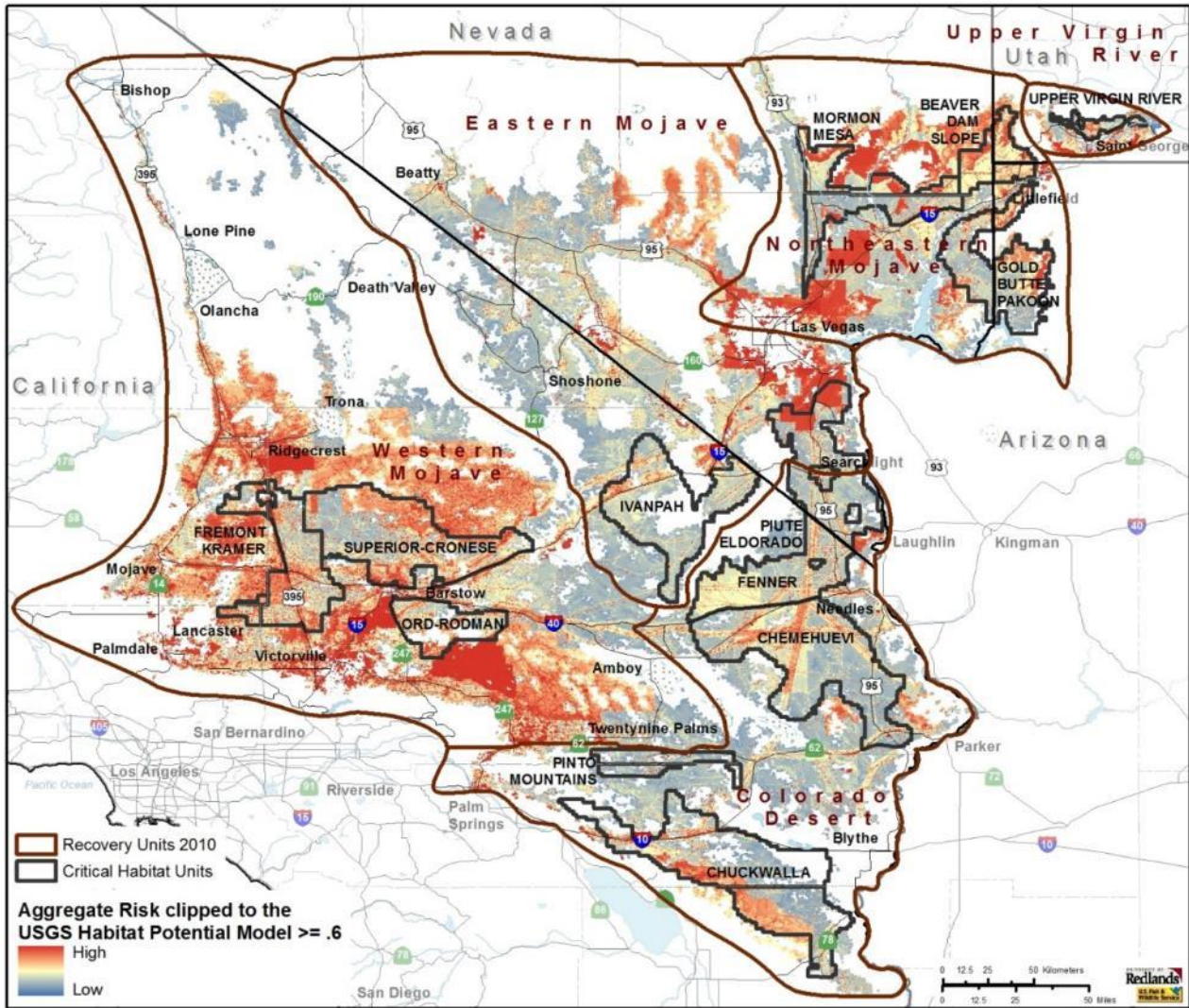


Spatial variation in threats



Where we expect tortoises to occur


Spatial Decision Support System (SDSS)



Risk to the Tortoise

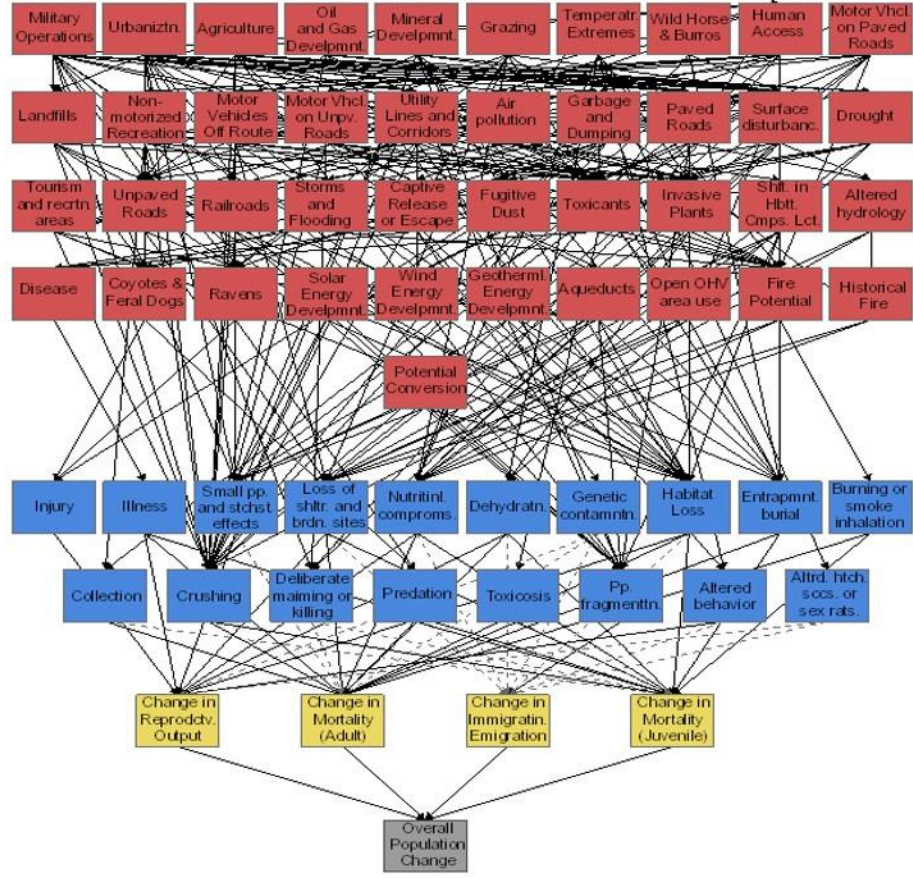
Model Explorer & Data Explorer

http://www.fws.gov/nevada/desert_tortoise/dtro/dtro_tools.html

Desert Tortoise Recovery Model Explorer 

data explorer model explorer login UNIVERSITY OF Redlands

- Threats**
 - Agriculture
 - Air pollution
 - Altered hydrology
 - Aqueducts
 - Captive Release or Escape
 - Coyotes & Feral Dogs
- Stresses**
 - Altered behavior
 - Altered hatching success or sex ratios
 - Burning or smoke inhalation
 - Collection
 - Crushing
- Population Effects**
 - Change in Immigration/Emigration
 - Change in Mortality (Adult)
 - Change in Mortality (Juvenile)
 - Change in Reproductive Output
- Recovery Actions**
 - Connect habitat (culverts/underpasses)
 - Control dogs



The diagram is a complex network graph illustrating the relationships between various factors. At the top, there are red boxes representing Threats, including Military Operations, Urbanization, Agriculture, Oil and Gas Development, Mineral Development, Grazing, Temperature Extremes, Wild Horses & Burros, Human Access, and Motor Vehicles on Paved Roads. Below these are more Threats: Landfills, Non-motorized Recreation, Motor Vehicles Off Route, Motor Vehicles on Unpaved Roads, Utility Lines and Corridors, Air pollution, Garbage and Dumping, Paved Roads, Surface disturbanc., and Drought. Further down are Tourism and recrtn. areas, Unpaved Roads, Railroads, Storms and Flooding, Captive Release or Escape, Fugitive Dust, Toxicants, Invasive Plants, Shift in Hbtt. Cmps. Lct., and Altered hydrology. Below these are Disease, Coyotes & Feral Dogs, Ravens, Solar Energy Development, Wind Energy Development, Geothermal Energy Development, Aqueducts, Open OHV area use, Fire Potential, and Historical Fire. A central box labeled 'Potential Conversion' is connected to many of these. Below the Threats are blue boxes representing Stresses: Injury, Illness, Small pp. and stoch. effects, Loss of shlr. and brdn. sites, Nutritinal comproms., Dehydratn., Genetic contaminntn., Habitat Loss, Entrapmnt. burial, and Burning of smoke inhalation. Below the Stresses are yellow boxes representing Population Effects: Change in Reprodctv. Output, Change in Mortality (Adult), Change in Mortality (Juvenile), and Change in Immigration/Emigration. Below the Population Effects are green boxes representing Recovery Actions: Connect habitat (culverts/underpasses) and Control dogs. At the bottom is a grey box labeled 'Overall Population Change'. The diagram shows a dense web of lines connecting these boxes, indicating complex interactions and feedback loops.


Model Explorer & Data Explorer

http://www.fws.gov/nevada/desert_tortoise/dtro/dtro_tools.html

The screenshot displays the web application interface for the Desert Tortoise Recovery Model Explorer and Data Explorer. The interface is divided into several sections:

- Header:** Features the text "Desert Tortoise Recovery Model Explorer" and "Desert Tortoise Recovery Data Explorer" with a small tortoise icon. Navigation buttons for "data explorer" and "model explorer" are present. Logos for "UNIVERSITY OF Redlands" and "U.S. FISH & WILDLIFE SERVICE" are also visible.
- Left Panel:** A vertical menu with four main categories: "Threats", "Stresses", "Population Effects", and "Recovery Actions". Each category has a corresponding icon (magnifying glass with plus/minus/crosshair).
 - Threats:** Agriculture, Air pollution, Altered hydrology, Aqueducts, Captive Release or Escape, Coyotes & Feral Dogs.
 - Stresses:** Altered behavior, Altered hatching success or sex ratios, Burning or smoke inhalation, Collection, Crushing.
 - Population Effects:** Change in Immigration/Emigration, Change in Mortality (Adult), Change in Mortality (Juvenile), Change in Reproductive Output.
 - Recovery Actions:** Connect habitat (culverts/underpasses), Control dogs.
- Main Map Area:** A topographic map of California and Nevada. The map includes labels for major cities (e.g., San Francisco, Sacramento, Fresno, Los Angeles, Las Vegas), national parks (e.g., Yosemite, Sequoia, Inyo, Death Valley, Joshua Tree), and geographical features like the San Joaquin Valley and Mojave Desert. A navigation toolbar on the left includes a compass, zoom in/out buttons, and a "Go to Bookmark" dropdown. A "Select a layer to add" dropdown menu is positioned above the map.
- Bottom Right:** A "Legend" button is located in the bottom right corner of the map area.

OVERALL RECOVERY IMPLEMENTATION TEAM (RIT) PROCESS

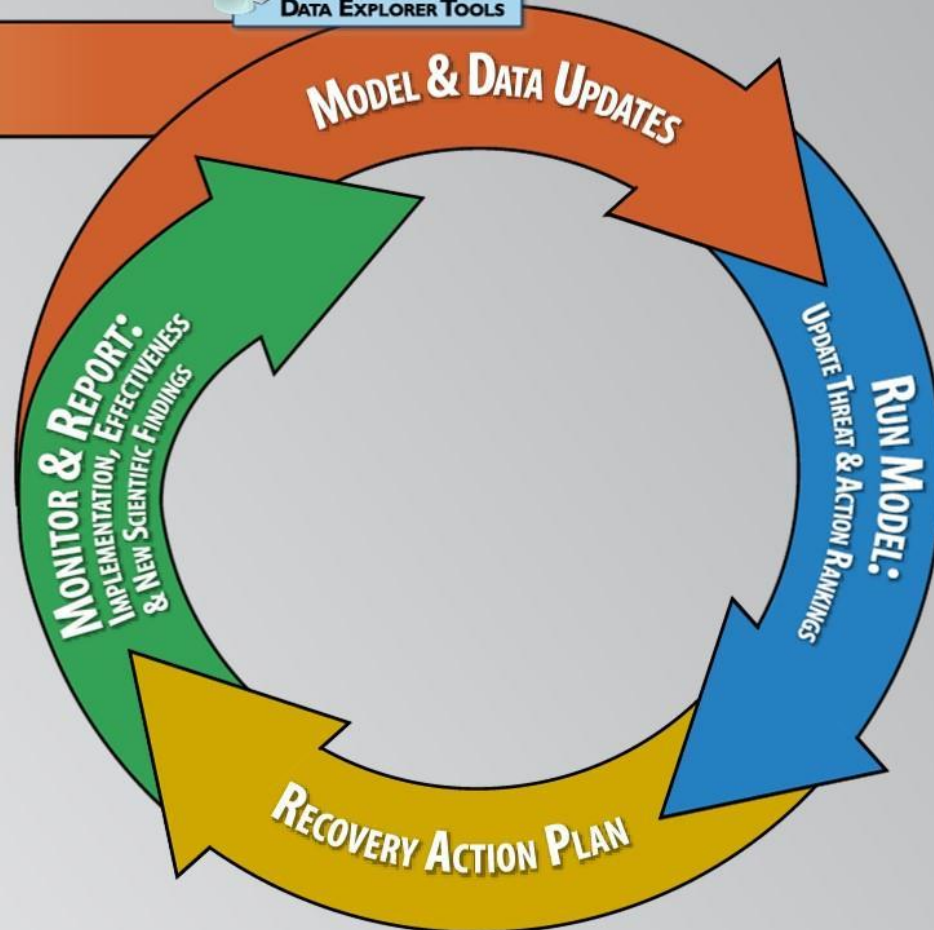
 **REVISED RECOVERY
PLAN SIGNED**
MAY 2011

 **RIT ORIENTATION
WEBINAR**
MARCH 2012

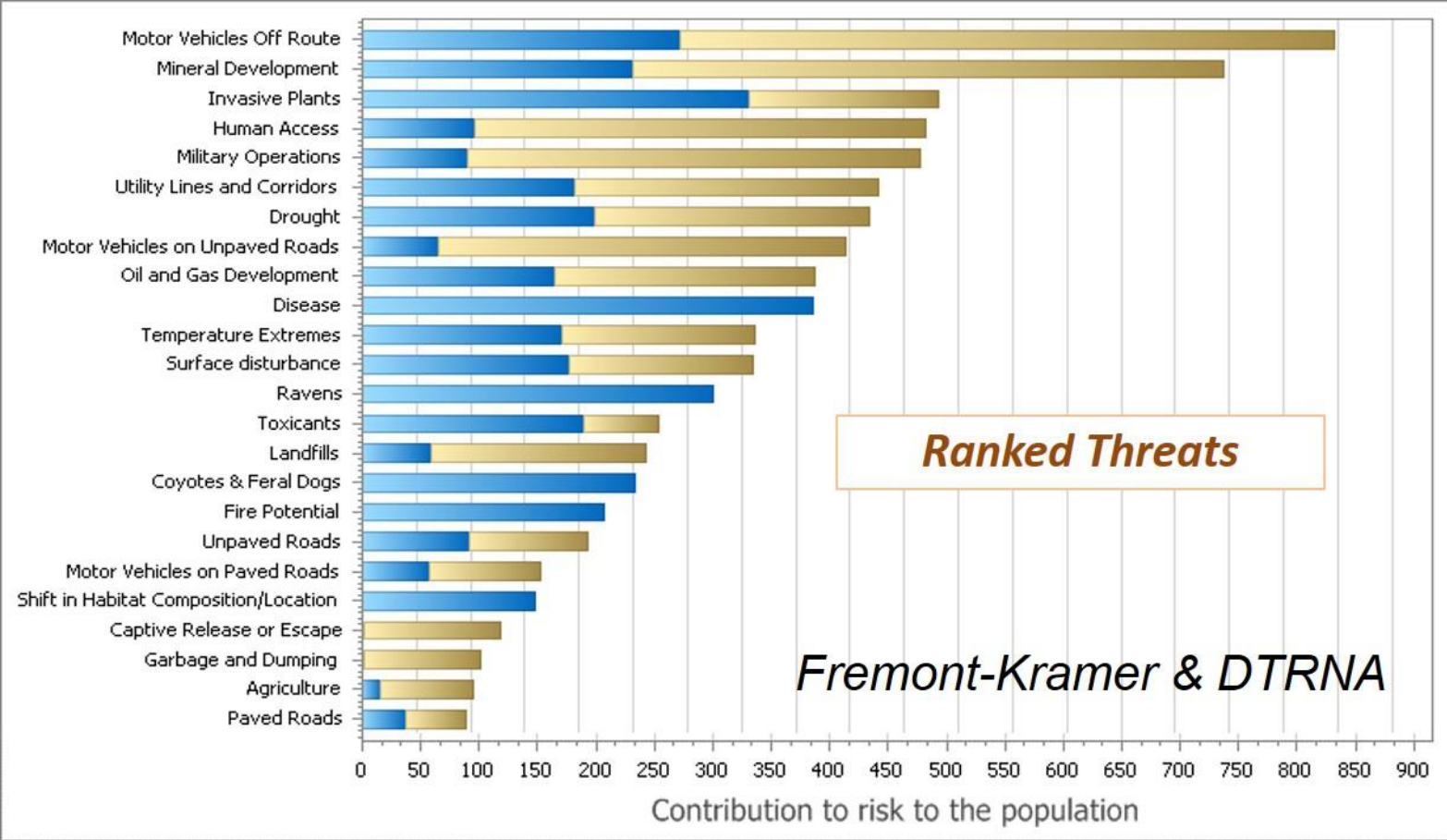
*We received a total of 168 comments ;
>30 new GIS datasets; 10 new references*

 **MODEL EXPLORER &
DATA EXPLORER TOOLS**

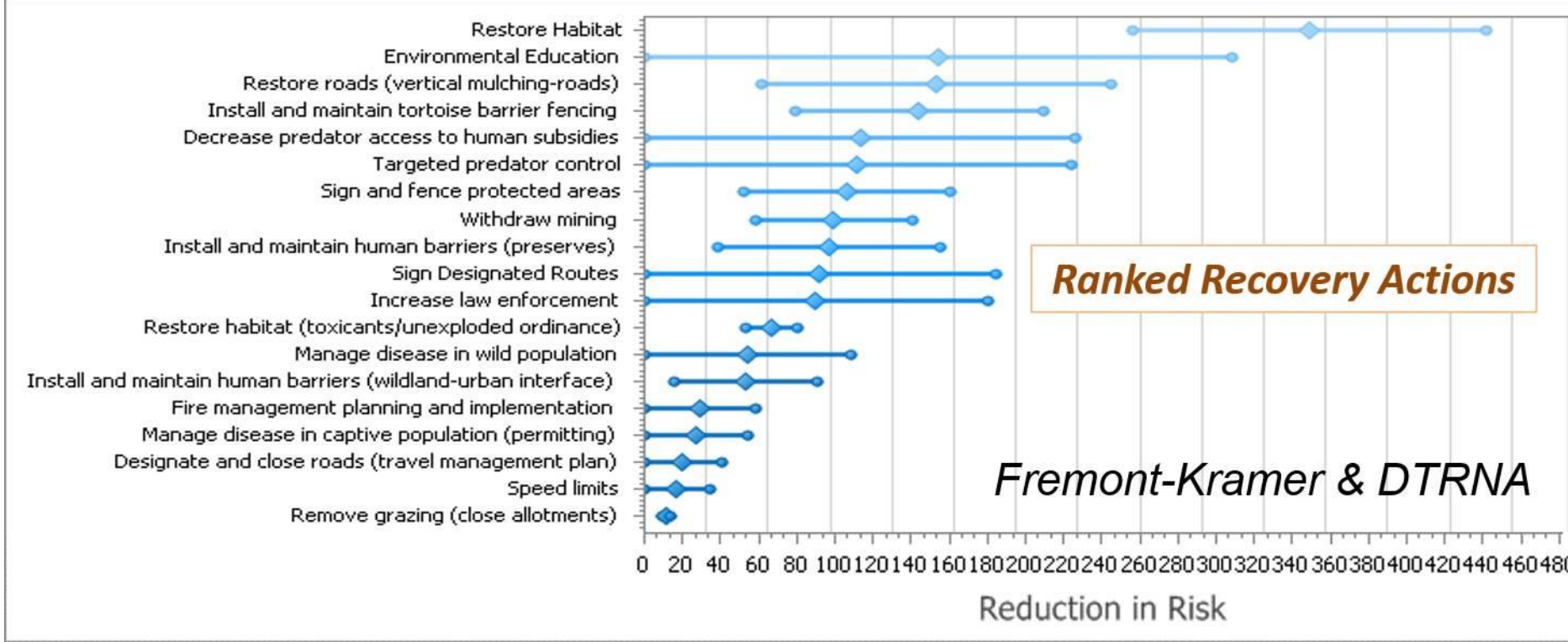
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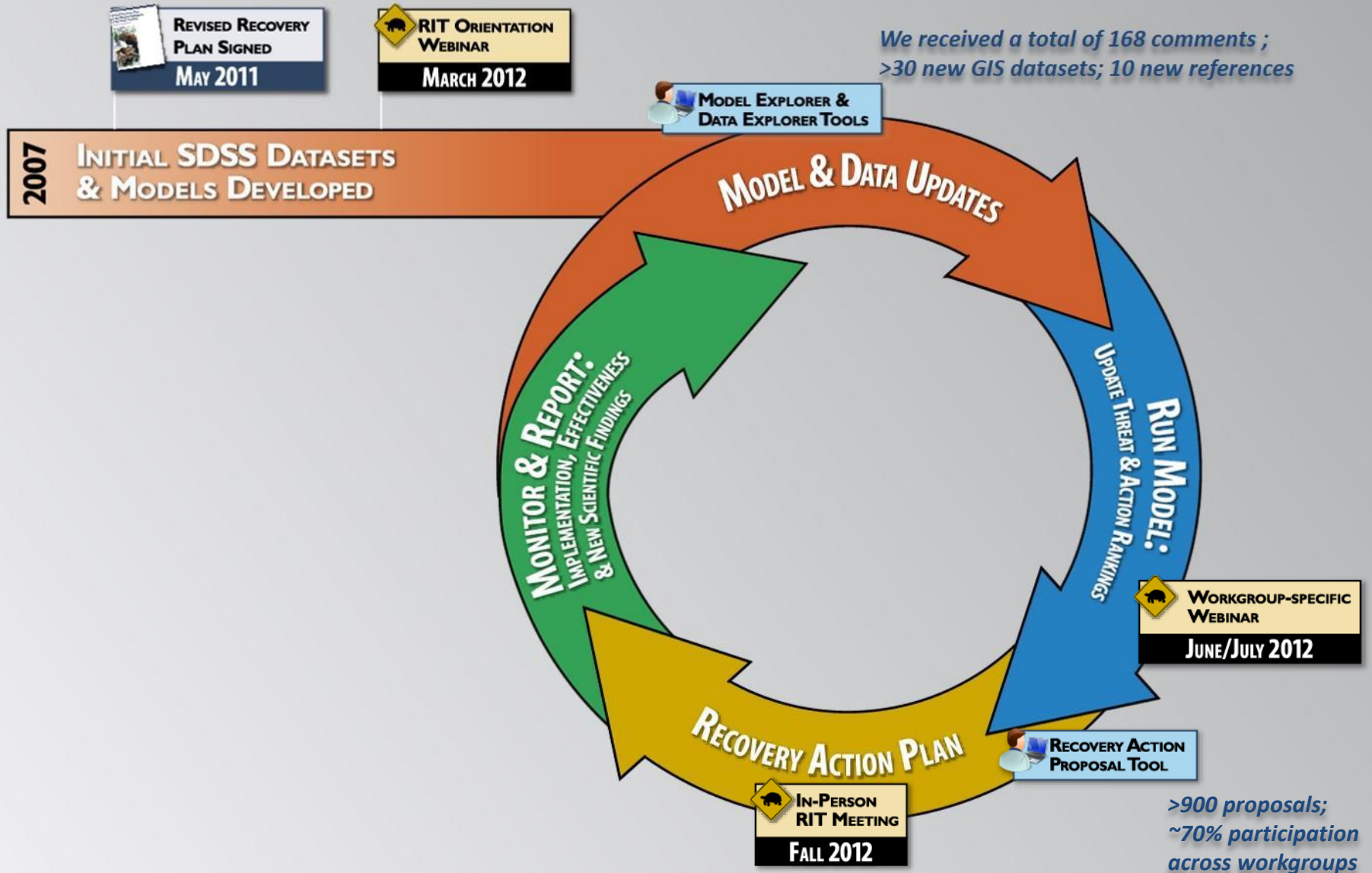
Spatial Decision Support System (SDSS)



Spatial Decision Support System (SDSS)



OVERALL RECOVERY IMPLEMENTATION TEAM (RIT) PROCESS



RIT In-person Meetings



Using a consensus-based framework, RIT workgroups prioritized:

- 1) Action proposals; and**
- 2) Effectiveness monitoring & research topics**



Recovery Action Plans v1

DRAFT

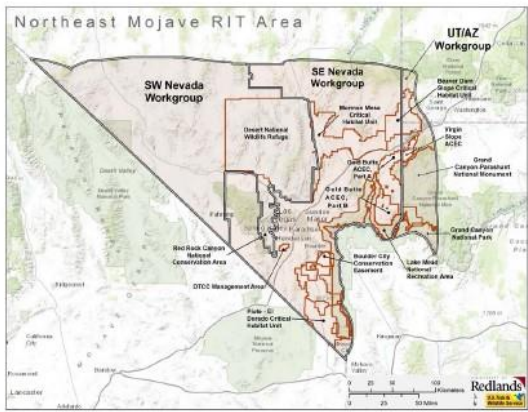
RECOVERY ACTION PLAN FOR THE MOJAVE DESERT TORTOISE IN CALIFORNIA



June 2013
Version 1

DRAFT

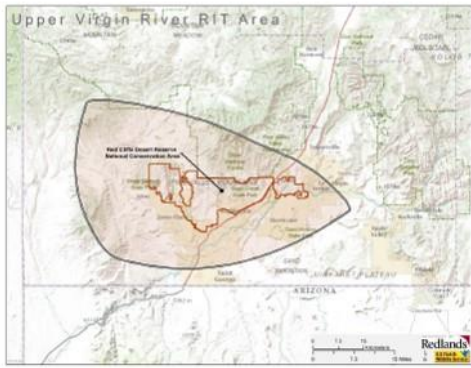
RECOVERY ACTION PLAN FOR THE MOJAVE DESERT TORTOISE IN THE NORTHEAST MOJAVE



June 2013
Version 1

DRAFT

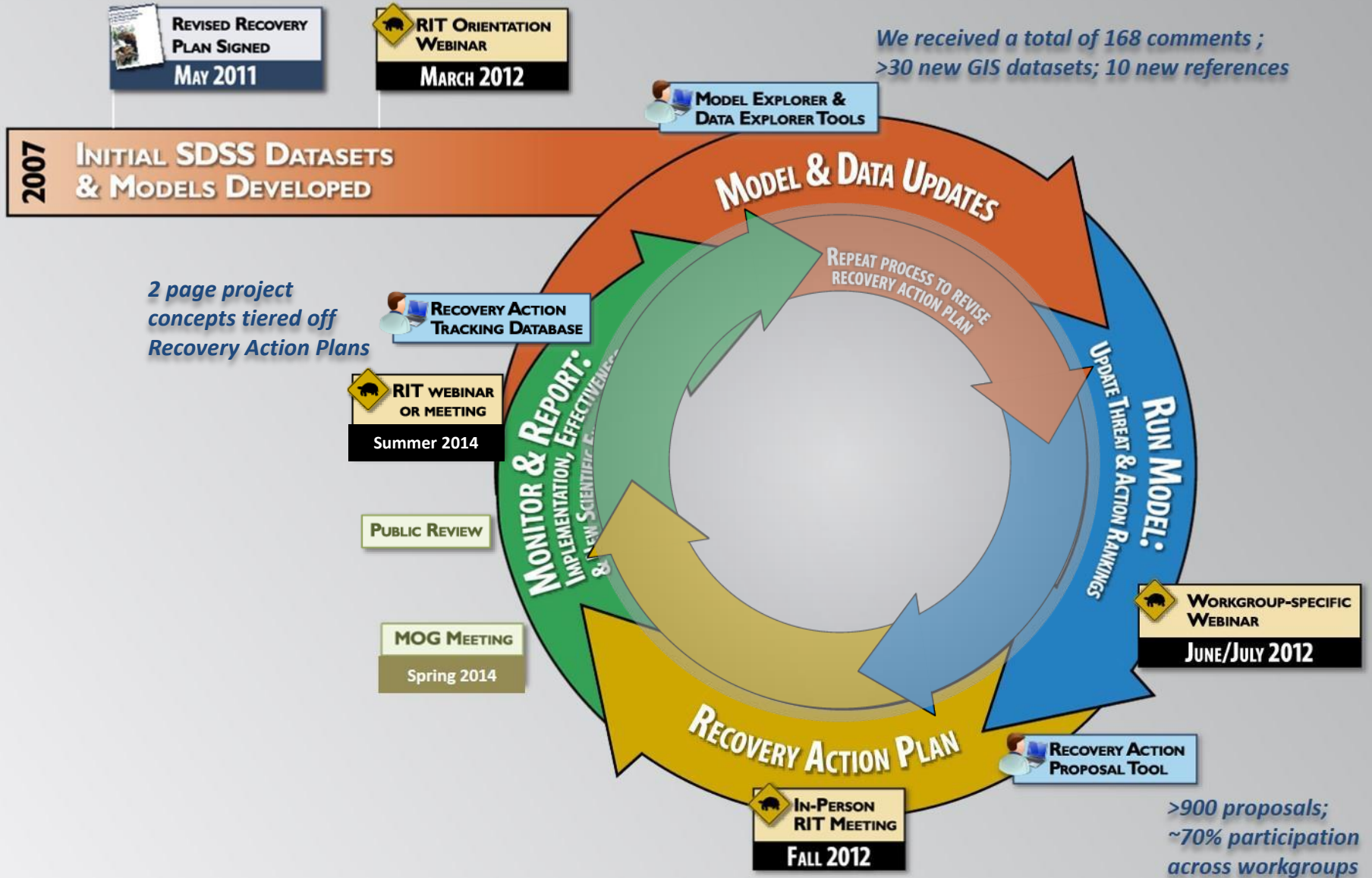
RECOVERY ACTION PLAN FOR THE MOJAVE DESERT TORTOISE IN THE UPPER VIRGIN RIVER



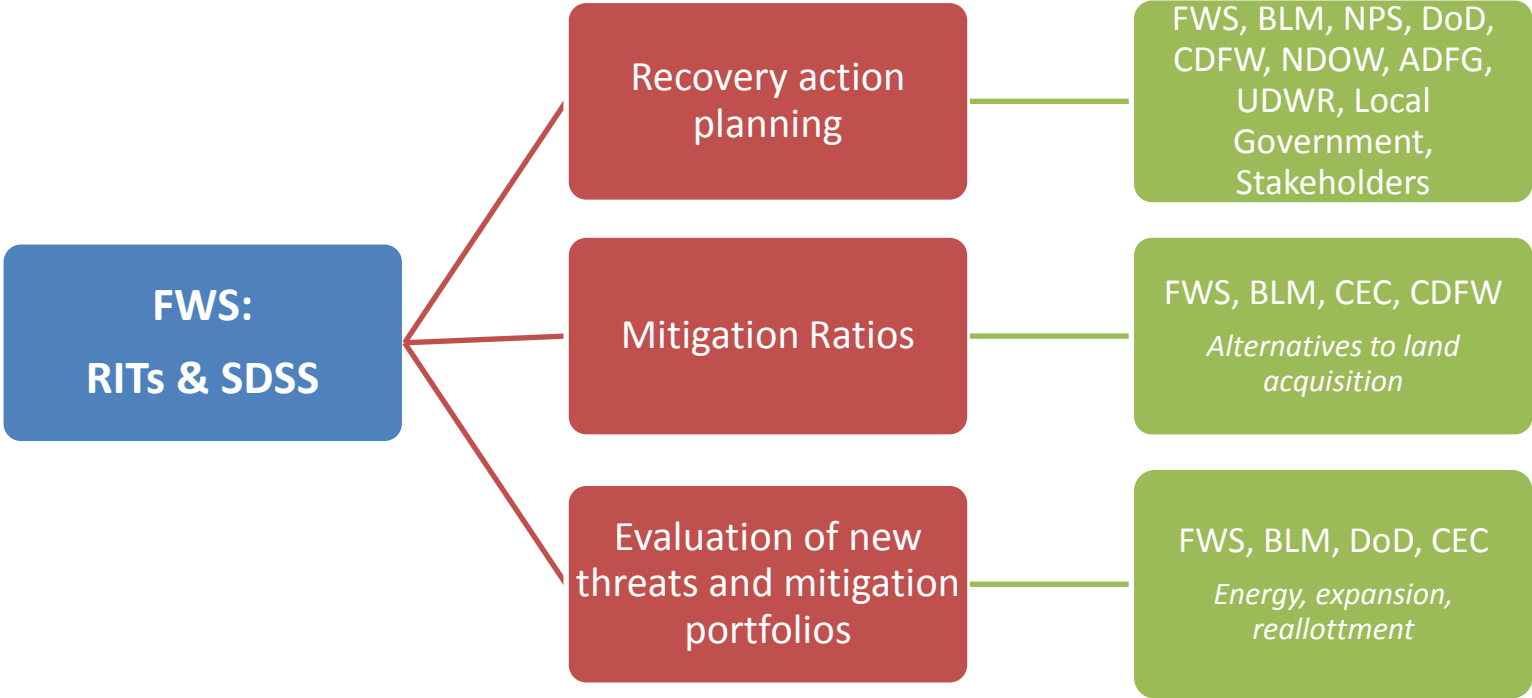
June 2013
Version 1

Recommendations for on-the-ground actions in need of funding to be considered by agencies as budgeting and planning opportunities arise

Overall Recovery Implementation Team (RIT) Process



Broader Context for the SDSS



Better science, technology & collaboration → Better management and decision making



Lessons Learned: What worked well

- Get started: managing even with incomplete information
- Using a structured process and shared information to build trust
- Using maps and visuals to communicate complex, spatial information
- Application: getting managers the numbers they need
- Our approach can be used for other species and ecoregions
- Advocate: your solution may work for other problems

Lessons Learned: Challenges

- Get started: managing even with incomplete information
- Using a structured process and shared information to build trust
- Using maps and visuals to communicate complex, spatial information
- Application: getting managers the numbers they need
- Our approach can be used for other species and ecoregions
- Advocate: your solution may work for other problems
- Good science and process may be ignored
- Lack of core information hampers trust
- Nice maps can't make up for bad data
- Where science is sparse, numbers hard to validate
- Our tortoise implementation is perceived as too complex
- Sustainability: What is next? Who will fund? Who will manage?

Thank you!

