September 2010 Update: Independent Science Advisory Process for California Desert Renewable Energy Conservation Plan

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Conservation Biology Institute

A 501(c)(3) non-profit organization.
Providing science for efforts to conserve biological diversity.

DRECP Independent Science Advisors

- Wayne Spencer (CBI) – Wildlife conservation biology, reserve design, mammals
- Reed Noss (U Central Florida) – General conservation biology, reserve design
- Kristin Berry (USGS) – Desert wildlife ecology, tortoise, Mohave ground squirrel (and more)
- Cam Barrows (UC Riverside) – Desert ecology, reptiles, risk assessment
- Kimball Garrett (LA Natural History Museum) – Birds
- Ted Weller (USFS, Pacific Southwest Research Station) – Bats and wind turbines
- Richard Redak (UC Riverside) – Invertebrates
- Todd Esque (USGS) – Desert community ecology, vegetation, fire, invasive species, desert tortoise
- Chrissy Howell (PRBO Conservation Science) – Spatial analyses, GIS, predictive modeling, bird ecology
- Scott Abella (UNLV) – Restoration ecology
- Robin Kobaly (SummerTree Institute) – Botany & plant ecology
- Robert Webb (USGS) – Desert disturbance & recovery processes

Review Schedule

- Peer Review Draft (June 2010)
  - Sent to >30 additional scientists
  - Comments received and incorporated from 4 reviewers.
- Public Draft (August 6, 2010)
  - Available at http://www.energy.ca.gov/2010publications/DRECP-1000-2010-008/DRECP-1000-2010-008.PDF
  - Comments accepted until September 10.
  - Comments requesting factual corrections, clarifications, etc., will be addressed.
  - Requests to change recommendations will **not** be addressed.
- Final Report (October 2010)

NCCP Act Requires Report to Cover Four Topics :

- Principles for Addressing Data Gaps and Uncertainties
- Principles for Conservation and Reserve Design
- Principles for Conserving Specific Target Species and Natural Communities
- Principles and Framework for an Adaptive Management and Monitoring Program

Also addressed:

- Scope of the Plan (covered species, geographic area, permit duration, etc.)

Philosophy and Approach

- Intent: Provide recommendations for minimizing adverse effects of energy development to desert biota and contribute to desert conservation.
- Constraints: We are not experts in renewable energy.
- Complying with all recommendations will take time:
  - Not an excuse to ignore recommendations.
  - Not an excuse for plan delays.
- Use "no-regrets" strategies and phasing to make progress while more difficult issues are resolved.

Overarching Issues and Recommendations

- Obtain additional scientific input at key milestones.
- Develop and implement the plan incrementally, in an adaptive management framework.
- Avoid and minimize new surface disturbance.

Overarching Recommendations
Data and Analytical Tools

- Complete a seamless, up-to-date, high-resolution, hierarchical vegetation map as soon as possible.
- Don't rely on species presence data (e.g., CNDDB) as a primary guide to siting conservation or development areas.
- Use spatially explicit models to fill information gaps.
- Make analyses and decision-making processes transparent and avoid compositing data layers.
- Subdivide the study area into units that are ecologically relevant and useful to planning.

Overarching Recommendations
Siting and Mitigation

- To the degree possible, site all renewable energy developments on previously disturbed land.
- Bundle new and existing linear facilities, so long as this does not create new ecological barriers.
- Implement and improve on conservation actions identified by existing conservation and recovery plans.
- Avoid siting developments where they will disrupt geological processes.
- Encourage renewable energy developments that maximize energy produced per unit land area.
- Encourage renewable energy developments that use less water.

Plan Scope

- Biological Goals and Objectives
- Geographic Area
- Permit Duration
- Covered Species (and potentially, Planning Species)
- Covered Communities
- Covered Actions
- Other Important Considerations

Biological Goals and Objectives

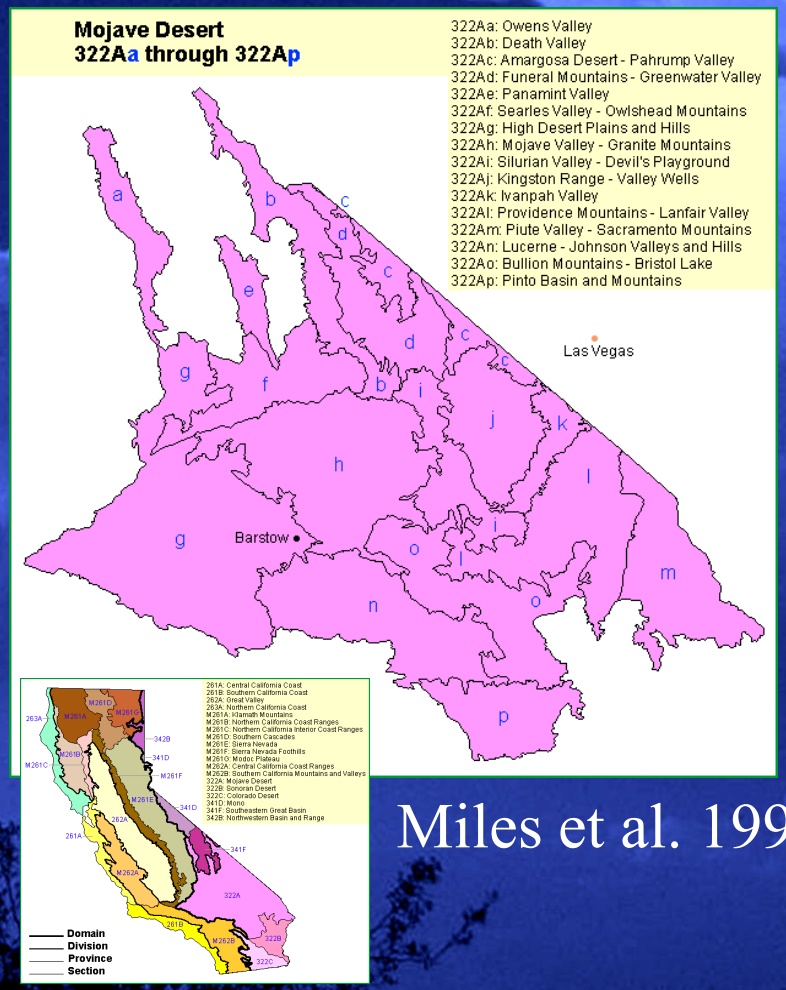
- **Recommended Goal:**

  Contribute to the persistence, distribution, and diversity of the desert biota and all its natural components and processes today and into the future, while accommodating renewable energy development and adapting to climate change.

- **Objectives** should be clear, hierarchical, with measurable outcomes.

Geographic Area

- Consider subdividing to account for biogeographic variance and clustered development patterns.



Miles et al. 1998

Webb et al. 2009

Permit Duration

- 30 years seems a maximum considering environmental variability, uncertainties, climate change, etc.
- Reassess important issues (species distributions, conservation priorities, etc.) at least every 10 years.
- Protections should be perpetual.
- Surface disturbance in desert is essentially permanent:
  - Therefore, reuse developed sites at end of project life or decommission and restore them.
    - However, decommission/restore cannot be viewed as full mitigation.

Natural Communities

- Conserve entire landscape mosaics, not just individual community types or species.
- Protect Rare, Unique, or Productive Communities:
  - Unique Plant Assemblages (UPAs)
  - Vegetation Alliances of limited distribution
  - Alliances supporting high species diversity
  - Alliances essential to covered species
  - All wetland communities

Covered Species

- The DRECP draft species list needs major revision:
  - Numerous rare and declining taxa were omitted.
  - Some included taxa are common and widespread.
  - Using CNDDB to identify potential covered species is problematic.
- Recommend a biological committee to revise the list.
- Recommend using traditional scientific nomenclature and organization for future lists.

Additional Planning Species

- Consider using "Planning Species" to help meet plan goals.
- Potential Examples:
  - **Joshua Tree**: An iconic "keystone species," that is susceptible to increased fire, climate change, etc.
  - **Ironwood**: A long-lived keystone species susceptible to hydrological changes.
  - **Common Raven**: A "subsidized" predator that has increased greatly due to human influences and that harms covered species.

Other Important Considerations

- Special Features
  - Sand dunes
  - Wetlands
  - Soil crusts
  - Playas
  - Desert pavements
  - Caves
  - Cliffs
  - Gypsum rich soils
  - Biological soil crusts
  - Etc.
- Ecological Processes
  - Geomorphology and hydrology
  - Eolian processes
  - Ecological range shifts
  - Wildlife movement
- Environmental Gradients
  - Elevation
  - Moisture
  - Geological substrates
  - Terrain types

Covered Actions: Impacts

- Recognize differences among technologies.
- Account for indirect and offsite impacts, including:
  - Sediment transport and dust fall
  - Changes in hydrology
  - Local and regional wildlife mortality
  - Habitat and population connectivity
  - Increased human access
  - Increased exotics and subsidized predators.

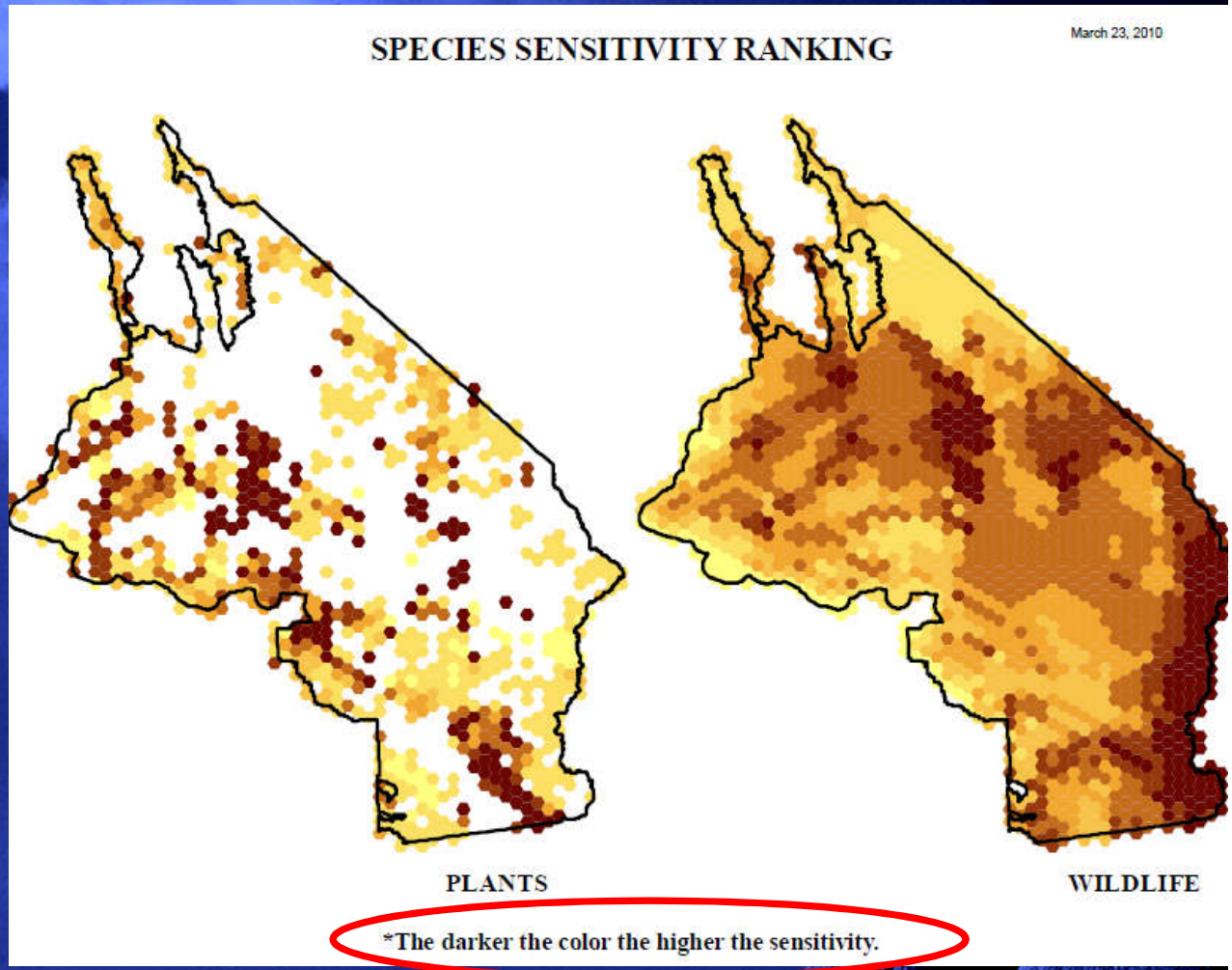
Addressing Information Gaps & Uncertainties

- Environmental base maps – Need a better vegetation map!
- Species locality data – More than CNDDB
- Species and habitat distribution models
- Decision support models – Formalize understanding of systems to compare alternative scenarios.
- Addressing climate change – Design a resilient, interconnected reserve system.

Review of REAT "Starting Point" Maps

Major Concerns:

- Lack of transparency
- Coarse resolution
- Compositing of data layers
- Use of locality data
- Species vs. subspecies issues



Cannot assume that lighter color = less sensitive!

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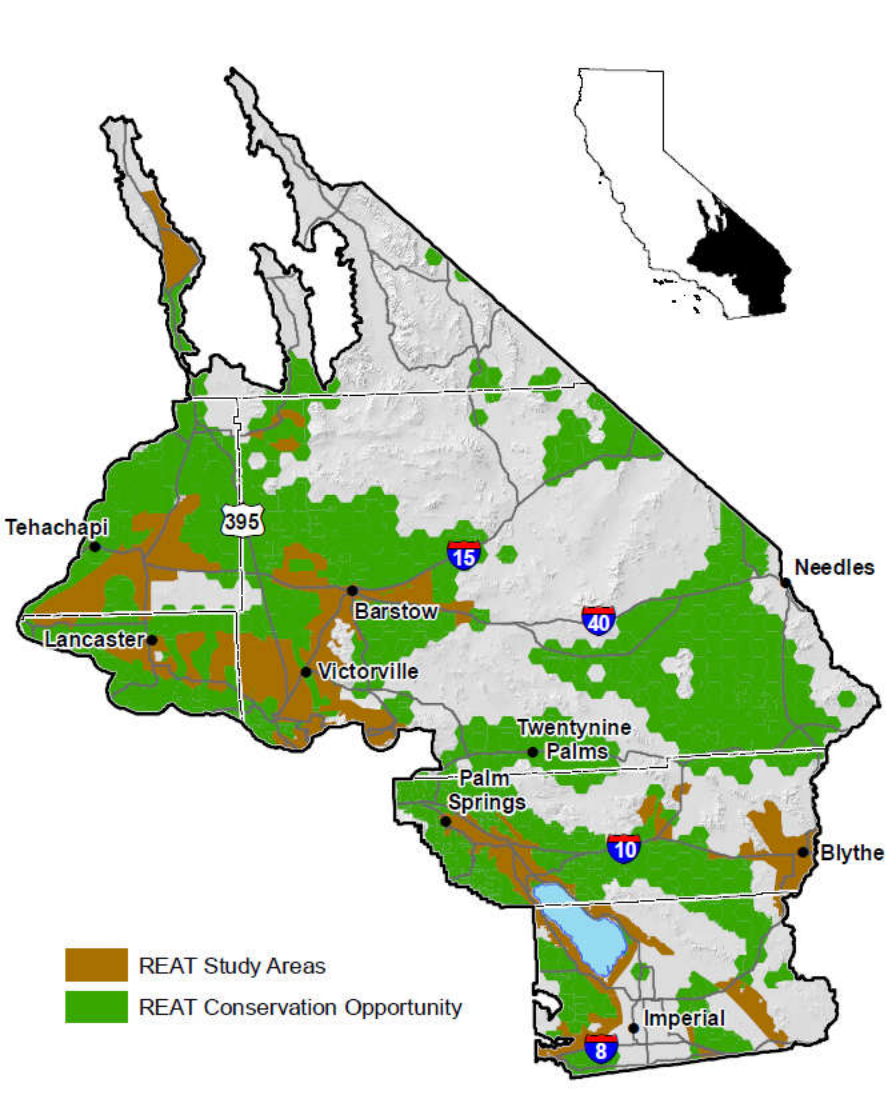
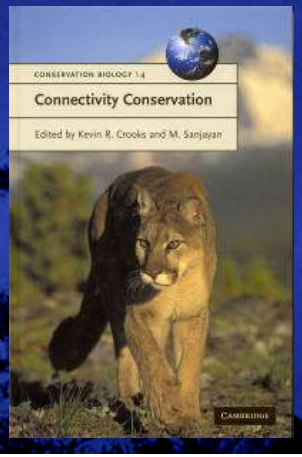


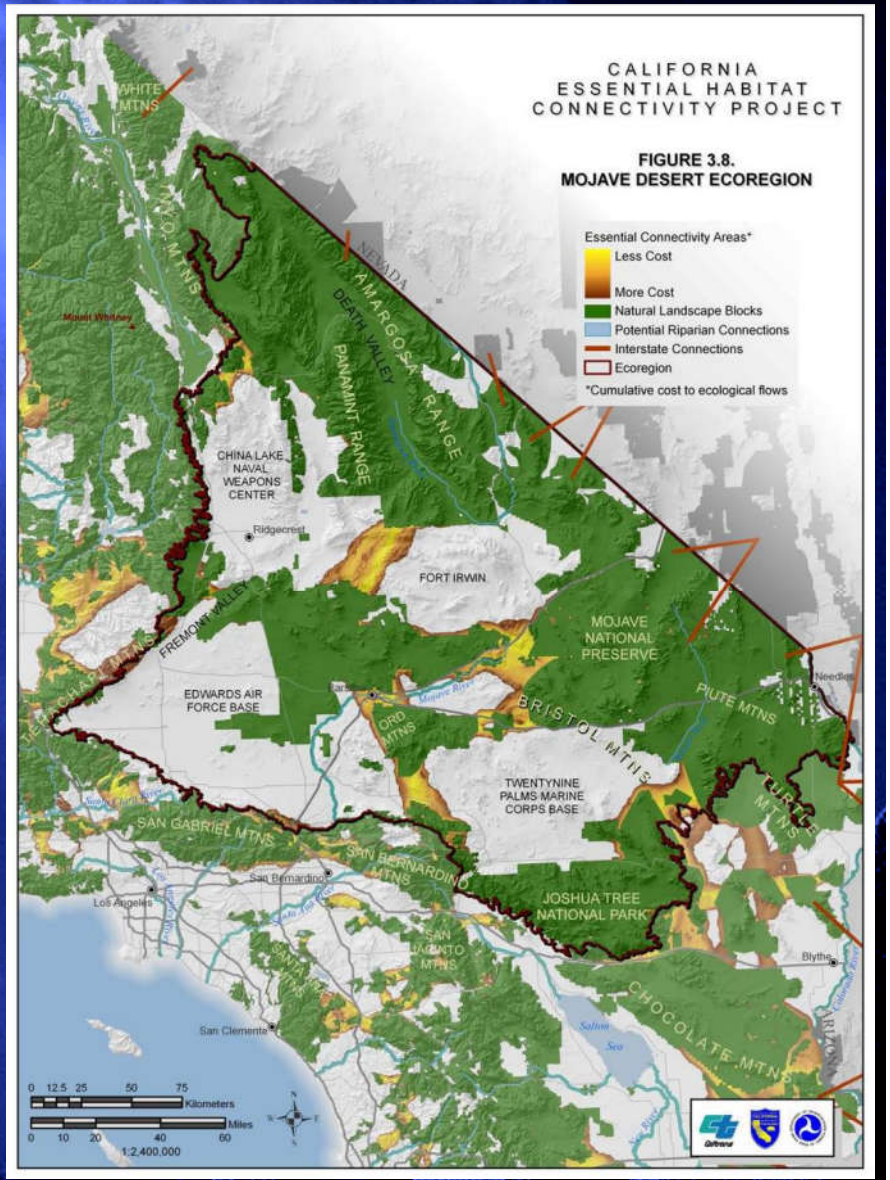
Principles for Reserve Design

- Make use of existing planning documents.
- Subdivide the planning area.
- Identify areas important to conservation and areas NOT important to conservation.
- Apply site-selection algorithms wisely.
- Provide large, well distributed reserve areas, but don't ignore small areas.
- Connect reserves and provide for wildlife movements.

Connectivity Conservation

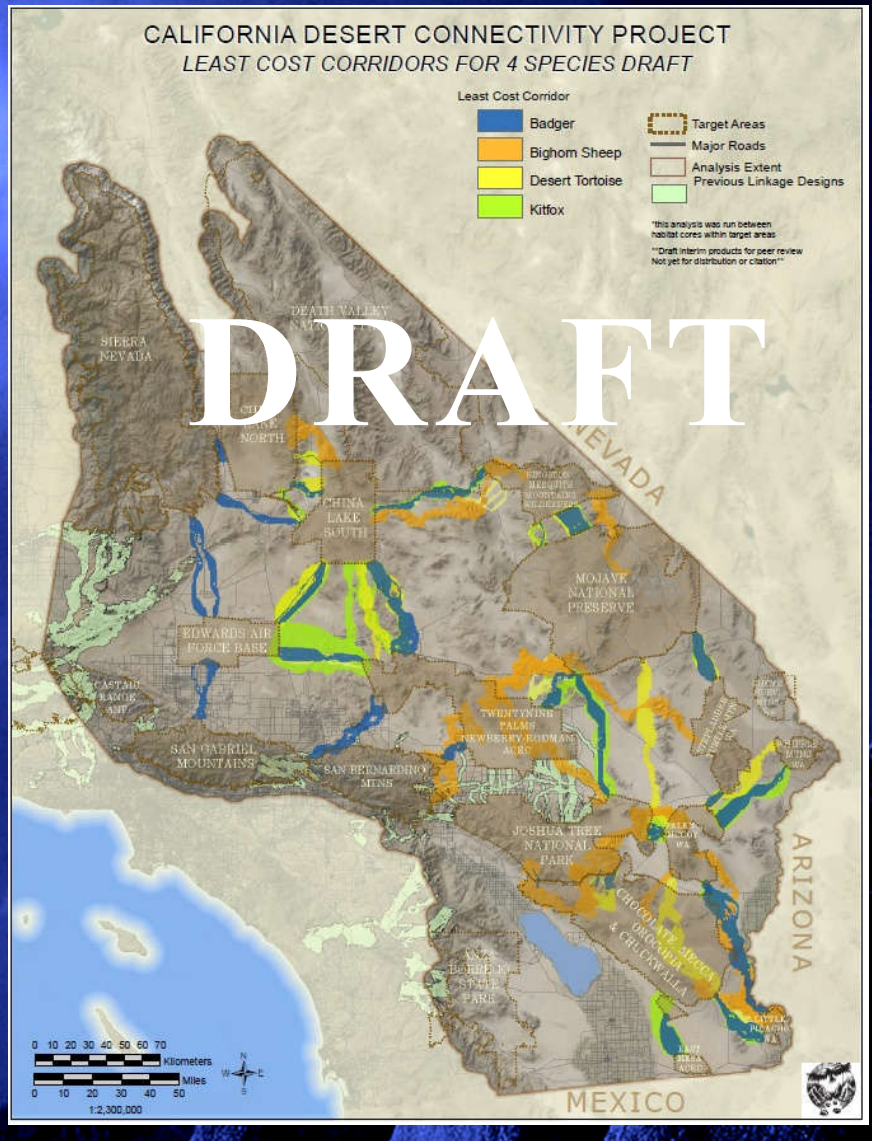
- An interconnected reserve network is essential for:
  - Demographic and genetic connectivity
  - Wildlife movements and migration
  - Range shifts
  - Climate change adaptation





Incorporate and Build on Existing Connectivity Plans and Studies

- California Desert Connectivity Project (Penrod et al., in preparation)
- California Essential Habitat Connectivity Project (Spencer et al. 2010)
- South Coast Missing Linkages Project (Beier et al. 2006, South Coast Wildlands 2008)
- Likely bighorn sheep movement corridors (Epps et al. 2007).



Siting and Mitigating Developments

- Site on already disturbed lands.
- Bundle linear developments.
- Minimize development footprints.
- Mitigate indirect and offsite impacts, such as:
  - Fencing
  - Barrier crossings
  - Dust control
  - Light control
  - Invasive species management
  - Trash control

Standards for Road Mitigation

Wildlife Crossings Guidance Manual

California Department of Transportation

Caltrans

Fencing must guide animals to the structure.

Meese et al. (2009)

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Solar-Specific Guidance

- Consider siting and configuring in linear arrays along existing roads, canals, etc.
- Use wildlife fencing to reduce mortalities.
- Avoid siting in eolian transport zones.
- Avoid siting near wetlands.
- Mitigate effects of polarized light on wildlife behavior and mortality with panel design.

Wind-Specific Guidance

- *California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development* (CEC and CDFG 2007)
  - Archive monitoring and operations data in an accessible database.
  - Study flight and foraging behavior of raptors.
  - Evaluate temporal and environmental factors in bird and bat mortalities to guide operations.

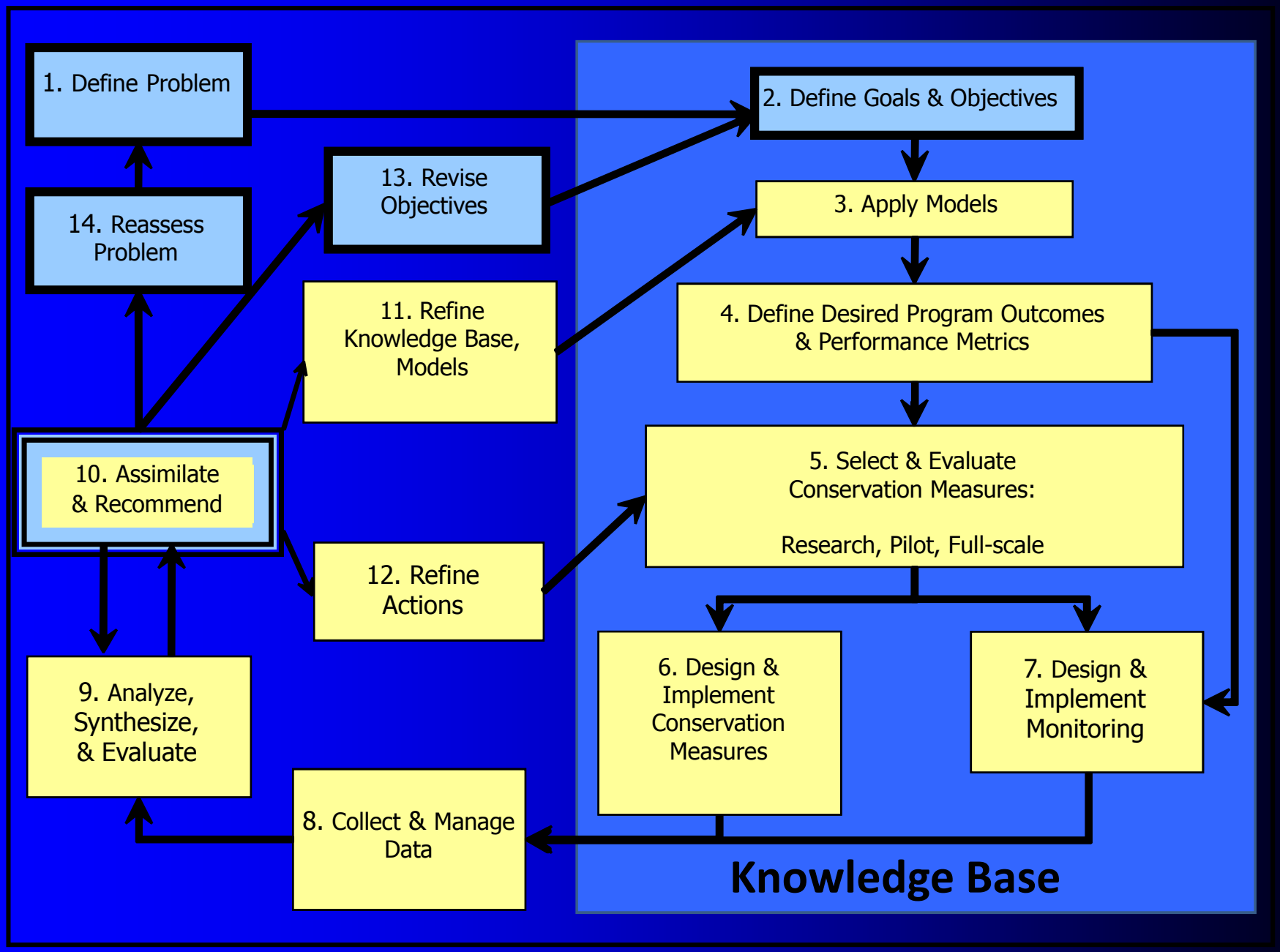
Species-Specific Guidance

- Mohave Ground Squirrel (MGS)
  - Implement recommendations of MGS Technical Advisory Group (in review)
- Desert Tortoise (DT)
  - Implement actions in DT Recovery Plan (such as, fencing roads and creating under-crossings).
- Bats and Raptors
  - Study seasonal movements to inform wind-turbine siting and operations.

Adaptive Management and Monitoring

- Timing: Begin immediately!
  - Access to proposed developments must be granted to researchers before, during, and after construction.
- Use hypothesis-based monitoring guided by conceptual models.
- Use robust statistical sampling designs (such as, Before-After-Control-Impact).
- Conduct systematic surveys and focused research studies.
- Monitor environmental conditions, such as:
  - Groundwater levels
  - Local climate effects
  - Erosion/deposition rates

AMP Institutional Structure (Dahm et al. 2009)



Questions?