Mojave Desert Tortoise Genetic Connectivity

- Ivanpah Valley And Beyond -

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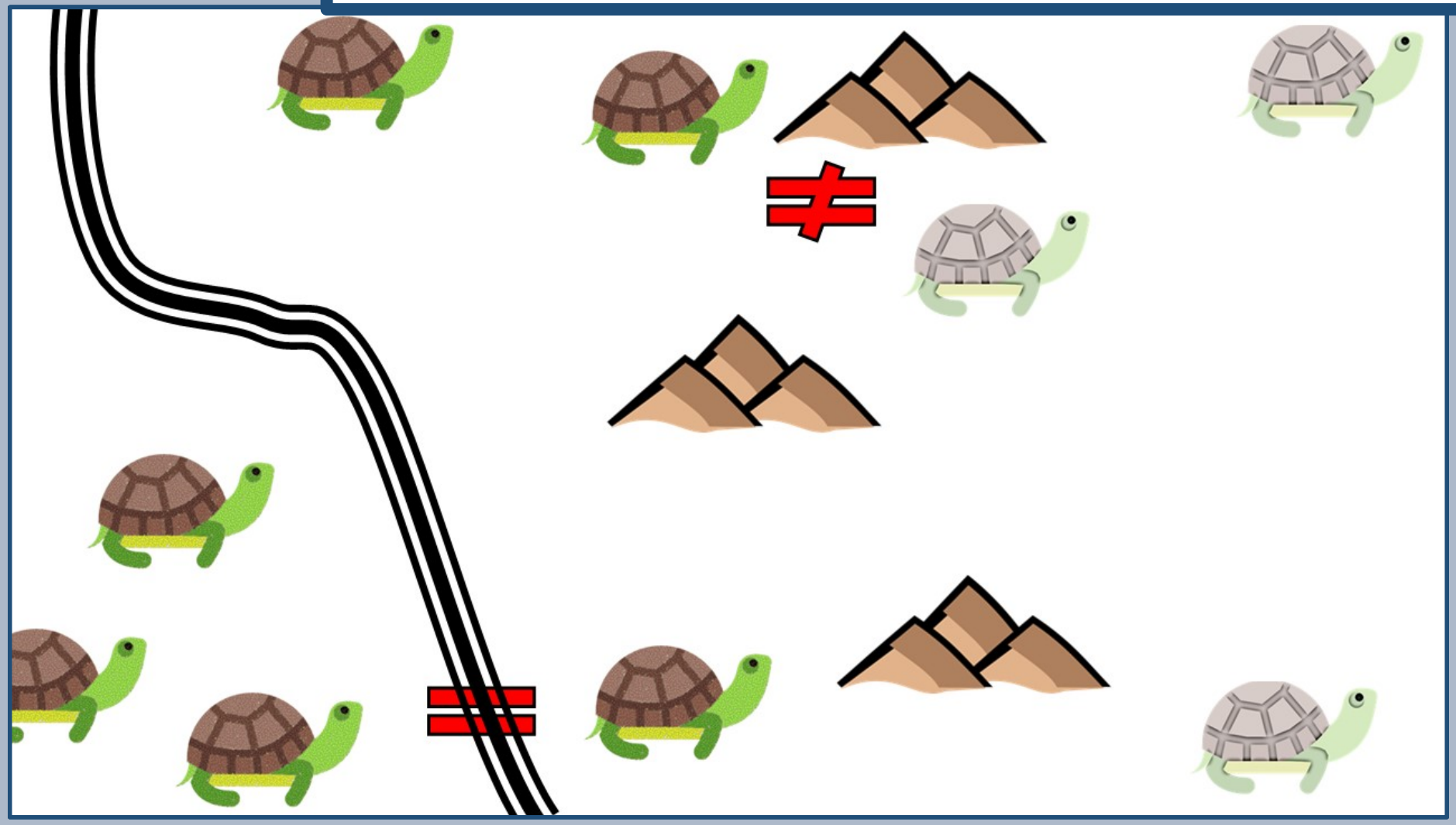
Research Goals

Genetic connectivity research in disturbed landscapes

» **Inform management decisions related to recovery**

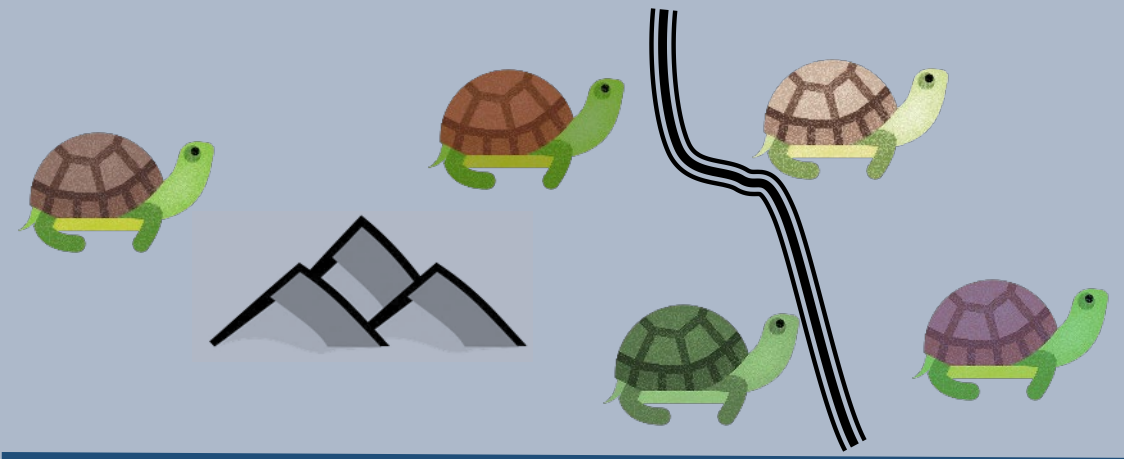
» **Mojave desert tortoise conservation (species + habitat)**

Genetic Connectivity



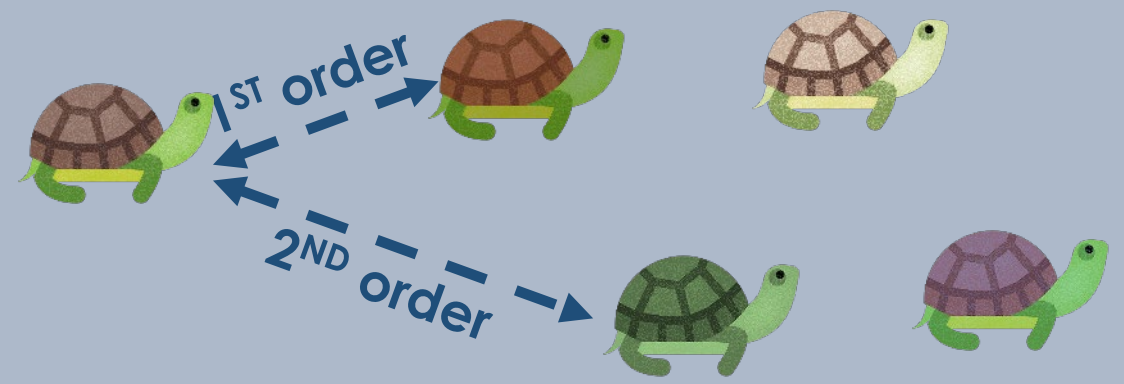
Landscape influences genetics

Relatedness & Population Structure



model comparison

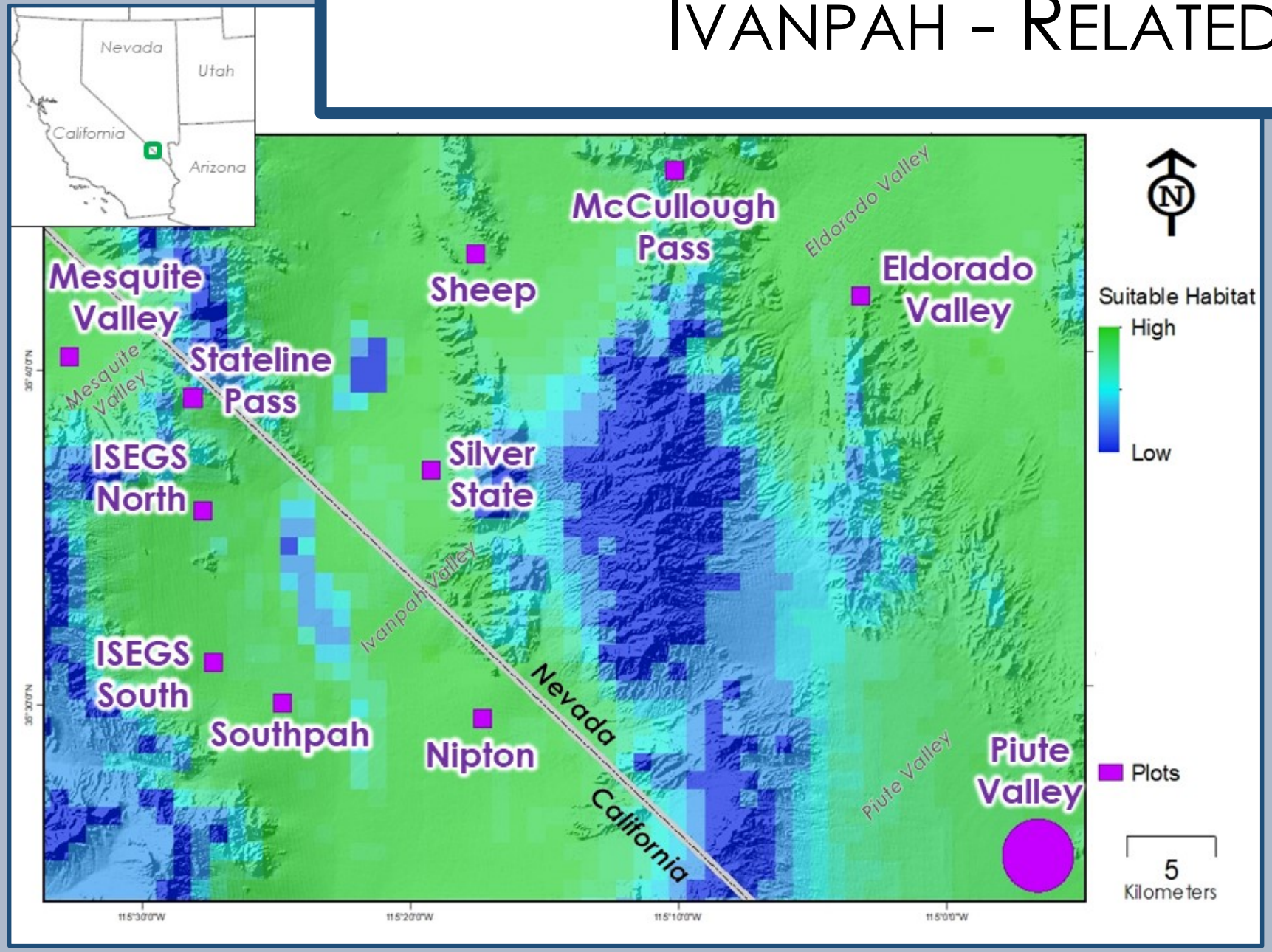
(genetic differences & cost surfaces)



pedigree reconstruction

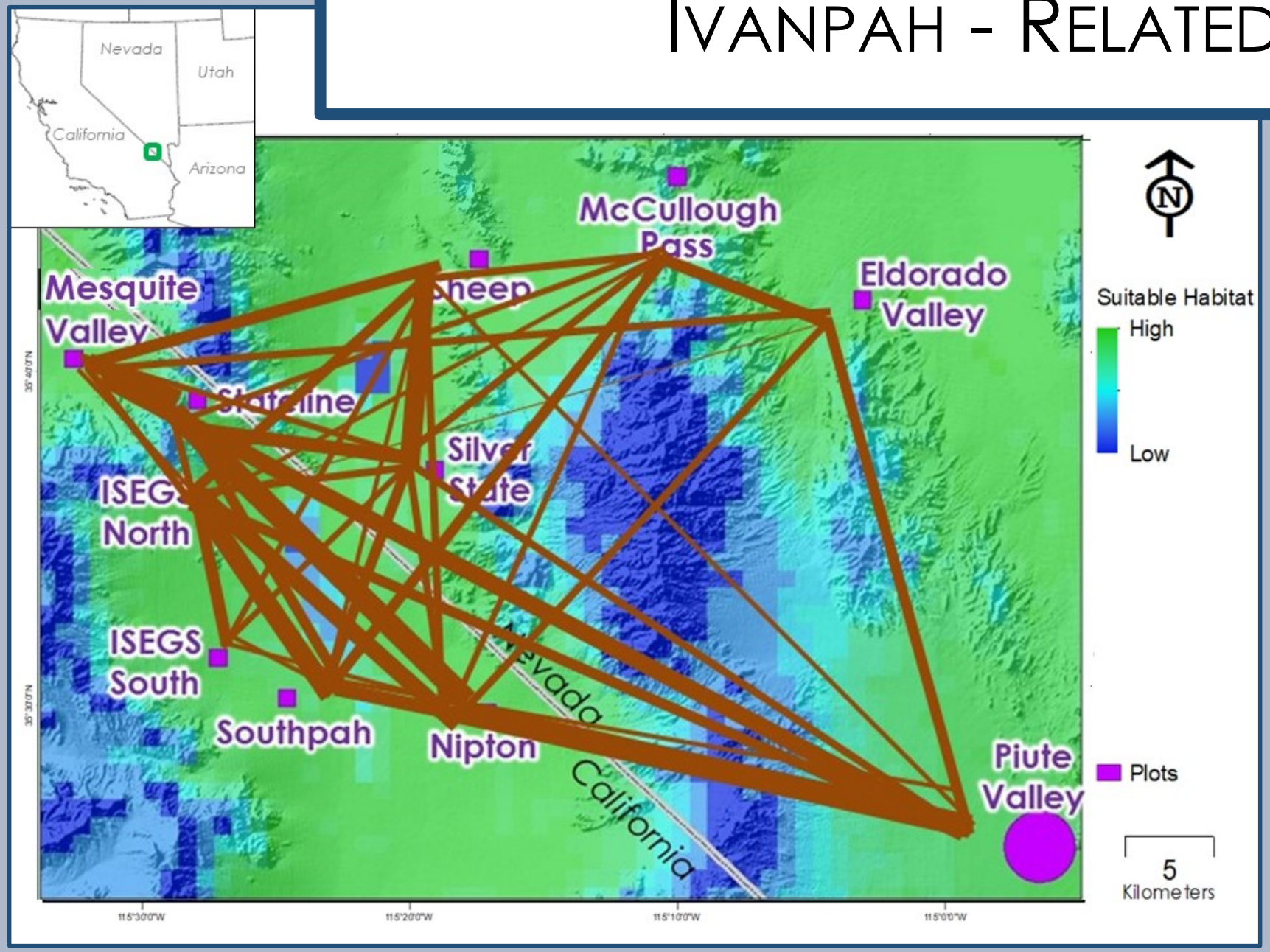
(Colony)

IVANPAH - RELATEDNESS



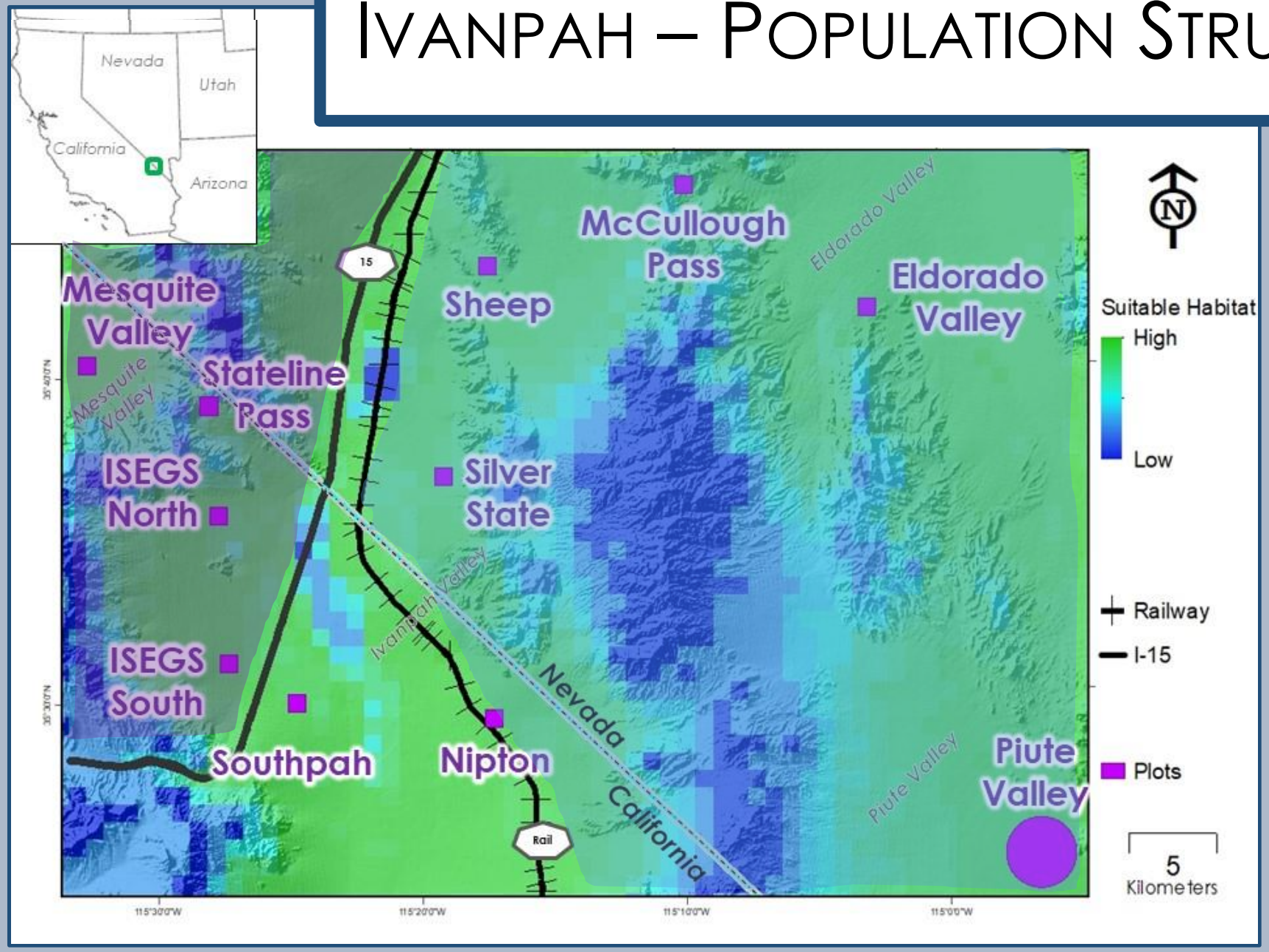
Ivanpah Valley plot locations

IVANPAH - RELATEDNESS



2ND order relationships among plots

Ivanpah – Population Structure Model



Habitat

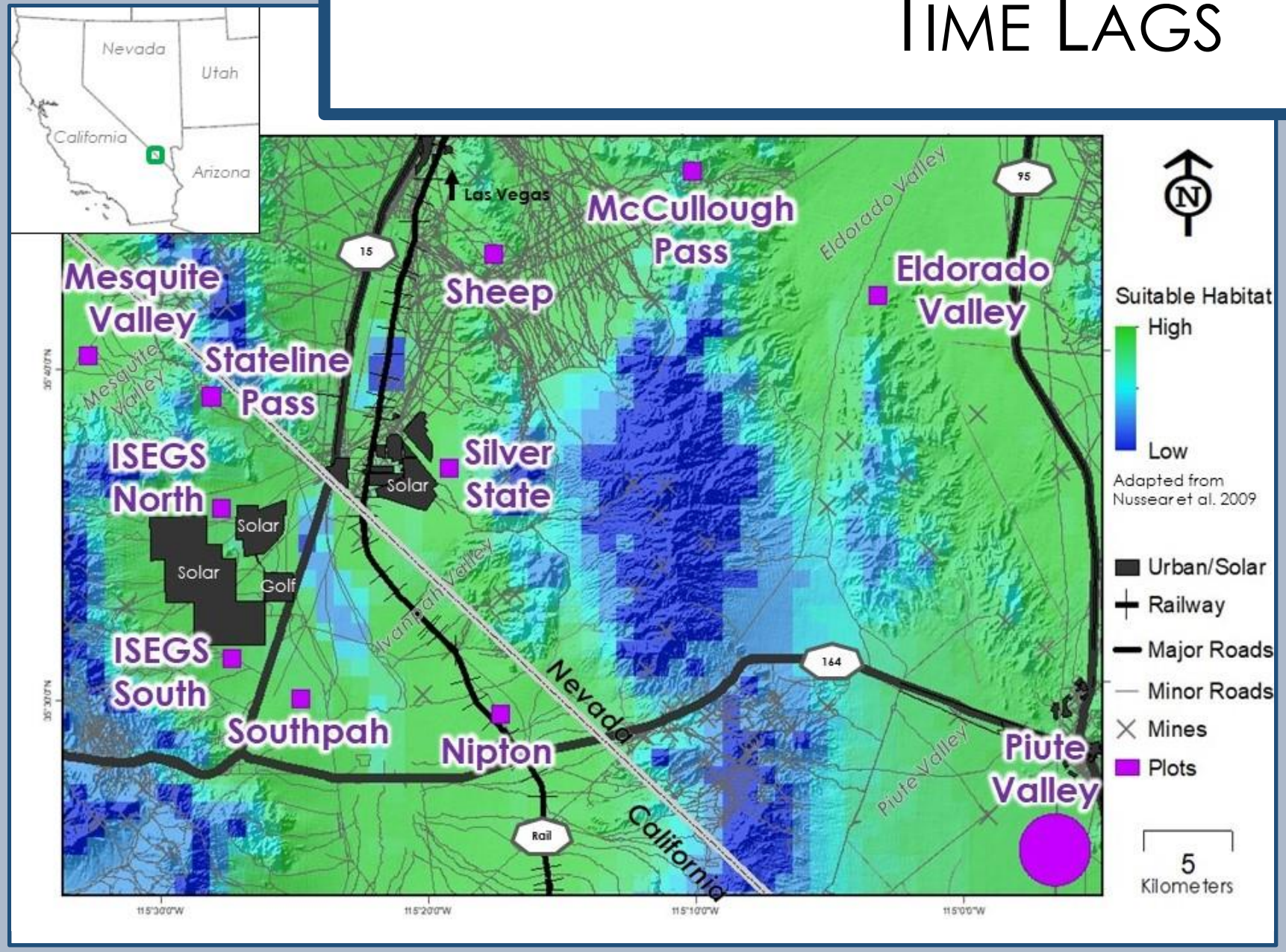
+ **Railroad**

$R^2 = 0.86$

+ **Highway**

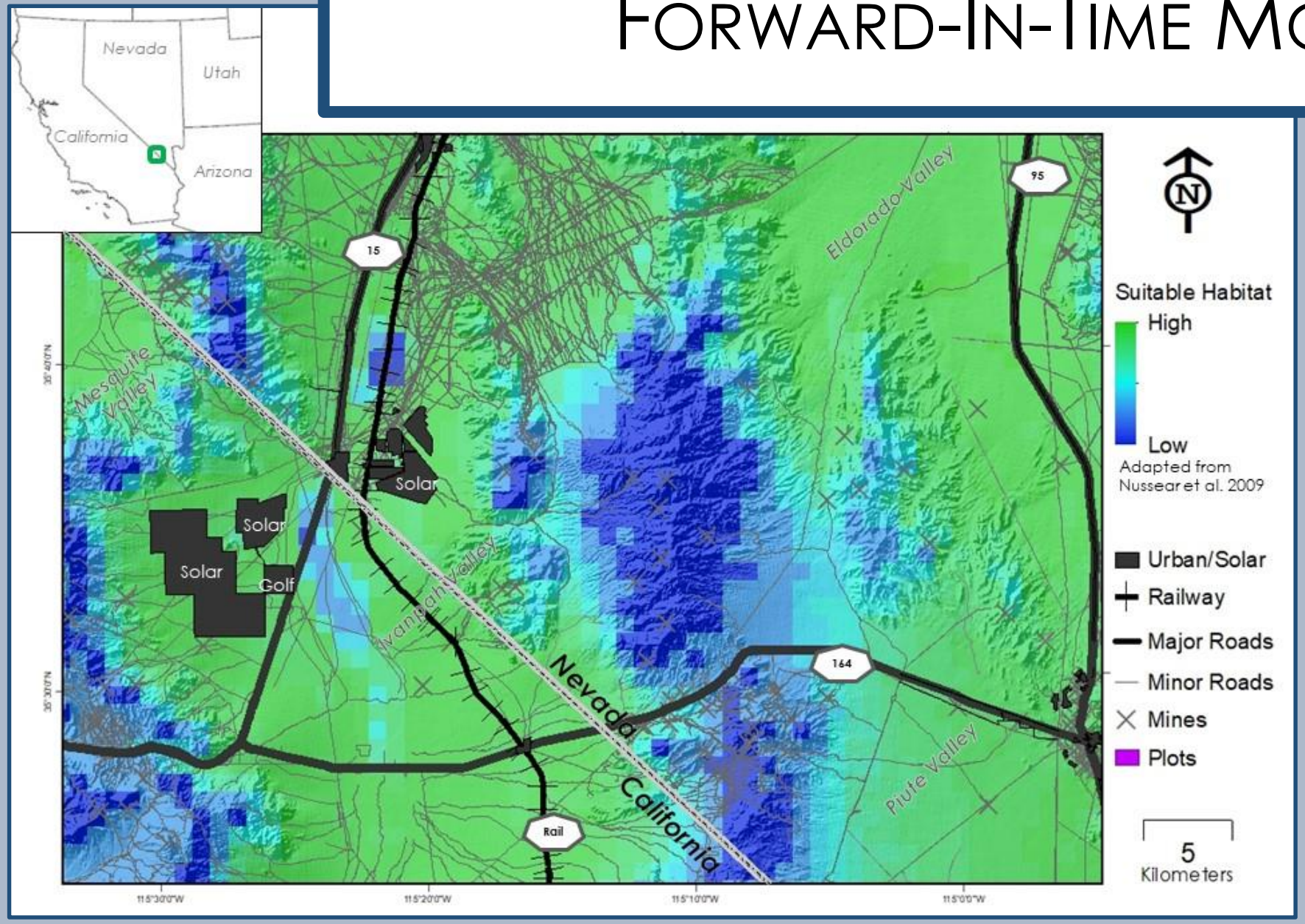
$R^2 = 0.84$

TIME LAGS



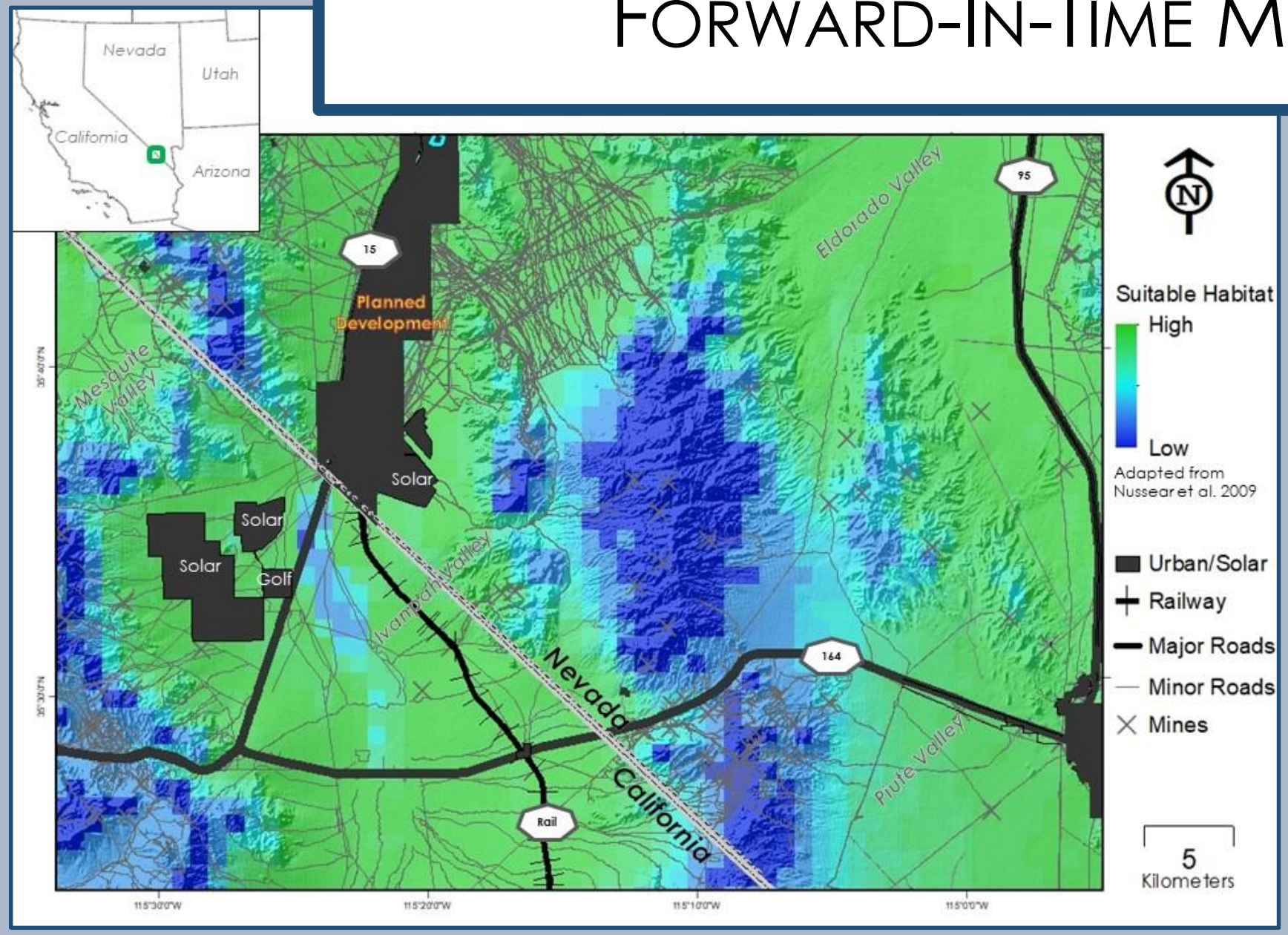
4 to 7
tortoise
generations

Forward-In-Time Models



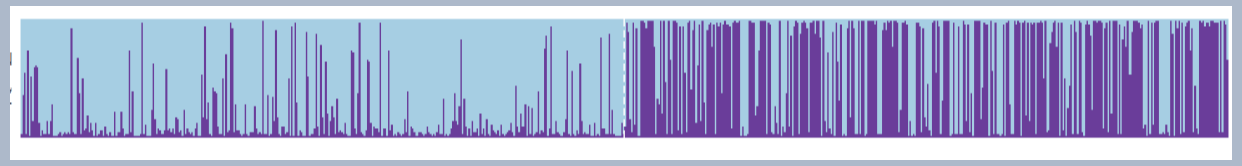
Current disturbance

Forward-In-Time Models

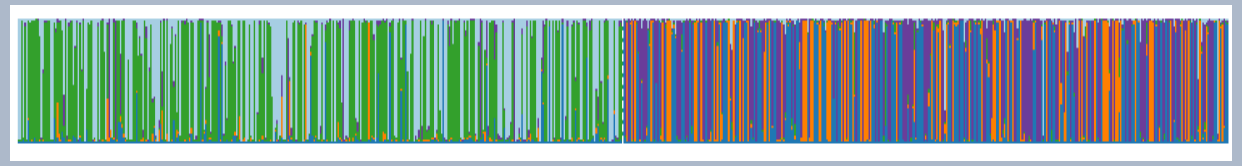


Future disturbance projections

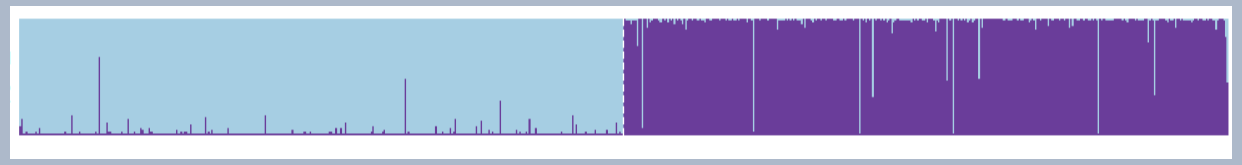
Predicted Population Structure



Historical – 2 clusters with gene flow

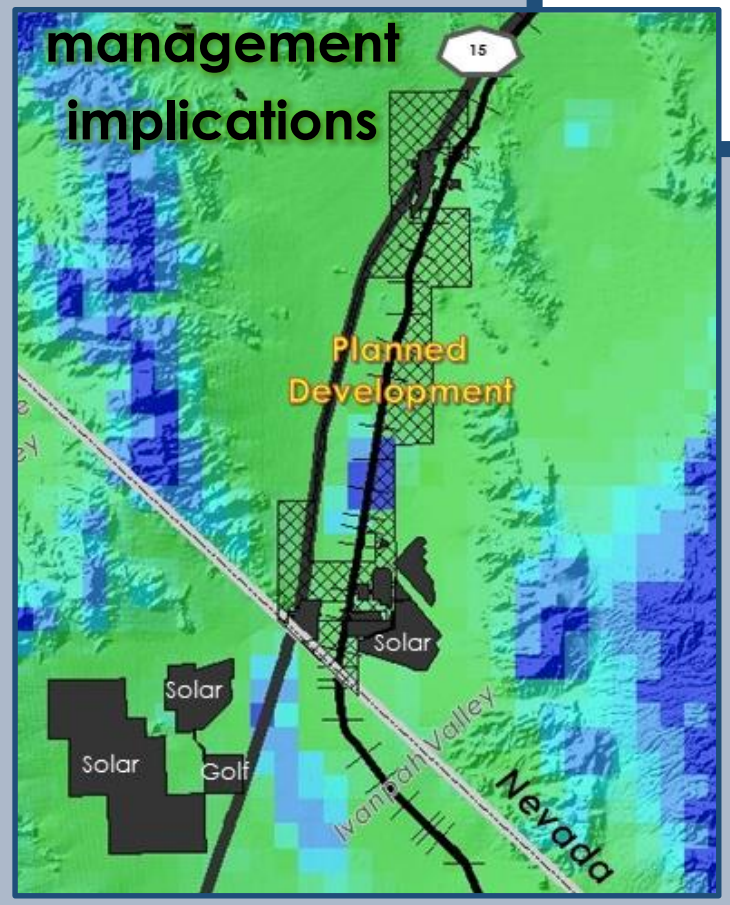


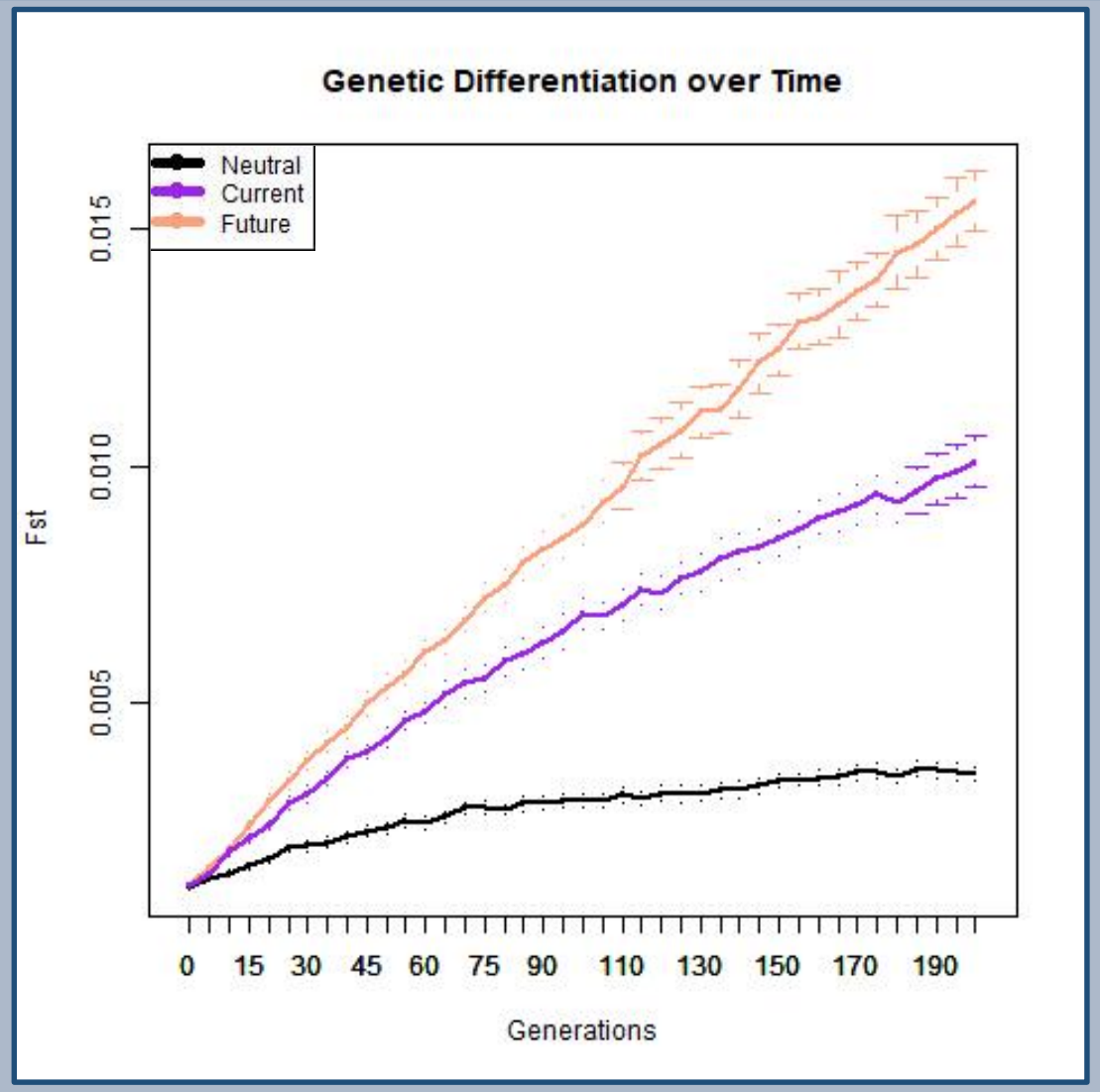
Current – 5 clusters with little/no gene flow



Future – 2 clusters with little/no gene flow

Predicted Genetic Differentiation

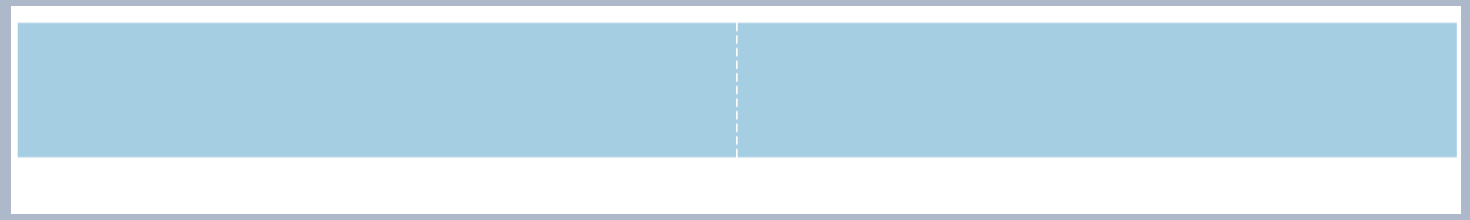




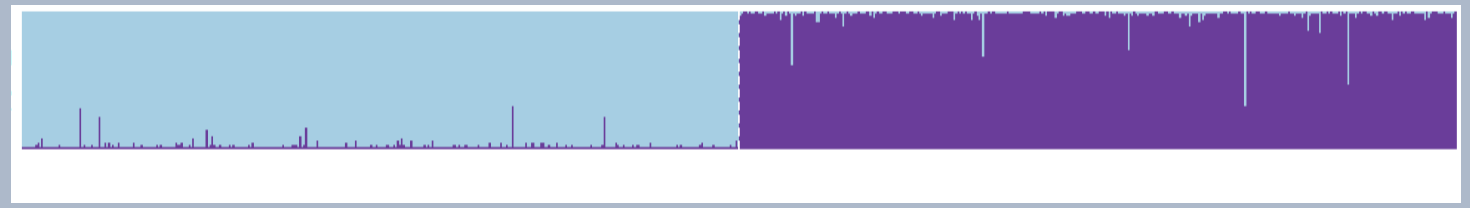
5 to 10 tortoise generations

Predicted Ability To Maintain Connectivity

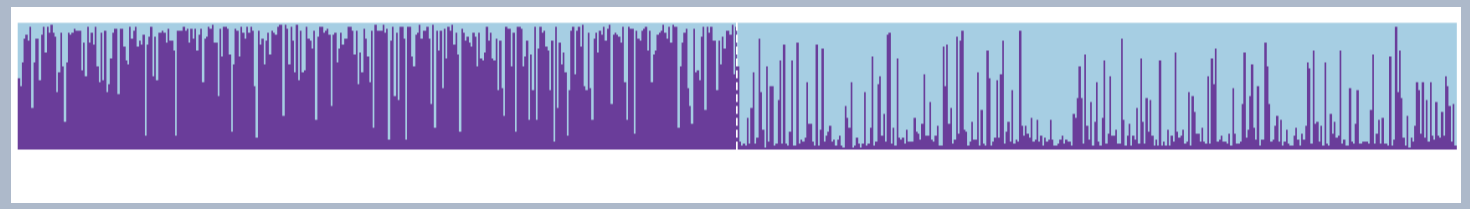
Ivanpah = little/no connectivity with current/future disturbance



Panmictic

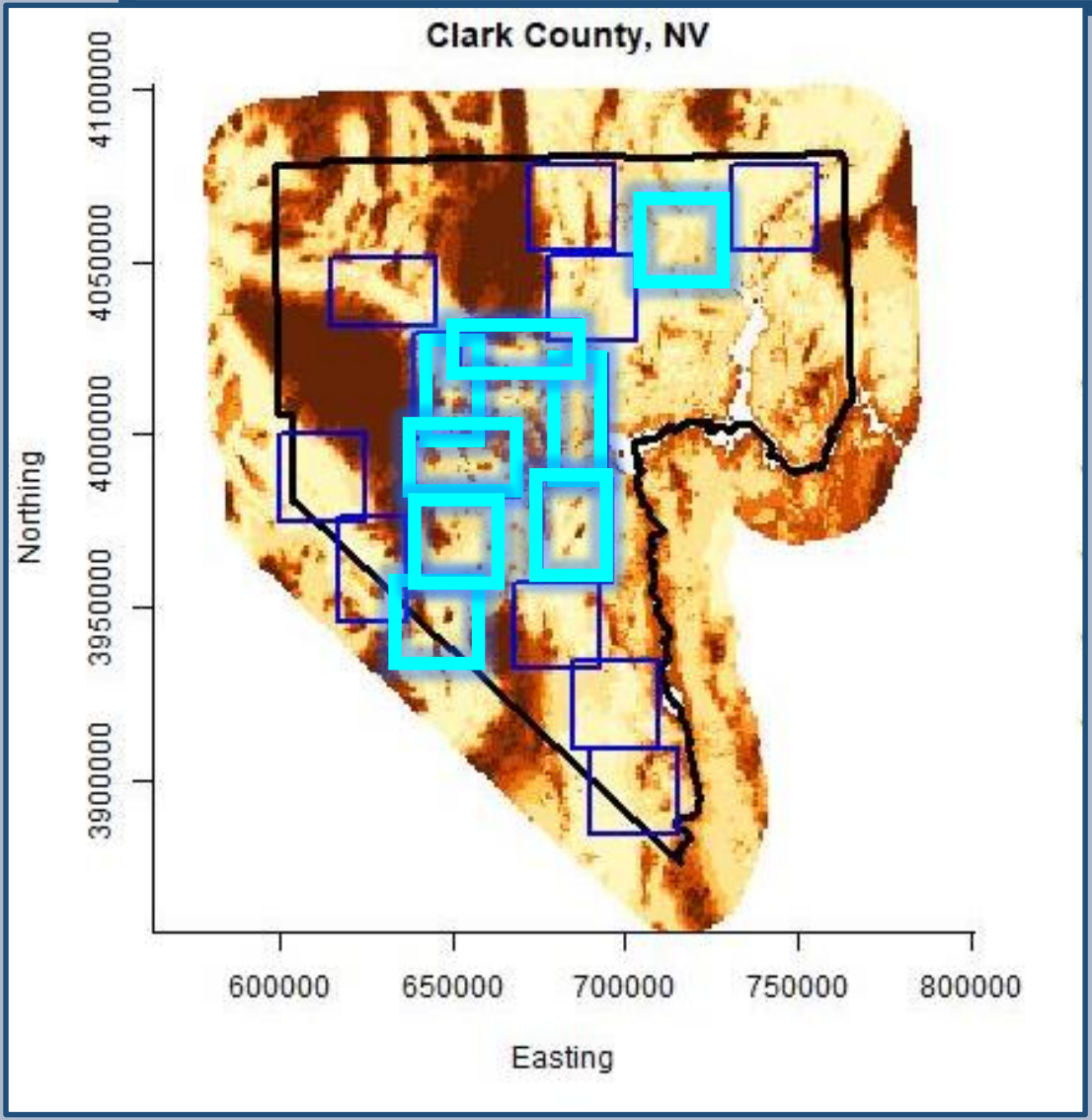


Isolated by linear barrier



Barrier with connectivity culverts

Modeled Locations



No genetic connectivity:

Current disturbance **5 of 17**

Future disturbance **8 of 17**

What Should Connectivity Look Like?

Rank areas & prioritize actions

» **protect areas that maintain connectivity**

» **strategically add corridors where connectivity is reduced**

» **rethink developments where connectivity will be lost**

Make informed decisions

» **project placement & connectivity corridors**

Thank You!

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