

# PRODUCING MORE INTERPRETABLE RECHARGE SUITABILITY MAPS:

Visualizing sensitivity to subjective choices during mapmaking

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International Symposium on Managed Aquifer Recharge

Madrid, Spain

21 May 2019

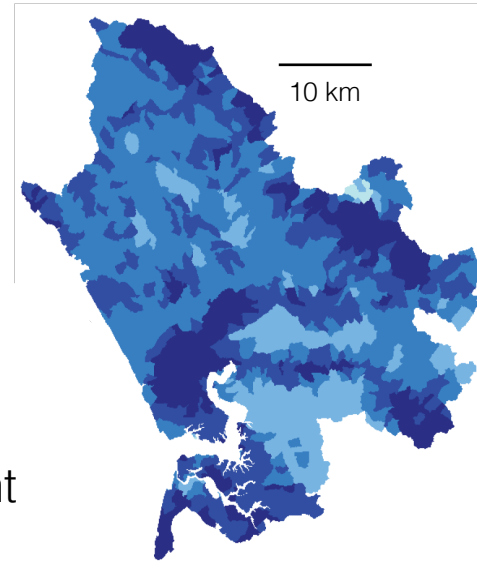


# Considerations in creating suitability maps

## DATA

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- Data availability/collection
- Co-registration/assimilation
- Ensuring data quality
- Extrapolating from limited datasets
- Data management and process development



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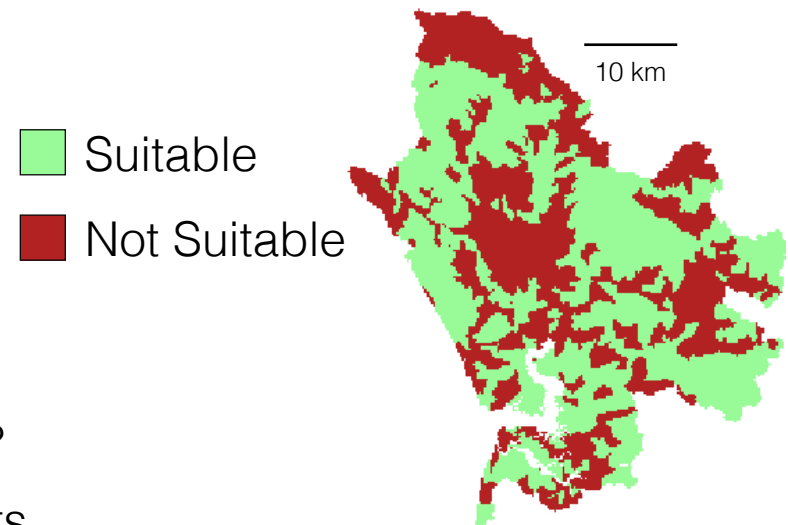
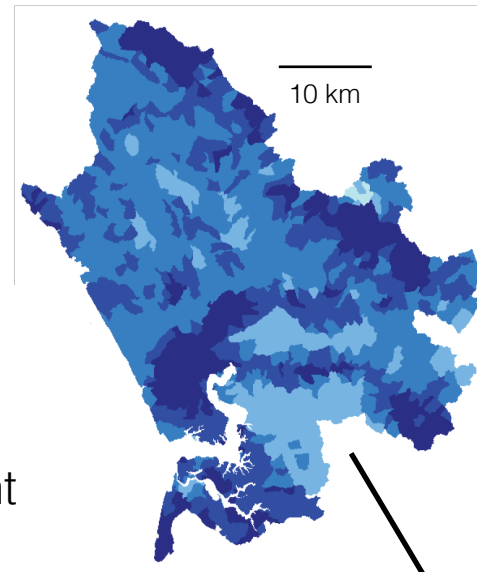
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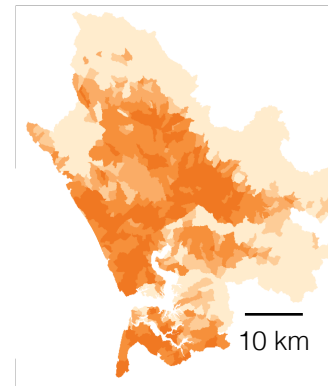
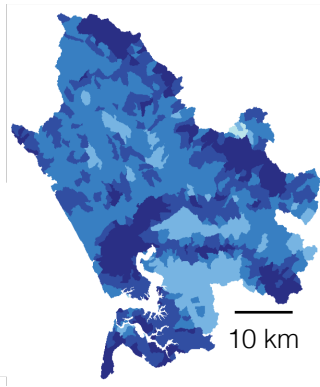
## DECISIONS

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- Suitability thresholds
- Aggregating, weighting and layering data
- Factor inclusion and relevance
- Agency and governmental priorities
- Scale dependence
- Is there a way to calibrate/groundtruth maps?
- Effective display and communication of results



Factors

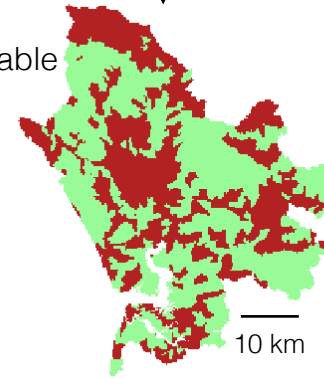
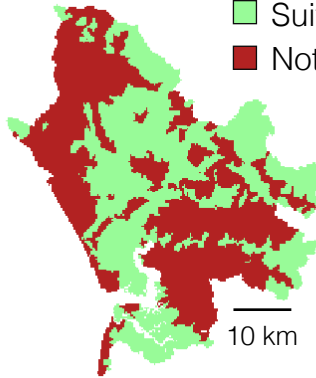


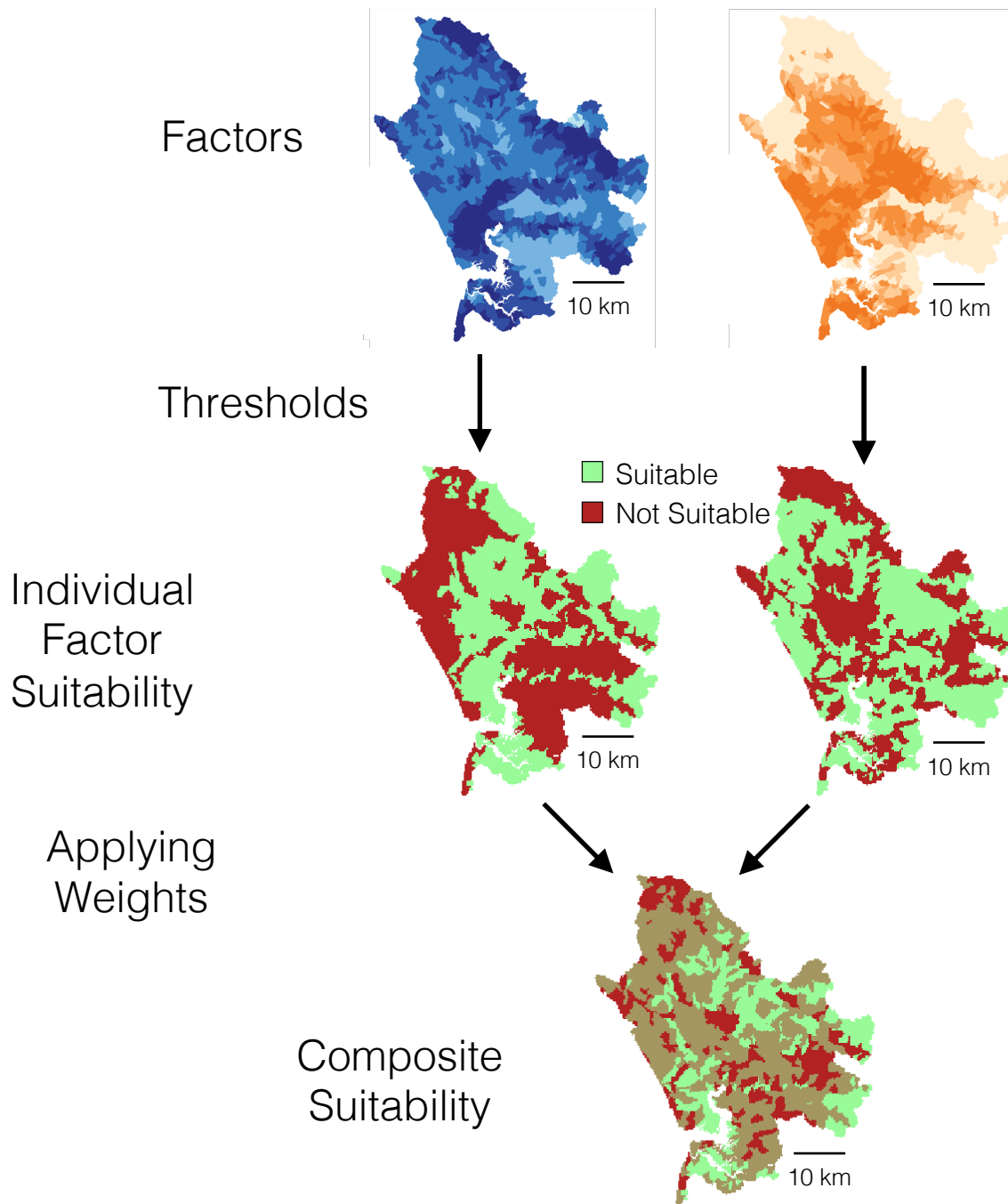
Thresholds



■ Suitable  
■ Not Suitable

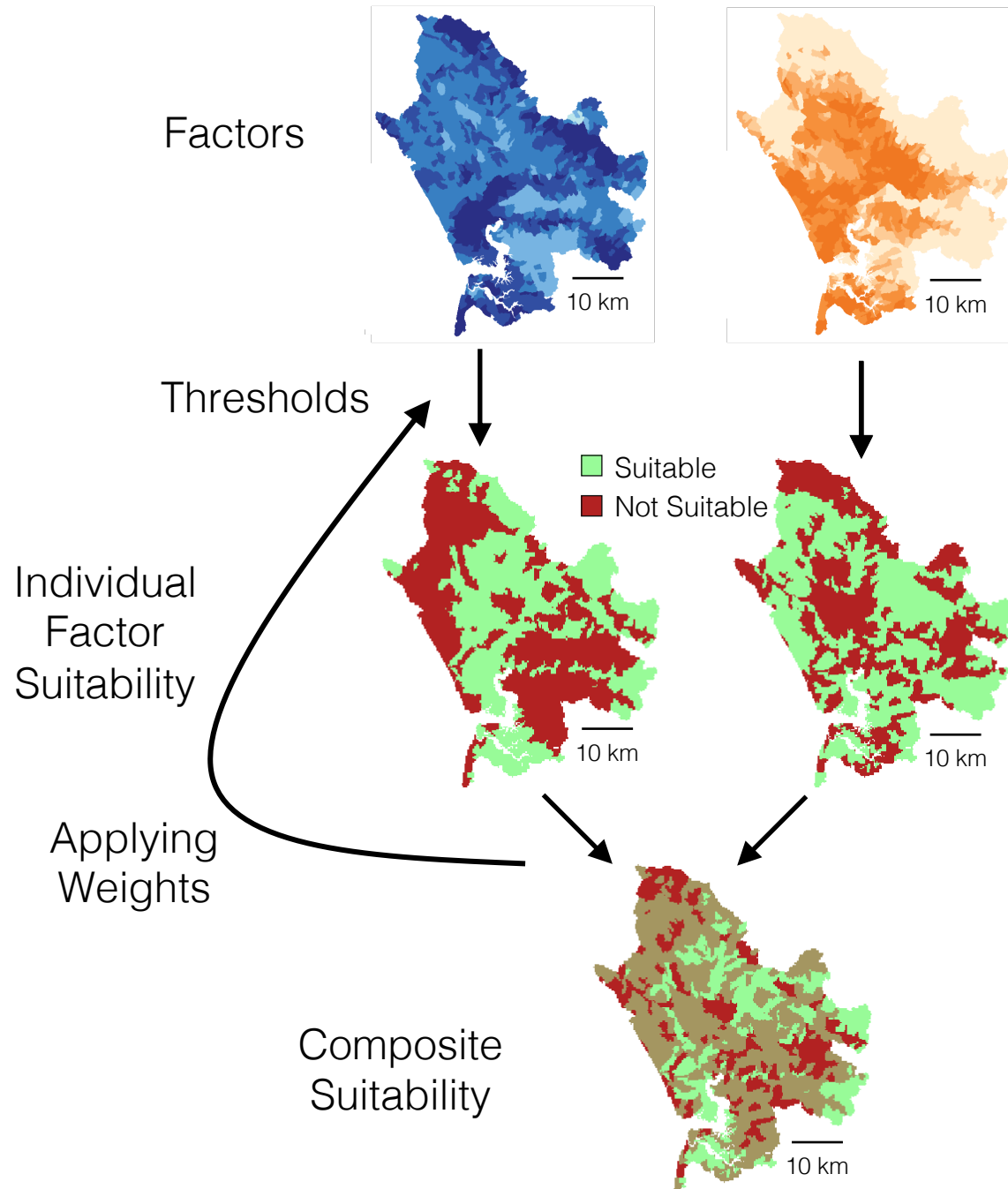
Individual  
Factor  
Suitability





# CHALLENGES

- These decision making processes are iterative and dynamic
- Their effect on final maps may not be obvious
- The decisions may be made on expert opinion or data not available to all
- Often a disconnect between how decisions are made and who is using and interpreting the mapping products



# A tool for dynamically visualizing the decision making process in creating suitability maps

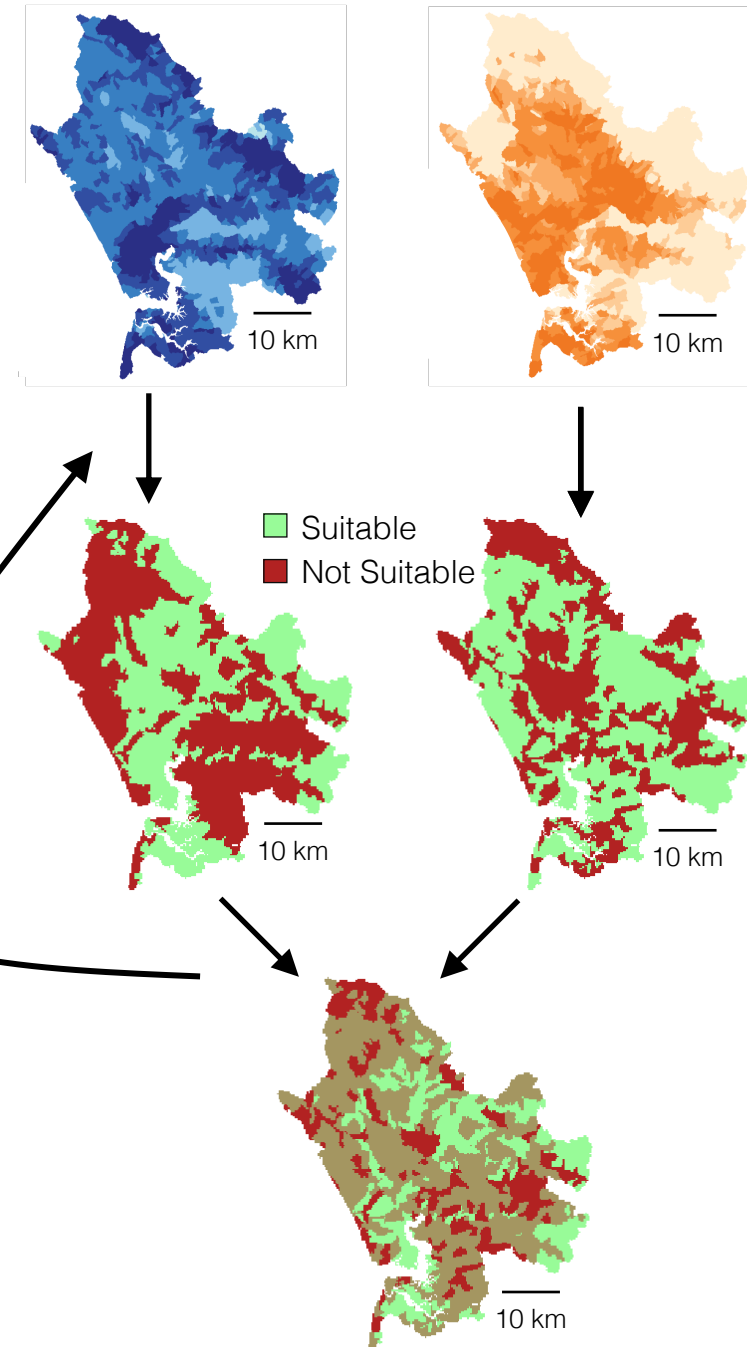
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Open source, sharable

Written in R using the Shiny web app  
development platform

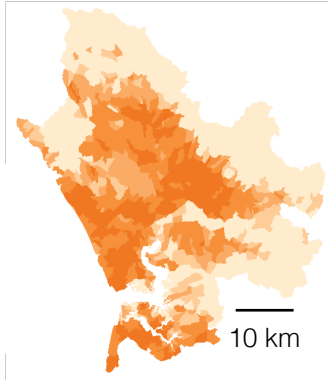
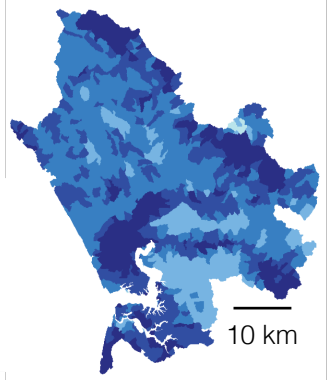
Intended as a compliment not substitute  
to other mapping software

Aimed at users with limited expertise in or  
access to more sophisticated mapping software



A tool for dynamically visualizing  
the decision making process in  
creating suitability maps

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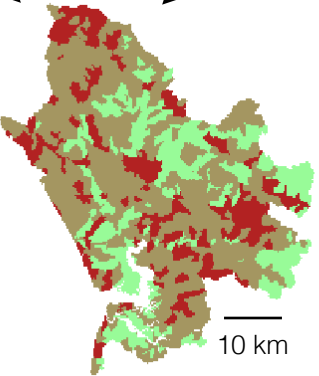
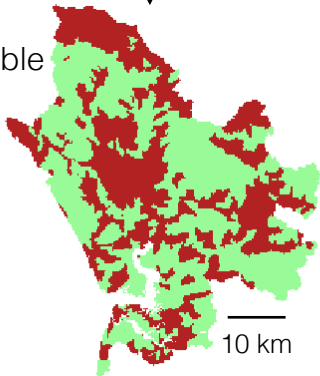
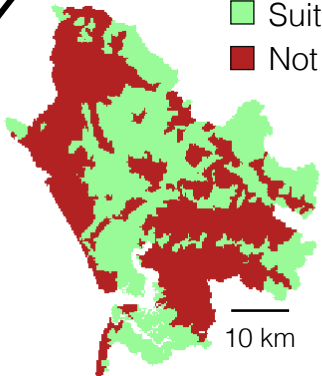
SIMPLE

INTUITIVE

INTERACTIVE

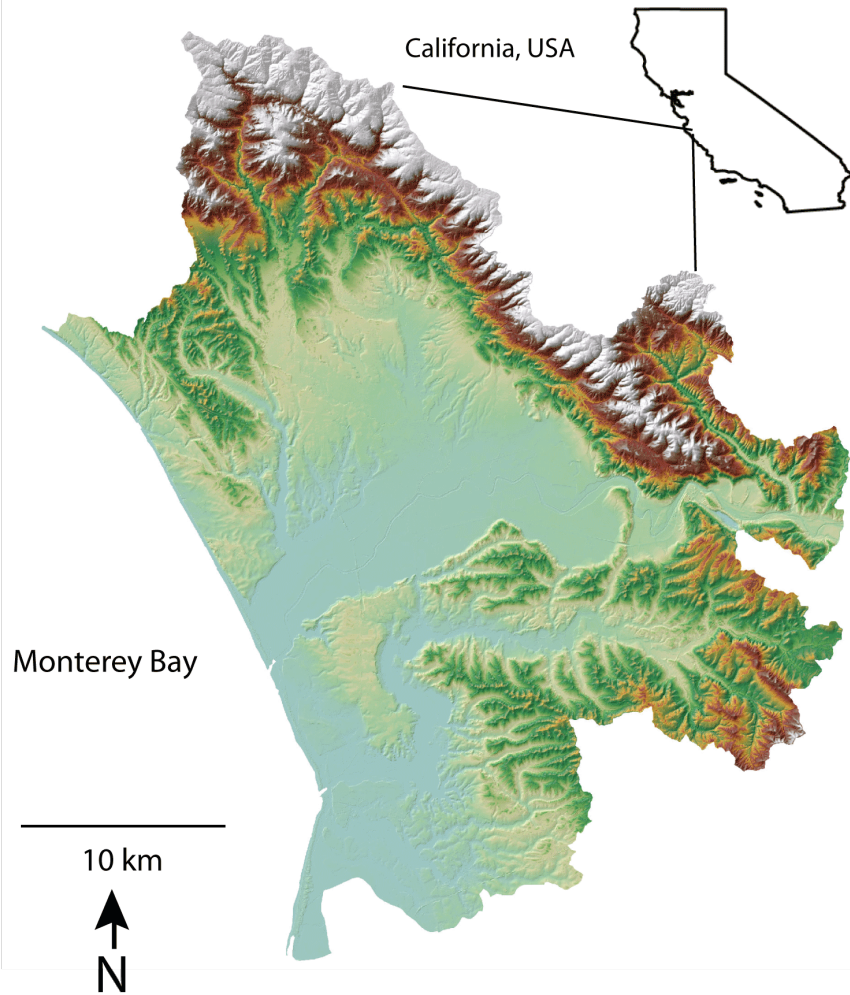
COLLABORATIVE

■ Suitable  
■ Not Suitable



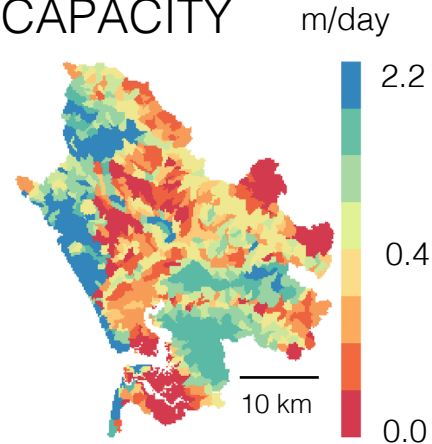


# An example from California

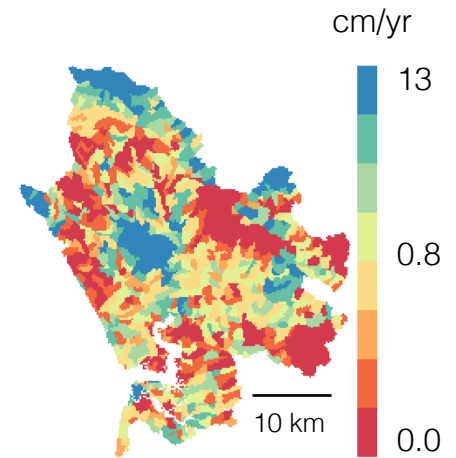


## Three Input Datasets

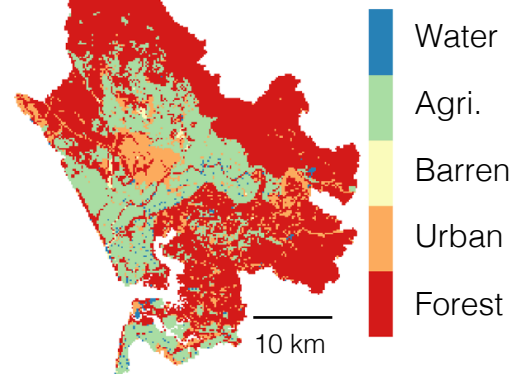
SOIL INFILTRATION  
CAPACITY



RUNOFF  
AVAILABILITY



LANDUSE



### First Factor

#### Upload GeoTiff File

Browse... 01\_Soil\_IC.tif  
Upload complete

#### Upload Raster Codes

Browse... No file selected

#### Name

Soil IC

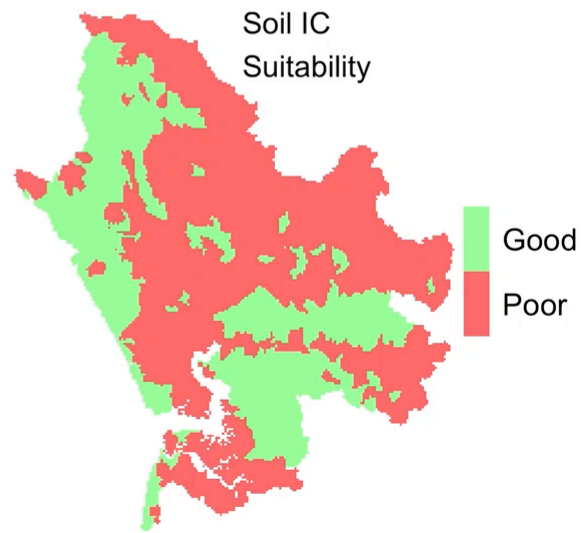
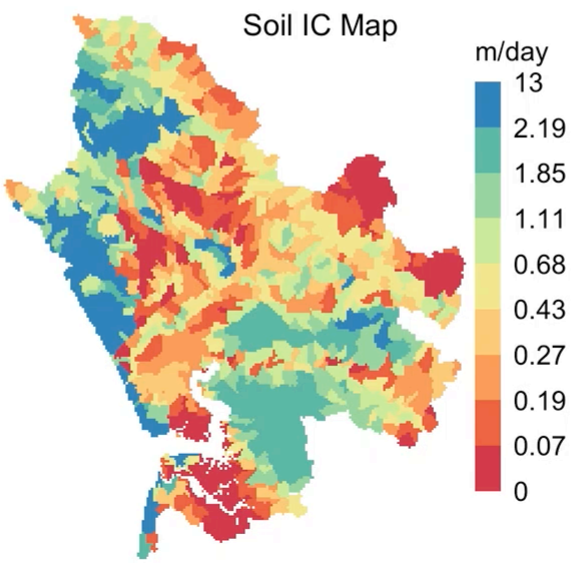
#### Units

m/day

#### Good Range m/day

0 1 13

Add New Range Classify



# A COLLABORATIVE TOOL

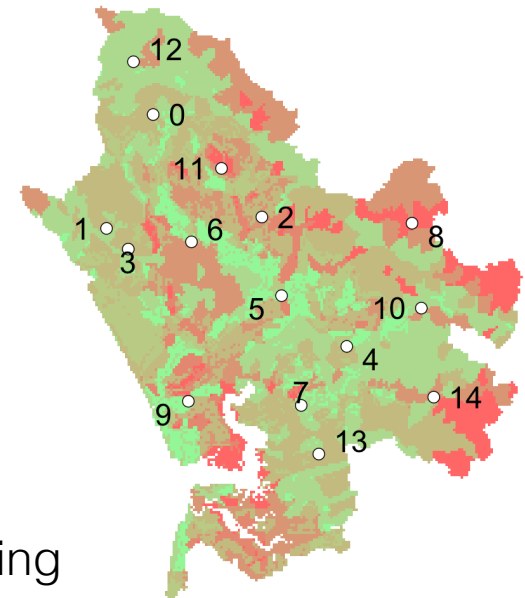
Build intuition in real time

Demonstrate the complexity of the map making process

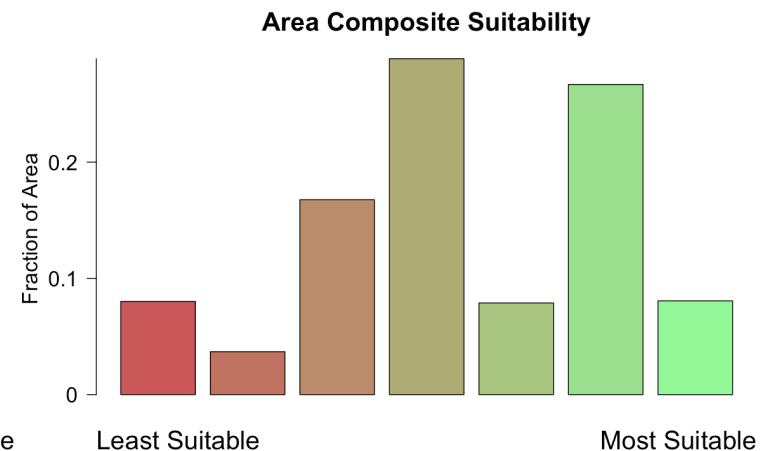
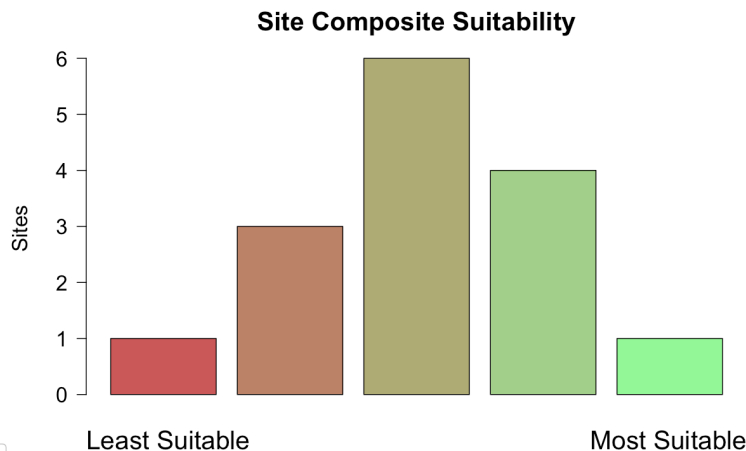
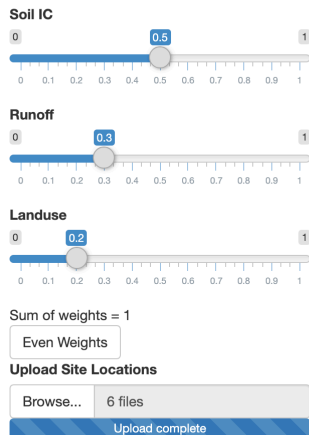
Illustrate the effect of decisions on ultimate suitability map

Serve as a means for communicating suitability mapping

Composite Suitability



## Factor Weights



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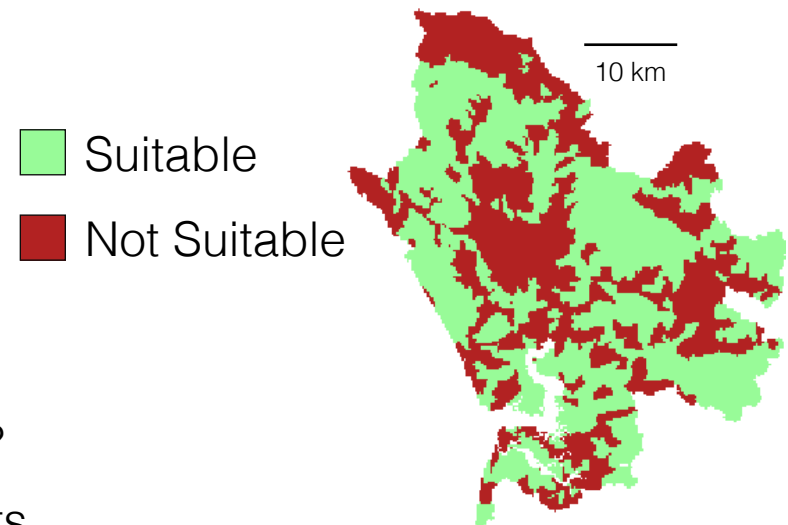
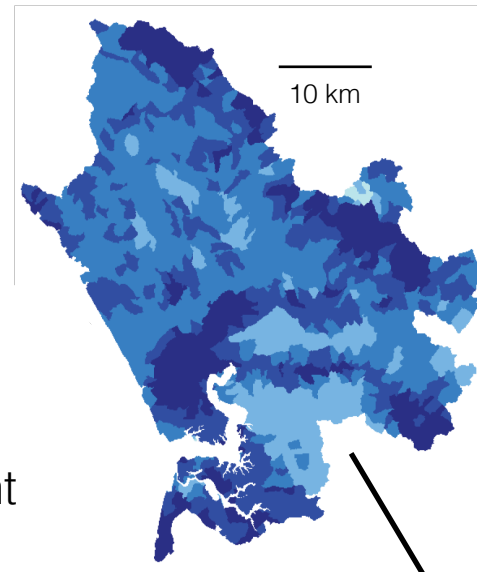
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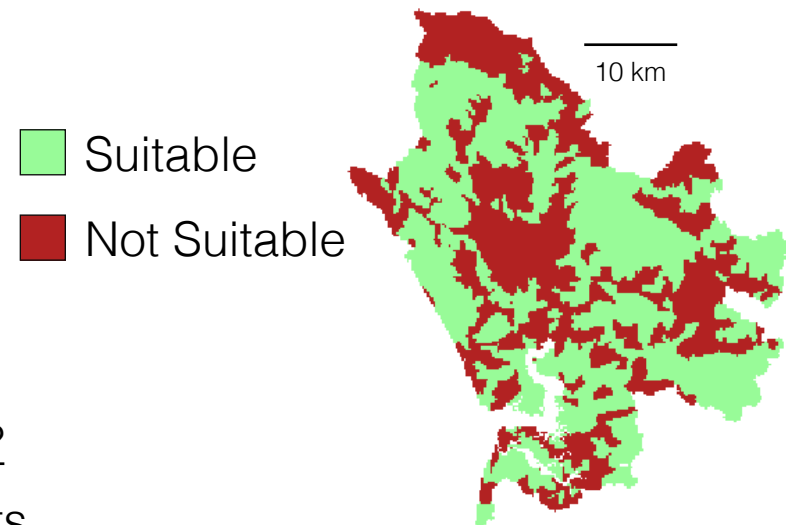
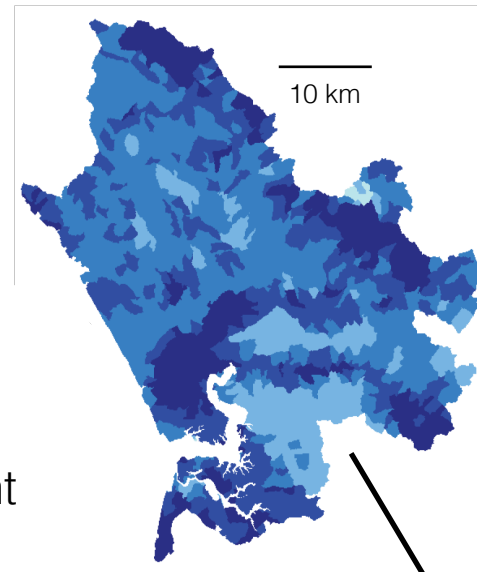
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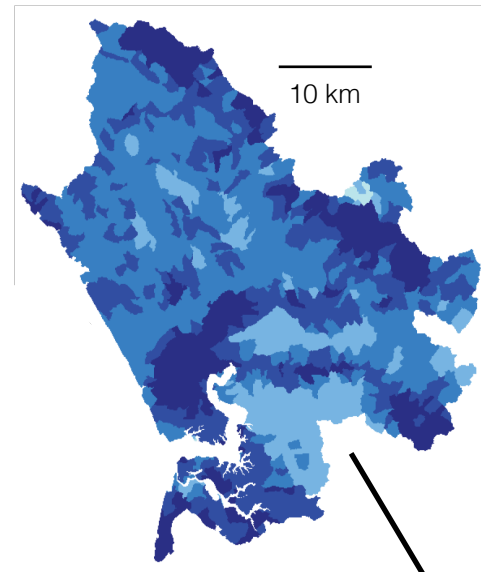


## FUTURE DIRECTIONS

Solicit input and feedback from the community

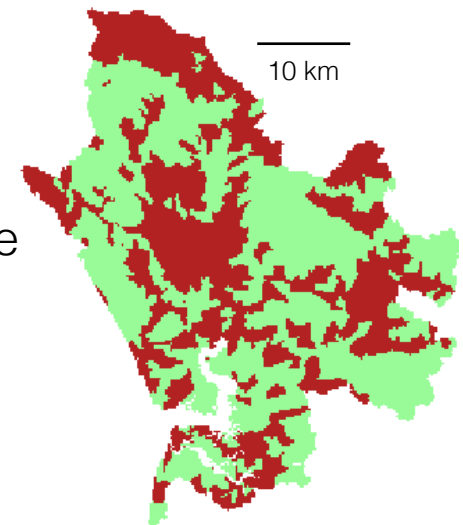
Online hosting/access

More examples from other areas and groups



 Suitable

 Not Suitable



# THANK YOU!

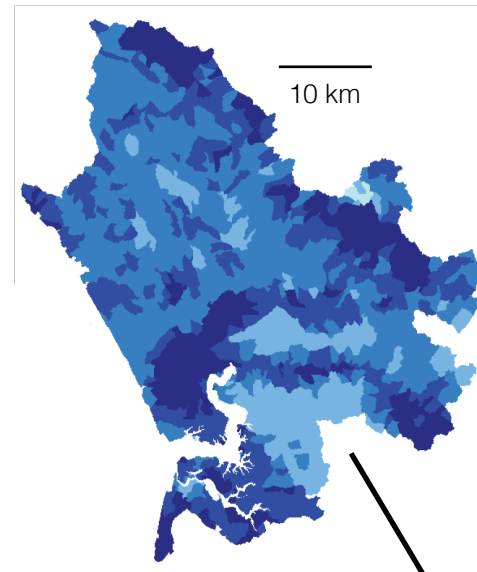
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## ACKNOWLEDGEMENTS:

Dan Goode, Gabriel Senay, Noura Hany, Elias Salameh, Shehdeh Jodeh, Mutasm Fadel, Heba Al-Hariry, Ghaida Abdallat, Ghadir Hanbali, Omar Zayed, Nour Al-Houda Itani, Muhammed Hmidat, Thair Al-Momani



■ Suitable  
■ Not Suitable

