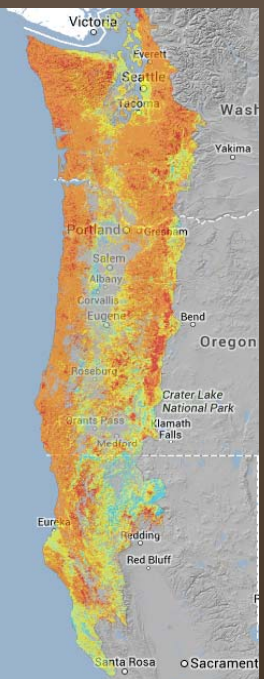
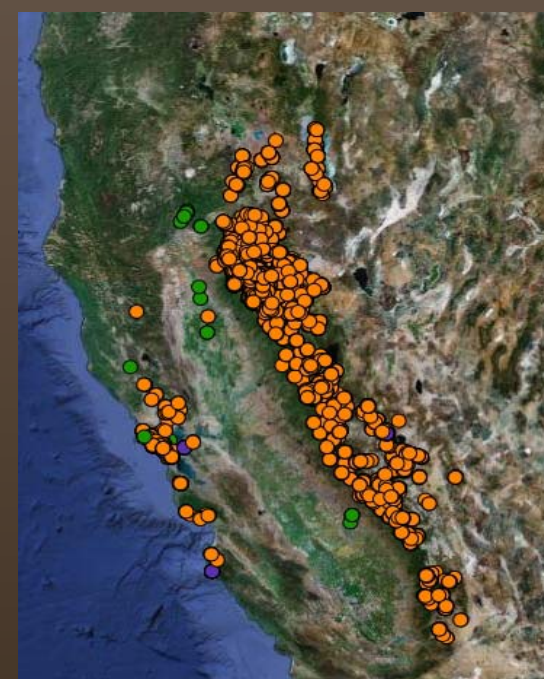


Landscape connectivity and urbanization



Ryan DiGaudio



Importance of connectivity

- Ecosystem processes at larger spatial scales
- Metapopulations
- Genetic interchange
- Climate change

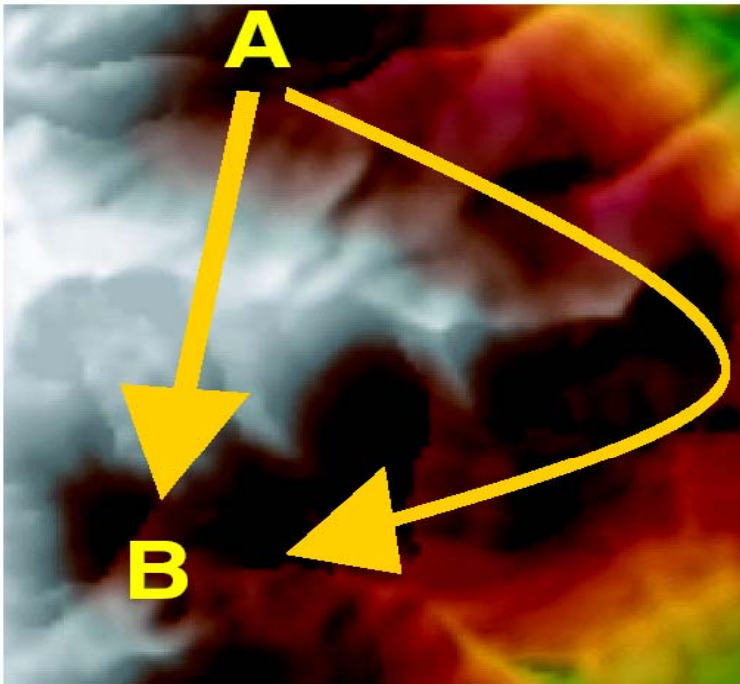
Types of connectivity

- Structural connectivity
- Functional connectivity
- Adjacency
- Corridors
- Matrix permeability

Types of connectivity

- Structural connectivity
- Functional connectivity
- Adjacency
- Corridors (least cost)
- Matrix permeability

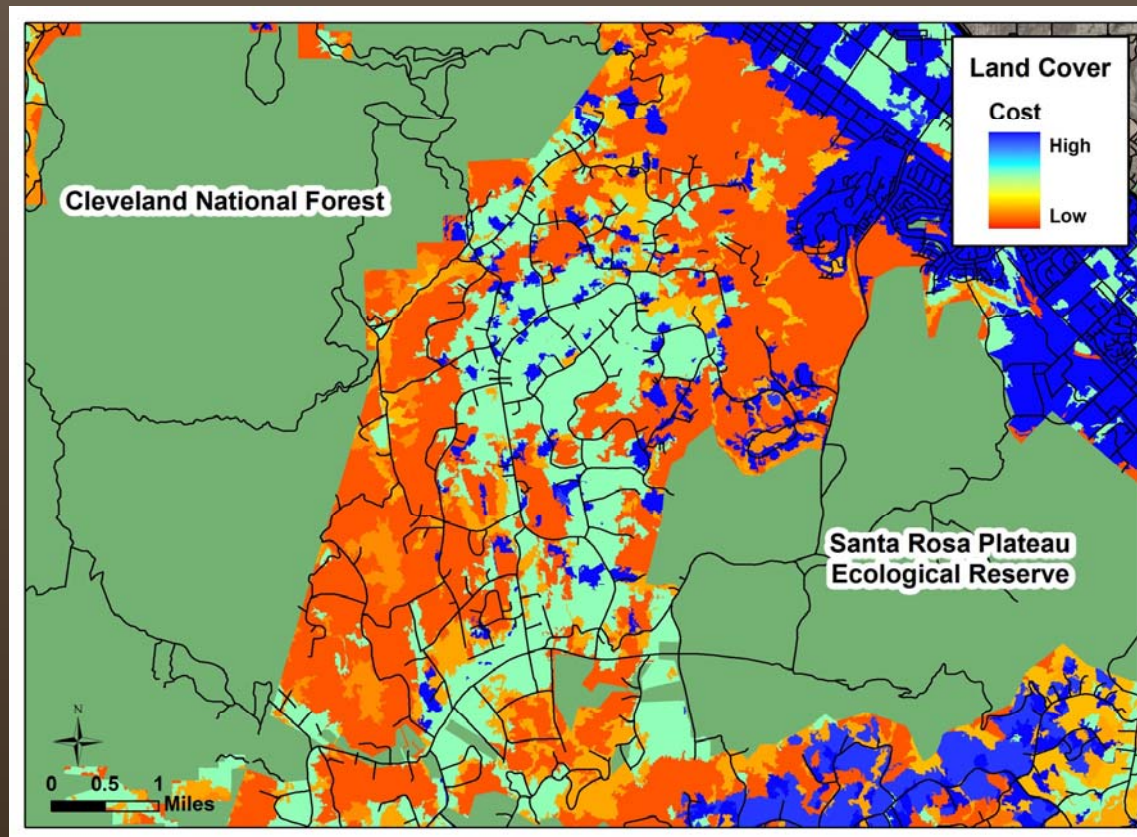
Cost weighted distance function



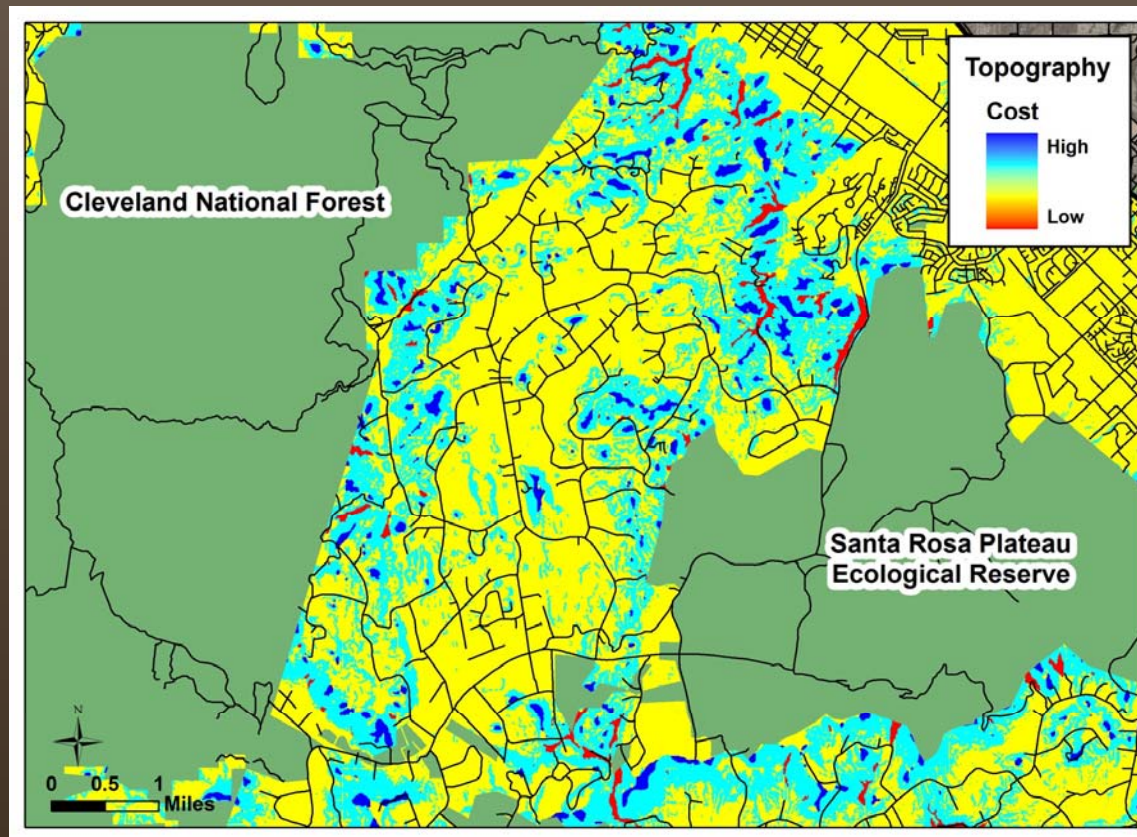
- Shortest distance is not necessarily a straight line
- “Cost” per step is included
- Cost distance

(McCoy and Johnston 2002)

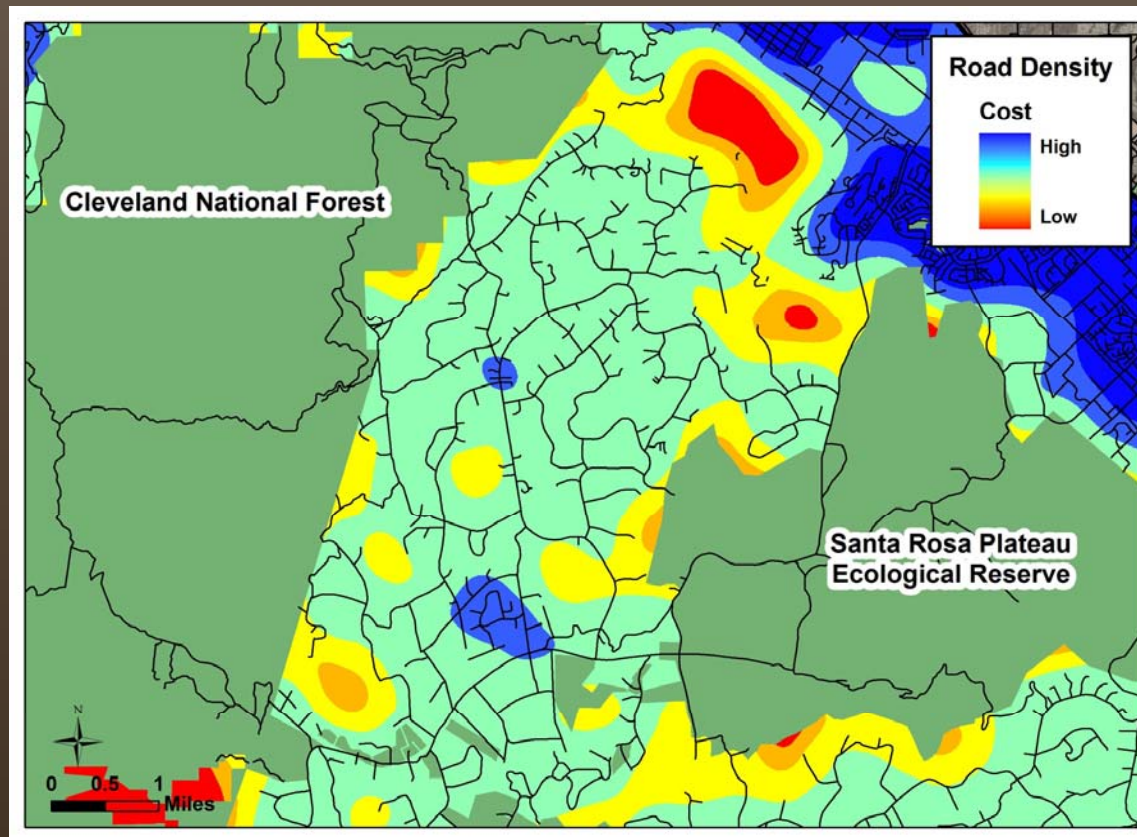
Cost surface – example



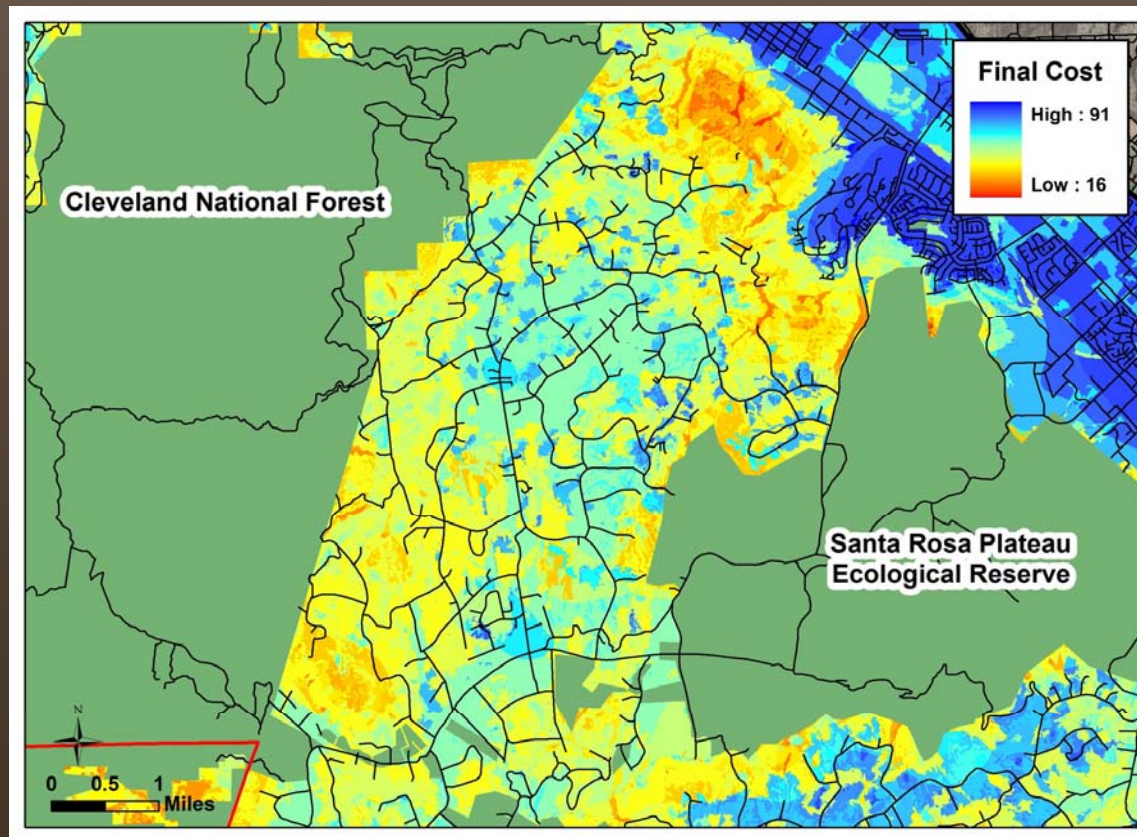
Cost surface – example



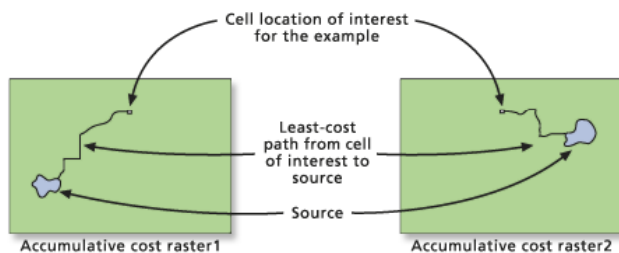
Cost surface – example



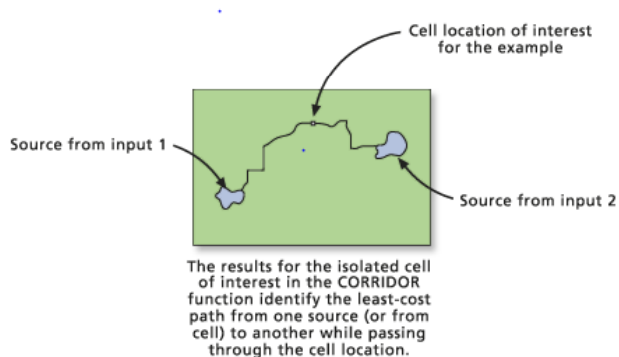
Cost surface – example



Calculating cost distance



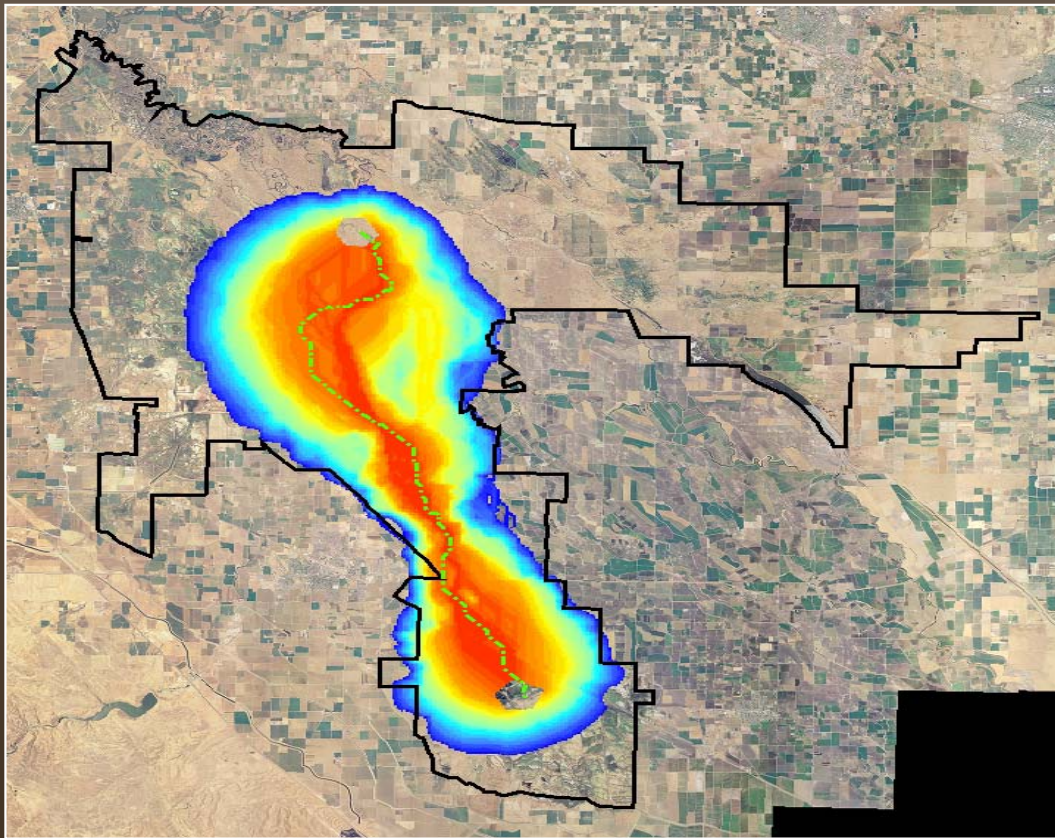
The Corridor function then adds the two accumulative cost surfaces together.



- Cost to each source raster is calculated for each raster cell
- Cost path rasters summed

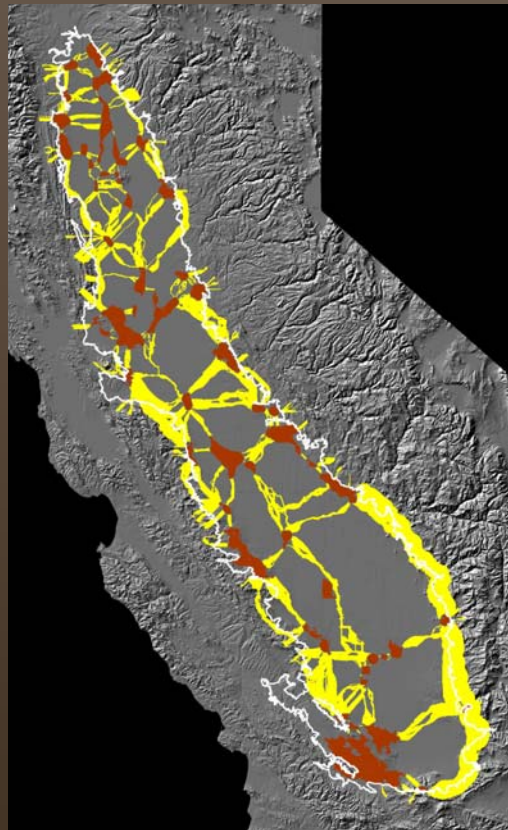
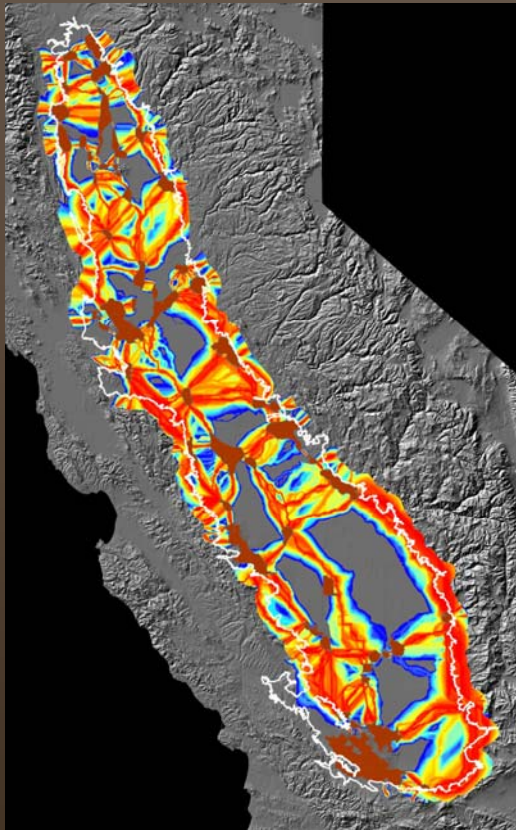
(ESRI website help)

Least cost path/corridor



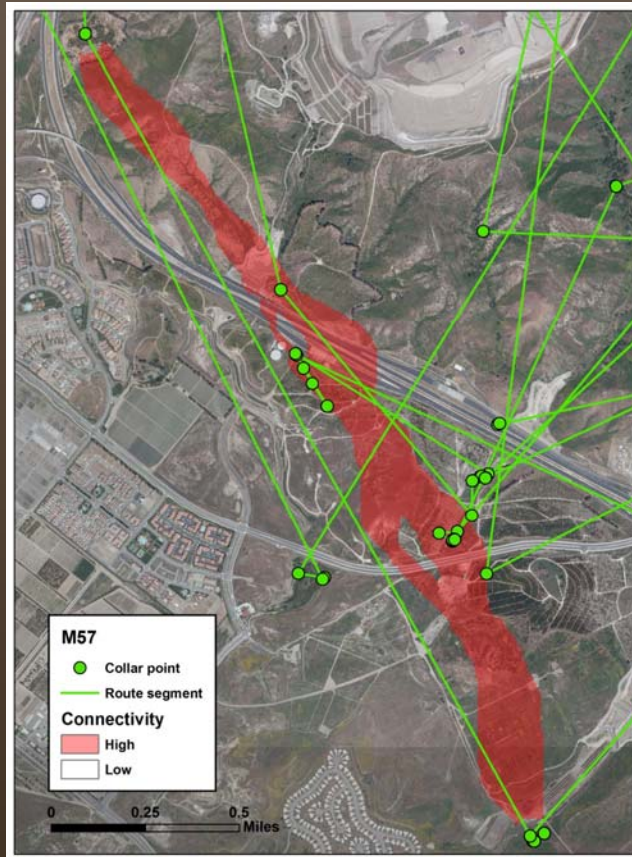
- LCP is single lowest cost path
- LCC gives a cost distance score to each raster cell
- LCP is good for measuring cost between termini, LCC for identifying potential corridors/linkages

Connectivity analysis – example



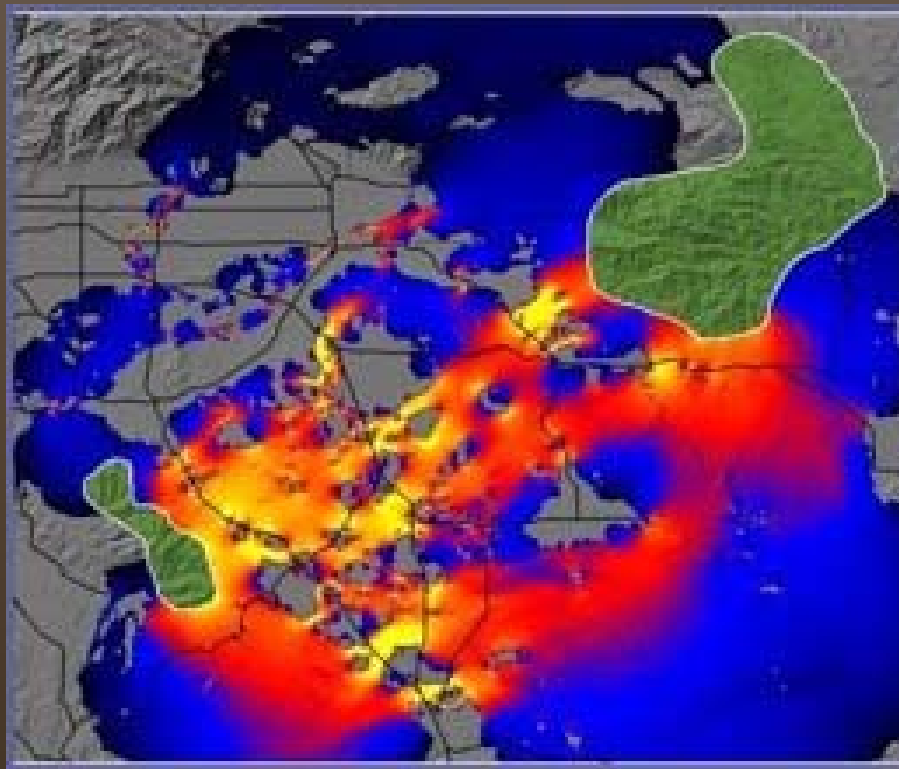
- Potential Central Valley conservation network (Huber et al. 2010)
- Multi-species
- Cores and corridors

Connectivity analysis – example



- Predicting movement
- Connectivity between mtn lion GPS collar points
- Probably most effective at shorter distances

Circuitscape



(Circuitscape.org)

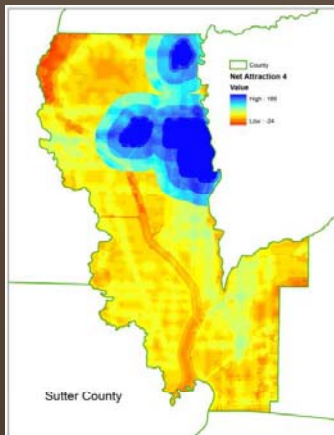
- Focus on chokepoints
- Connects all termini

Connectivity – threats

- Urbanization
- Edge effects
- Climate change

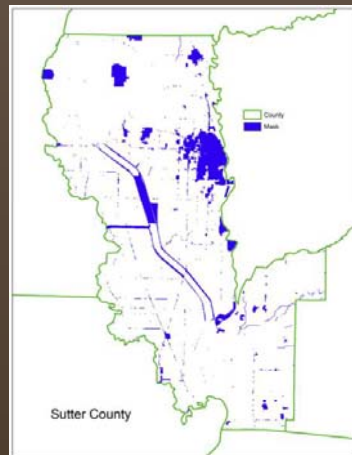
UPlan model – GIS inputs

Attractors/ Discouragements



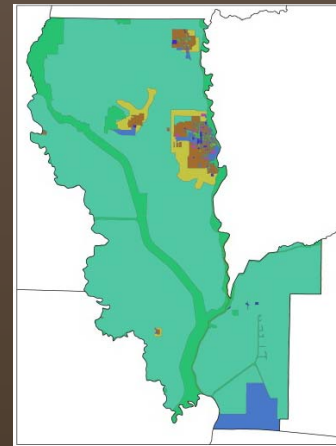
- Roads (+)
- Existing Infrastructure (+)
- Wetlands (-)
- Floodplains (-)

Masks

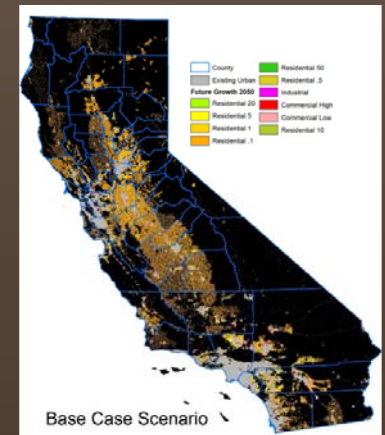


- Public lands
- Lakes
- Existing Urban

General Plan

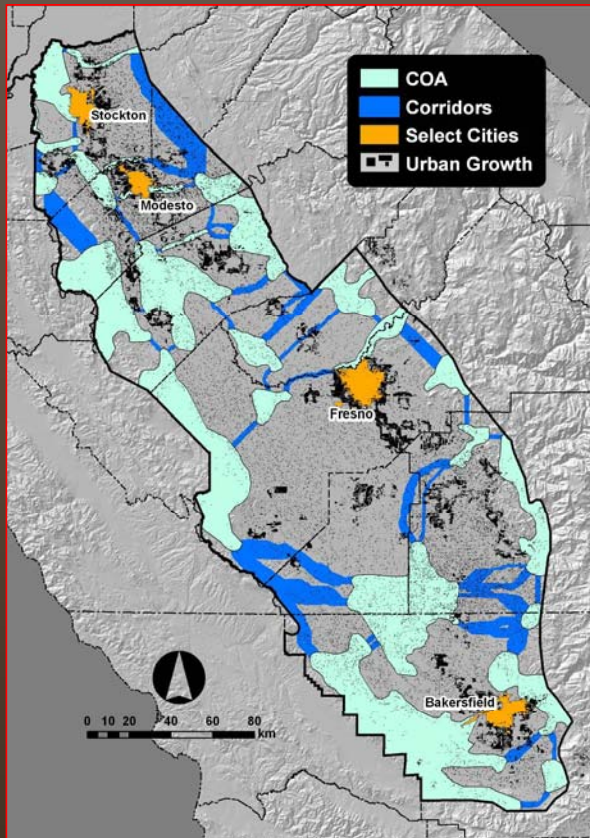


Statewide Output

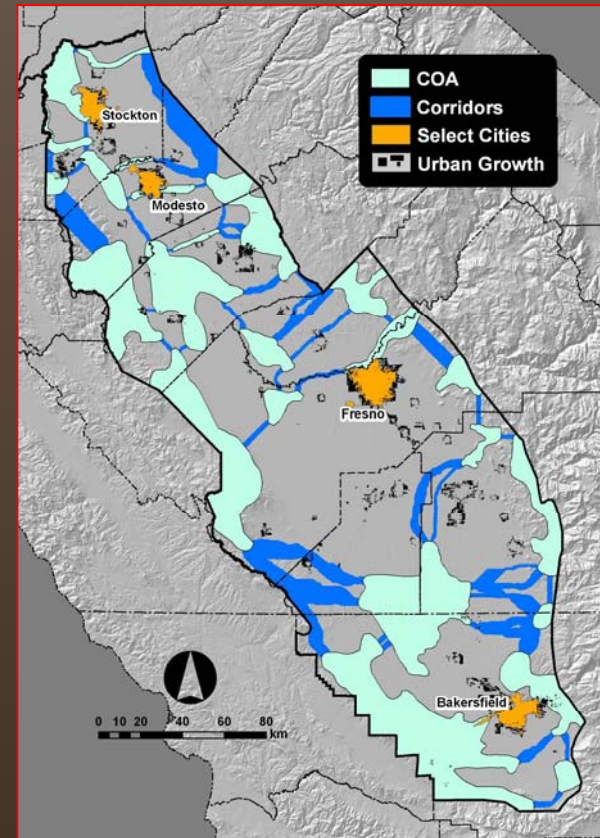


UPlan – San Joaquin Valley example

Status
Quo



Compact
Growth



UPlan – San Joaquin Valley example

