State Highways and Habitat Connectivity

A Caltrans Biologist's Perspective on Thresholds and Data Needs

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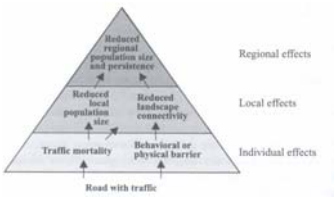
Basis for My Perspective

- Biologist in Caltrans Environmental Planning on Central Coast (Dist. 5)
- In this capacity because of personal interest in natural resources, but representing the greater *public* interest in natural resources
- Charged with delivering transportation infrastructure projects to the public
- A practitioner—not a researcher.

How Roads Affect Wildlife Populations



Forman et al. 2003

CEQA Thresholds

CEQA Mandatory Findings of Significance (CEQA guidelines section 15065):

…*substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; substantially reduce the number or restrict the range of an endangered, rare or threatened species…*

CEQA Thresholds cont'd

- Initial Study checklist:
  - Would the project *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established…wildlife corridors, or impede the use of native wildlife nursery sites?*

NEPA

- 40 CFR 1508.27
- Significance determination under NEPA based on context and intensity of impacts

NEPA cont'd

- **Context**: local, regional, national-geographic setting and affected human interests
- **Intensity** or severity of impact; must consider 10 factors, including
  - "unique characteristics of the area such as…**ecologically critical areas**"—areas required to sustain a population?
  - Degree of controversy
  - Degree of effects to fed listed species or their habitat

Federal Endangered Species Act

- The Section 7 Jeopardy Standard: jeopardize= "to engage in an action that reasonably would be expected…to reduce appreciably the likelihood of both the survival and recovery of a listed species [the entire population] in the wild by reducing the reproduction, numbers, or distribution of that species."
- Similar standard for adverse modification of critical habitat

California Endangered Species Act

- Requirement to minimize and fully mitigate impacts to State-listed species
- Jeopardy standard similar to federal act

Why Thresholds are Important

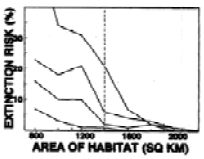
- Impacts that approach or exceed thresholds leverage mitigation
- Public expenditures have to be justified—wildlife crossings add cost
  - Public expenditures must have a long-term, demonstrated public benefit
  - Many transportation projects compete for funding statewide

General Data Needs for Determining Significance

Clue in Threshold Language	**Example of Data Needed**
Substantially reduce the habitat	Current range, whether road will isolate habitat, degree of existing fragmentation, how target species responds to road features and traffic levels, etc.
Drop below self-sustaining levels (=jeopardy)	Minimum viable population, minimum habitat area, degree of isolation
Ecologically critical areas	Required for survival of a population?

Example 1. Effective Science for Road Effects Analyses: Mtn. Lion

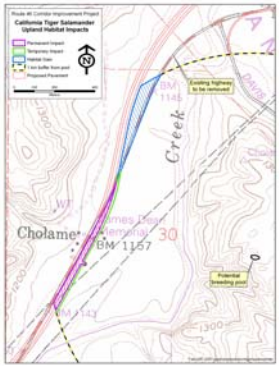
- This graph and other results clearly illustrated implications of habitat fragmentation
- Demonstrates significance to biologists and non-biologists
- Model based on radio-collaring data, undercrossing monitoring, home range analyses, population viability analysis, etc.
- Influenced So Cal highway design



Top through bottom lines show percent simulated populations that went extinct within 100 years when the numbers of immigrants per decade were 0, 1 male, 2 males, or 3 males and 1 female, respectively (Beier 1993).

Example 2. Tiger Salamander

- dispersal probability=$(0.264)e^{-0.0028 \cdot distance}$ (Trenham et al. 2001)
- 50%, 90%, and 95% remain within 150m, 490m, and 620m of their breeding pond respectively (Trenham and Shaffer 2005)
- This type of information provides for meaningful impact analysis

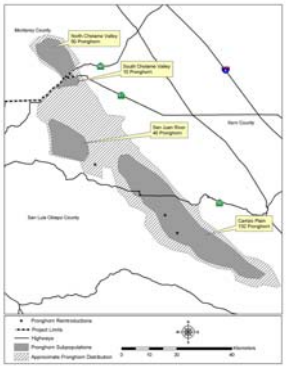


Example 3. Pronghorn

- Examples in California, Arizona, and Wyoming show that fenced, 4-lane highways prevent pronghorn movement and isolate subpopulations (Ward et al. 1980, Ockenfels 1984, J. Yoakum, Western Wildlife Consultants, personal communication)

Example 3. Pronghorn cont'd

- minimum viable population threshold of 50 breeding adults proposed for pronghorn by several authors
- Direct count data and range of affected population available from DFG
- All of this info helped make the case for incorporating major crossing structures on a proposed widening project in SLO County
- Established signficance under CEQA and NEPA for non-listed species



Example 4: Ecologically-based Planning Framework

- Planning framework that identifies conservation areas, including corridors
- How many general plans identify corridors?
- Important because highway wildlife xings need to be placed next to habitats that will remain viable

Specific Data Needs

- Cuesta Grade corridor viability—connectivity to Santa Lucia Mtns. north of 101
- Isolation of Point Conception area wildlands bounded by Hwys 101, 1
- Santa Cruz Mtns. fragmentation and isolation, effects from 101, 17, others
- Spadefoot toad upland habitat use and road effects
- Median barrier effects on wildlife

Spiel

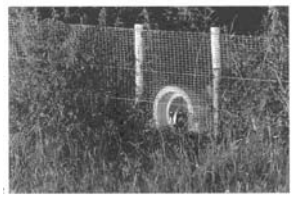
- The standard for data upon which significance determinations are made is “the best available information that is reasonably attainable”—so make the information available before highway and development projects are proposed
- Look for existing corridors and patches and do research that demonstrates their importance before they are threatened

Spiel cont’d

- Do research that will answer species- and area-specific habitat connectivity questions that decision makers can use when determining the significance of effects.
- Do research that will help land-use planning agencies determine where to establish corridors and patches.

Spiel cont’d

- Recognize when crossings and corridors may not be warranted or may not offset impacts. Advocating crossings and corridors which are not justified by sound science or at least reasonable theory diminishes credibility for the cause.



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