Tools in Support of Effects Analysis on Wildlife

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March 2007

Combining Habitat Suitability Estimates with a Landscape Population Model

(1) Measure suitable habitat (focus: CASPO)
- **Different approaches**
- **Simple quantity measures insufficient**

(2) Relate suitable habitat to a wildlife (owl) population
- **Landscape model**
- **Estimate of population that can be supported**

(3) Estimating changes arising from vegetation treatment
- **Re-run the landscape model**

1. Possible Suitability Measures for CASPO

>= 40% canopy cover, trees >= 12 inches dbh (“>= 4M”)

Data driven probability of occupancy map

Scoring system

Probability of Occupancy Mapping

Rooted in empirical data

Predicts likelihood of CASPO occurrence based on combinations of variables (vegetation type and others), using detailed statistical modeling

Advantages: should do a good job for the area in which it was developed and similar areas; also can benefit from superior vegetation data

Disadvantages: relies on data that is costly to obtain, probability estimates may not translate well to other areas

Scoring System

Rooted in expert opinion

More nuanced view of suitability than “>= 4M”

Advantages: can be used broadly in the Sierra Nevada, refined as superior vegetation data come available

Disadvantages: relative scores cannot be validated statistically, system may not work well in some areas.

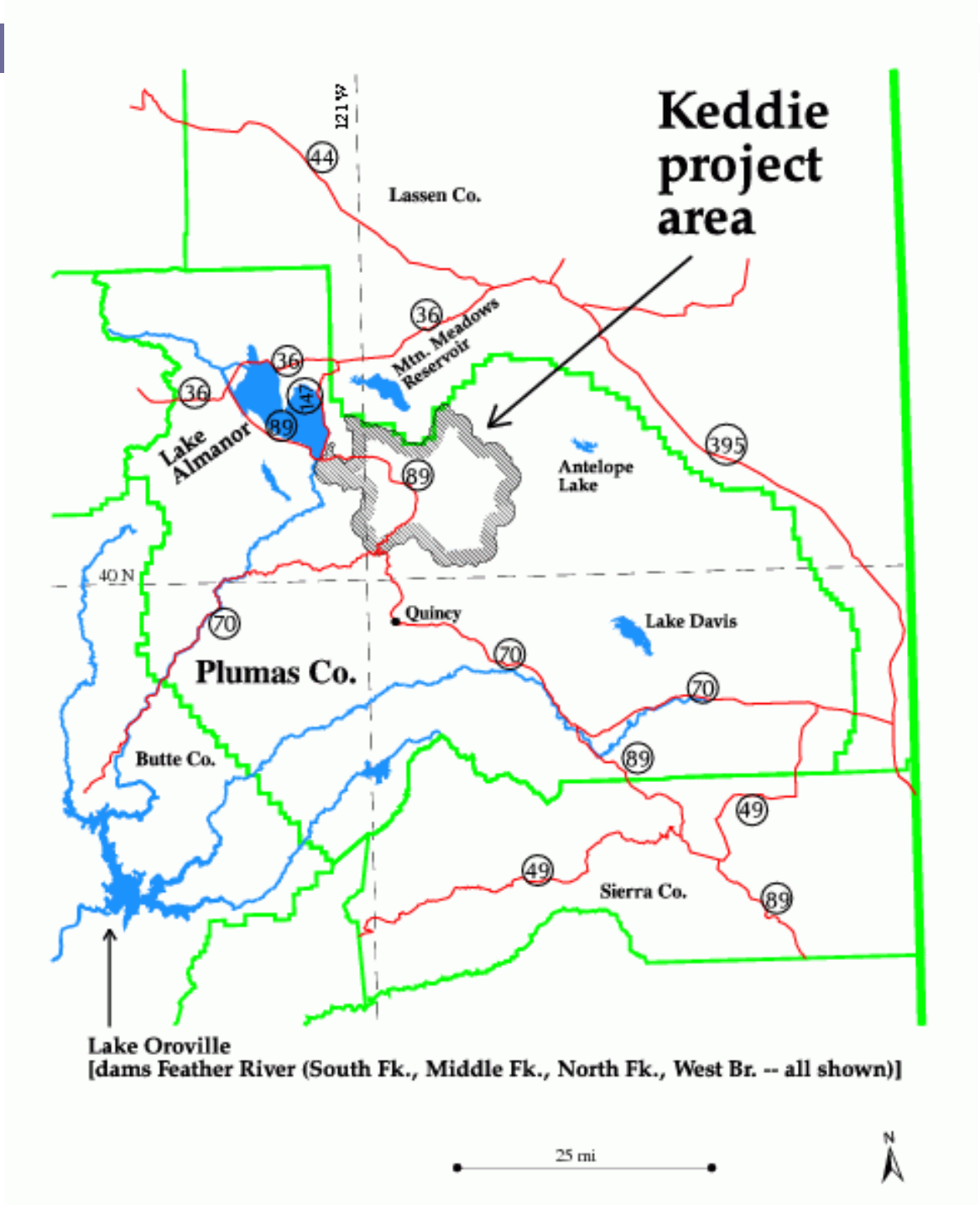
A CASPO Habitat Suitability Scoring System

Ranges from -4 to 10.

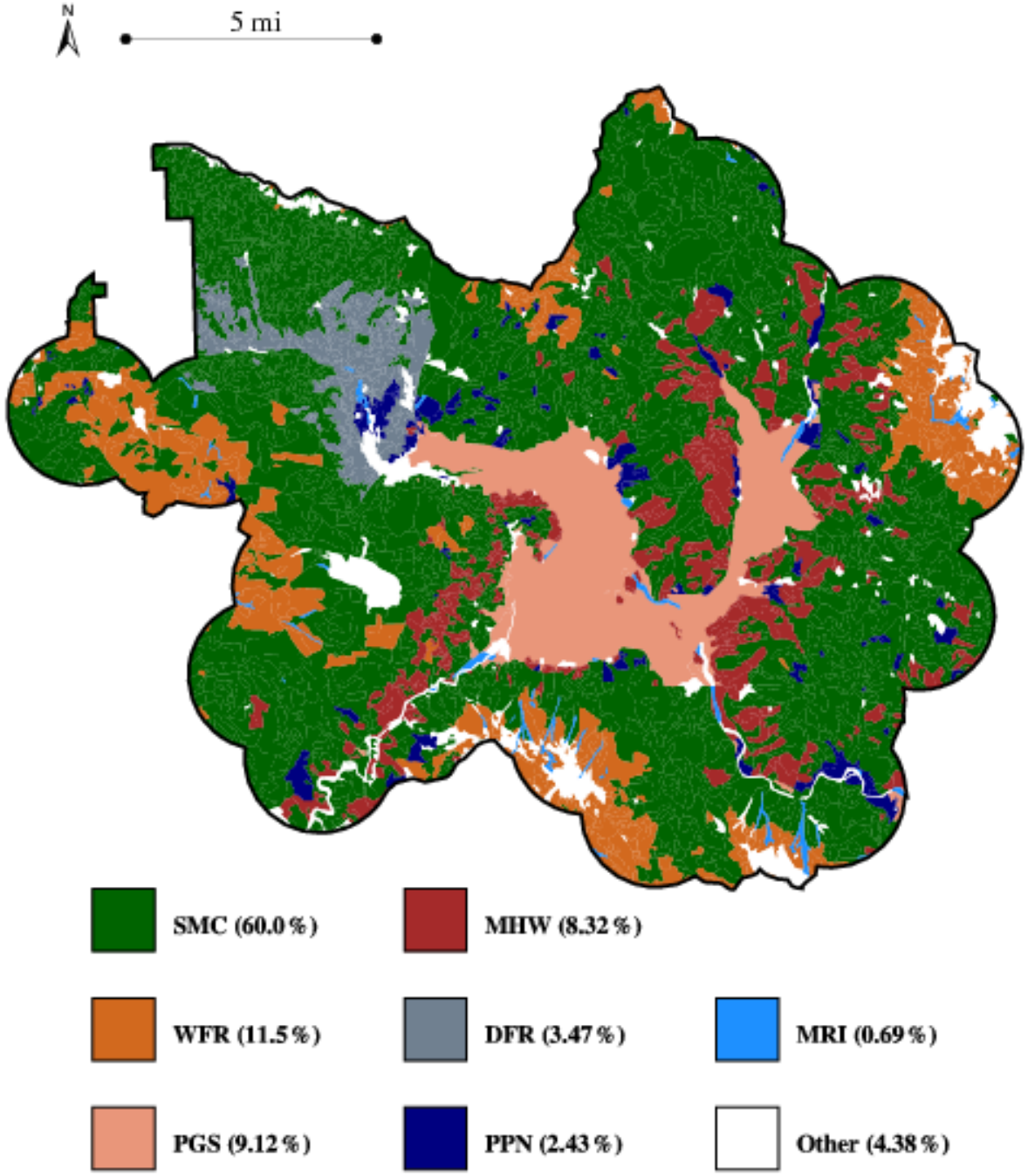
Examples:

- Annual grassland, water is lowest, = -4
- Ponderosa Pine 5M = 4
- Ponderosa Pine 5D = 7
- Sierran Mixed Conifer 5M = 8
- Sierran Mixed Conifer 5D = 10

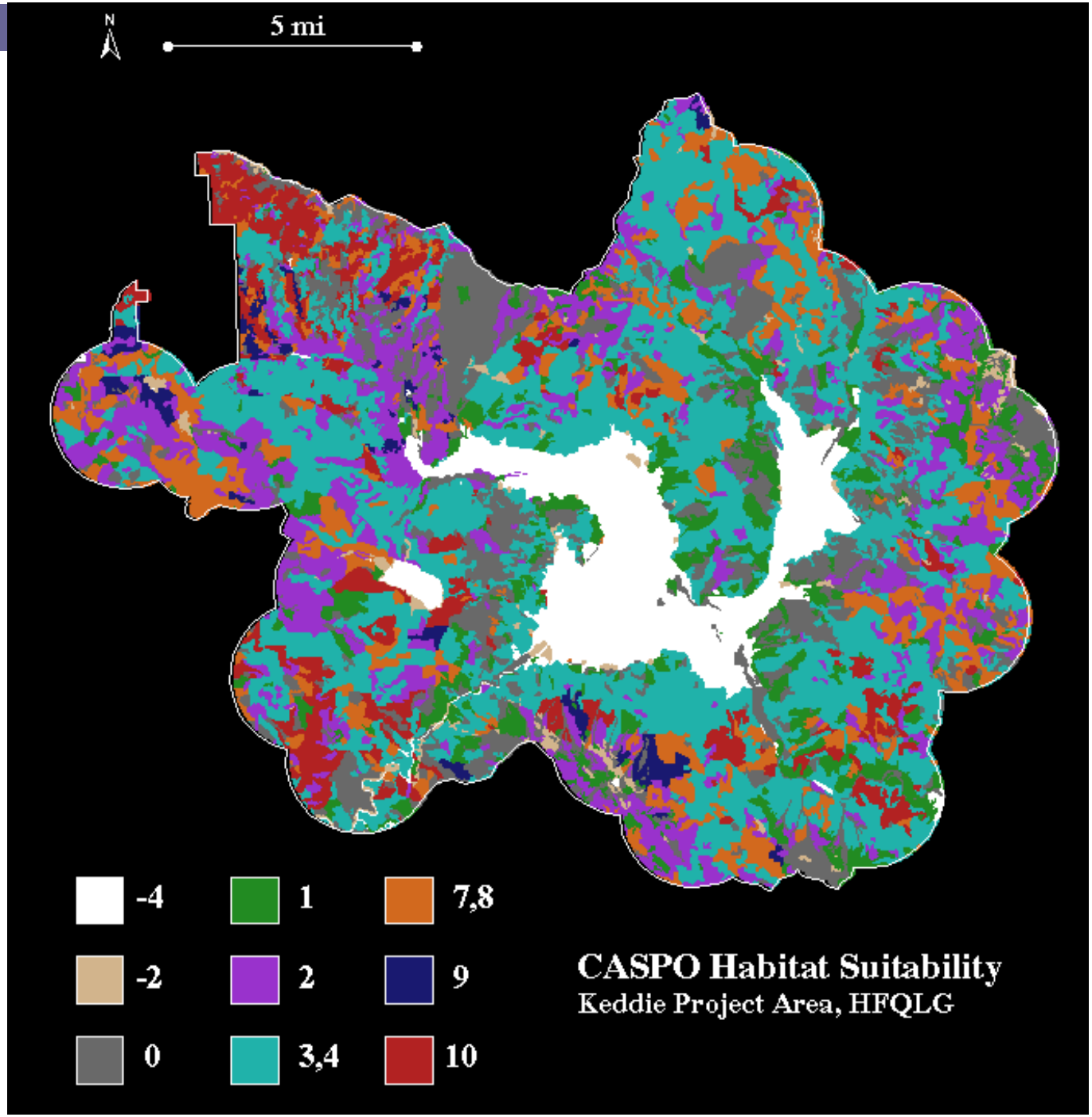
. . . Example applying the Scoring System to a project area (Keddie)



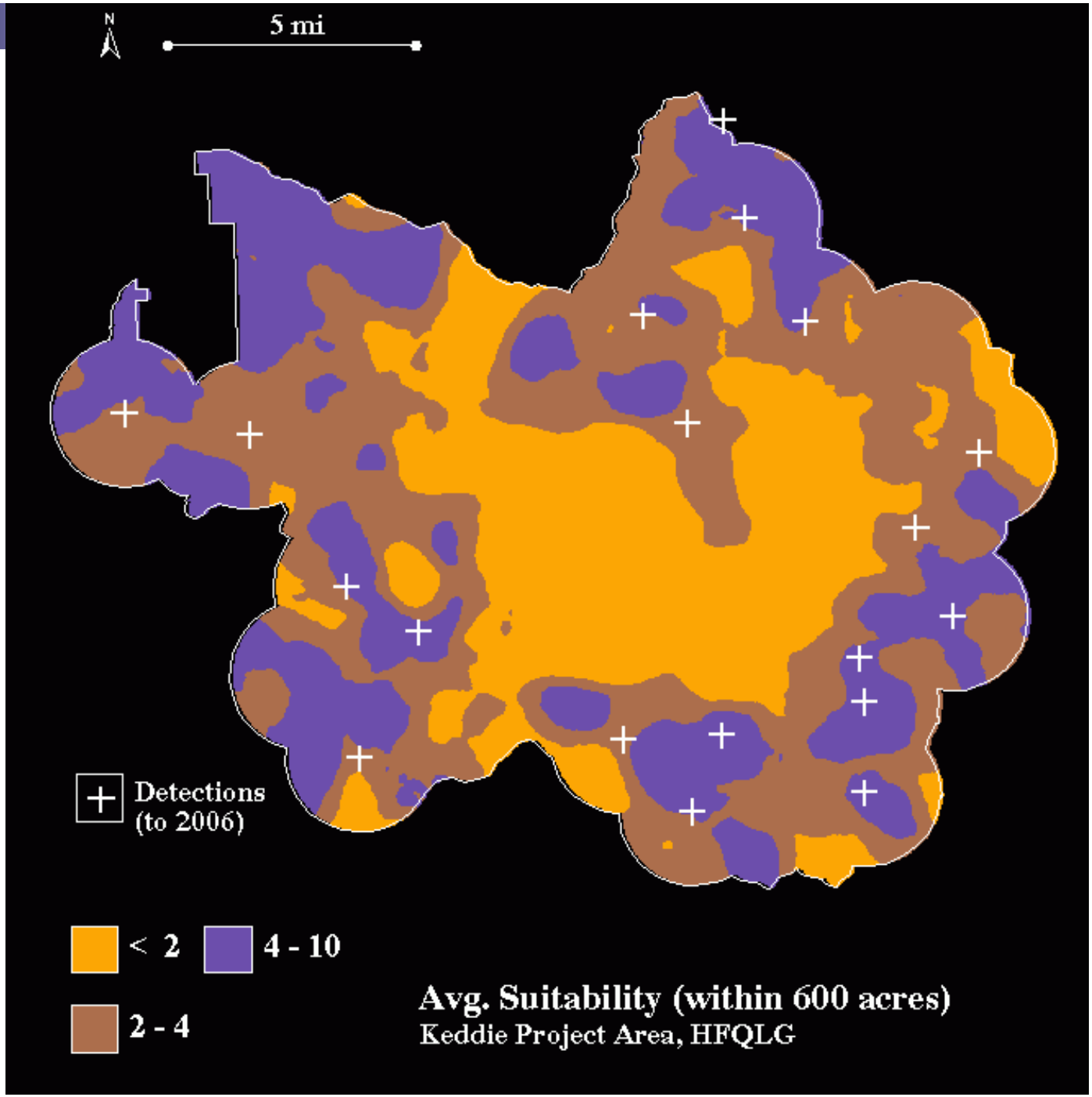
Veg types


N
5 mi
SMC (60.0 %)
MHW (8.32 %)
WFR (11.5 %)
DFR (3.47 %)
MRI (0.69 %)
PGS (9.12 %)
PPN (2.43 %)
Other (4.38 %)

Suitability Map



Smoothed Suitability Map



2. Translating Habitat Suitability to a Level of Owl Population

Can relate suitability to individual owl nesting pairs based on known locations

<u>Population</u> level

- **What can be supported by available habitat?**
- **Potential as opposed to Actual owl locations . . .**

Primary factors

- **Habitat amounts and configuration**
- **Spacing of territories**
- **Translates to an optimal packing problem . . .**

3. Measuring Impacts

Direct reduction in habitat suitability in known territories

Cumulative impact: re-do the population analysis in a post-treatment landscape

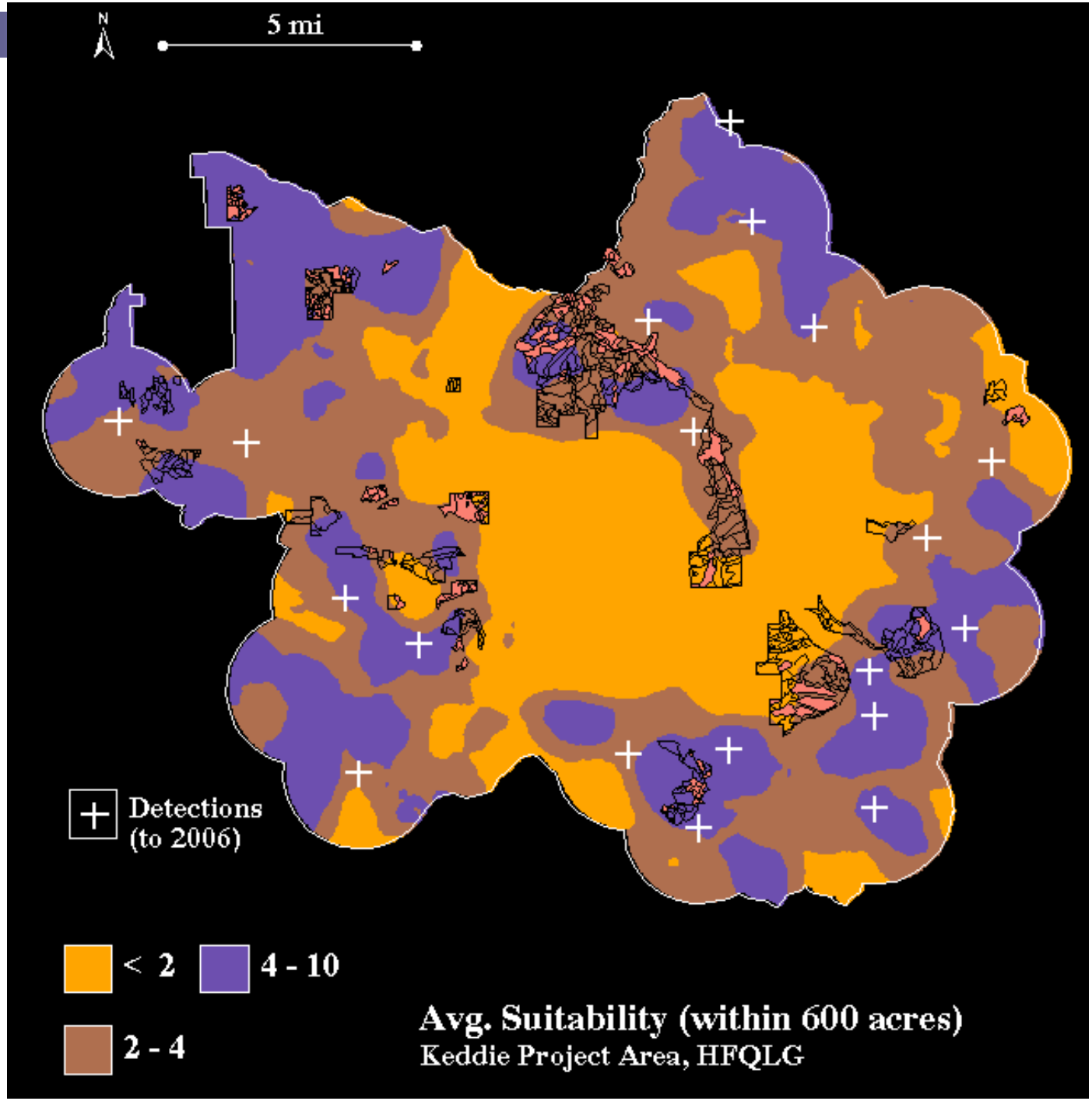
- **Altered veg map, altered suitability map**
- **How much change or reduction do you find?**
- **A large reduction would be a red flag . . .**

Other scenarios (relies on having other models):

- **Fire**
  - **Without treatment**
  - **With treatment – what is the difference?**
  - **Suggests tradeoff analysis, short-term habitat impact vs. longer-term mitigation of fire risk to owl population**
- **Forest health promotion**
  - **Attempts to improve habitat or provide for future habitat**

Alter Suitability Map According to Treatments

[Run "R-separation" type of model on this type of grid]



Relevance of the Approach

Tool can still be useful without complete data; can benefit from improved data

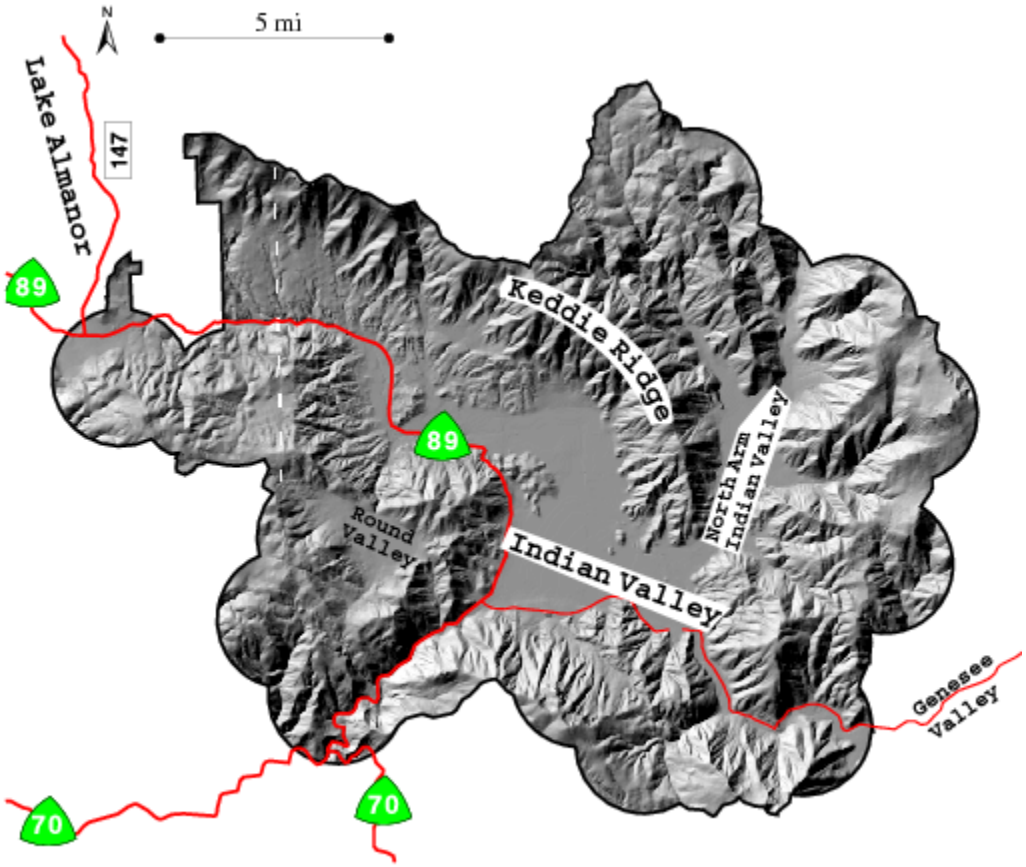
Can potentially be applied to other wildlife species for which we can estimate territorial requirements.

Objective, standardized (or semi-standardized) analysis

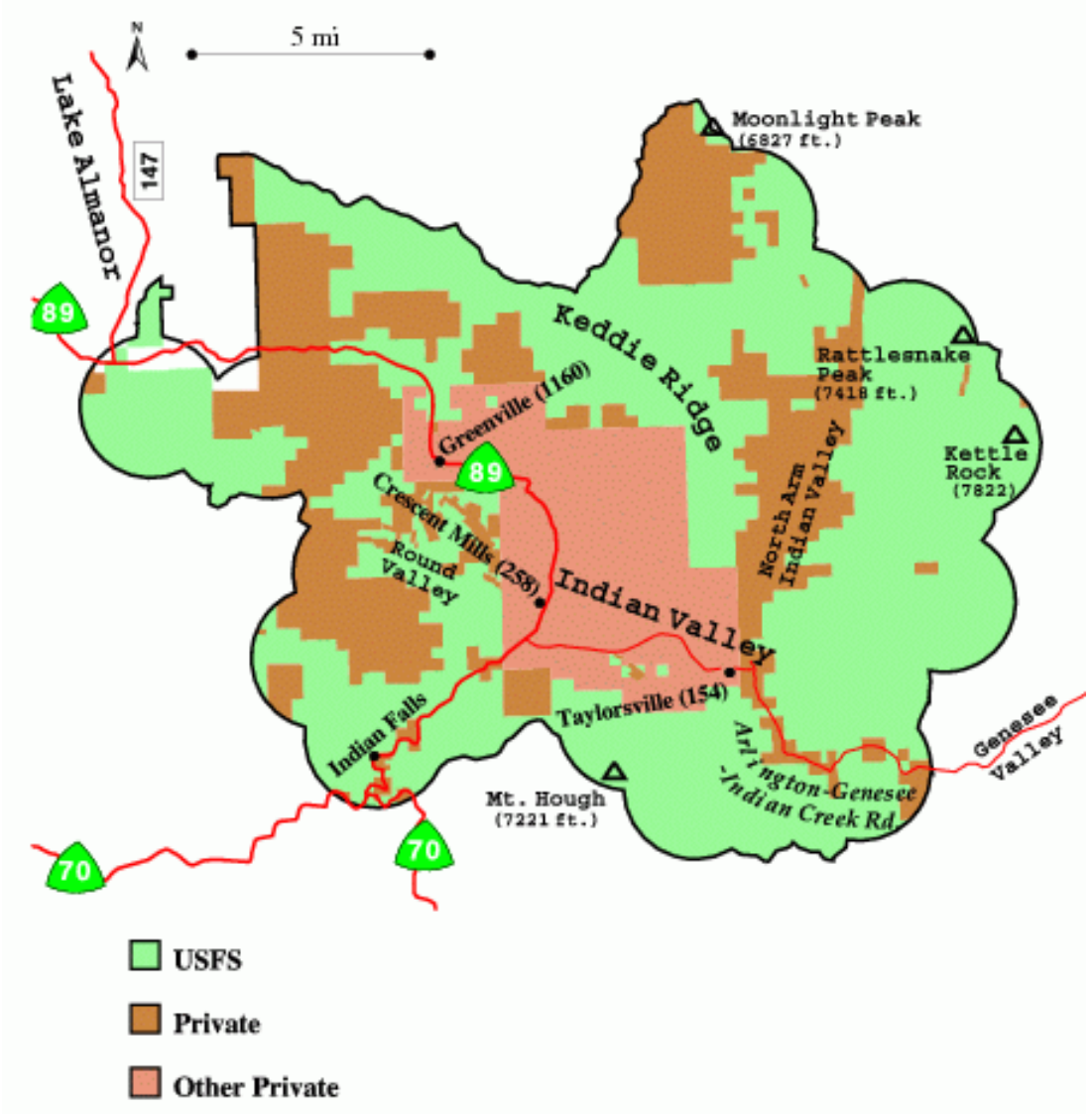
Future development:

- **Improved habitat suitabilities**
- **More capable R-separation interface**
- **Using a packing problem with other than circles.**

Relief


N
5 mi
Lake Almanor
147
89
Keddie Ridge
89
North Arm
Indian Valley
Round
Valley
Indian Valley
Genesee
Valley
70
70

Ownership


N
5 mi
Lake Almanor
147
89
Moonlight Peak
(6827 ft.)
Keddie Ridge
Rattlesnake
Peak
(7418 ft.)
Greenville (1160)
89
Kettle
Rock
(7822)
North Arm
Indian Valley
Crescent Mills (258)
Round
Valley
Indian Valley
Taylorsville (154)
Indian Falls
Mt. Hough
(7221 ft.)
Arlington-Genesee
-Indian Creek Rd
Genesee
Valley
70
70
USFS
Private
Other Private