

Tools and approaches for nonperennial streams

Raphael D. Mazor



www.sccwrp.org
raphaelm@sccwrp.org

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Main Messages

- Nonperennial streams have value
- Nonperennial streams are threatened
- We have tools to assess threats, inform management decisions

Perennial
streams

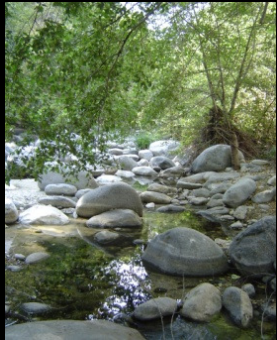
Nonperennial streams

Semi-permanent

Intermittent

Ephemeral

Arid



Wetter

Drier

A wide range of aquatic ecosystem types

Functions and services of nonperennial streams

Much the same as perennial:

- Convey water and sediment
- Support aquatic and terrestrial life
- Process nutrients
- Replenish groundwater
- Recreation




Why are they particularly important?

- Unique biological communities, special-status wildlife
- Ubiquitous, extensive
- A critical part of every watershed
- Where the action is: Represents the greatest interaction between land and water

Accelerated nutrient processing / Groundwater interactions





Aquatic life:
Biologically distinct

Arizona snowfly

Mesocapnia arizonensis

Most are a subset of species we find at perennial streams
A few specialists prefer nonperennial streams

Adaptation to dry summers



Dobsonfly (*Neohermes sp.*) aestivation chamber

Support for endangered species



Arroyo toad (*Anaxyrus californicus*)

Functions of the dry phase



Algae deposits: remove nutrients

Refugia from invasive species



Migration corridors



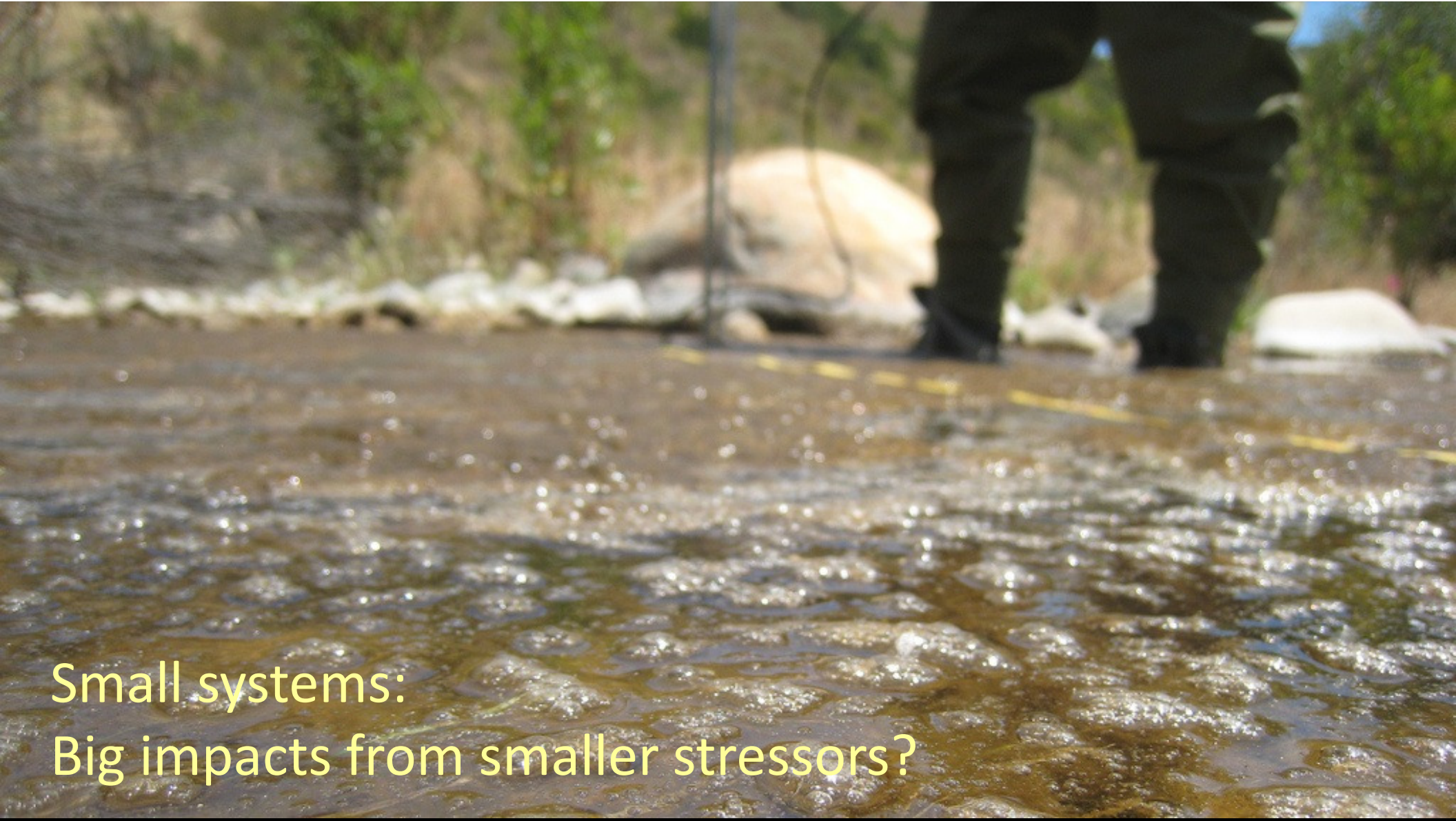
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Threats to nonperennial streams

- Grazing
- Wildfire
- Urbanization
- Invasive species
- *Water extraction
- Nutrient enrichment
- *Runoff / perennialization
- Rural development (septic influence)
- Recreation (hikers, equestrian, ORV)





Small systems:
Big impacts from smaller stressors?

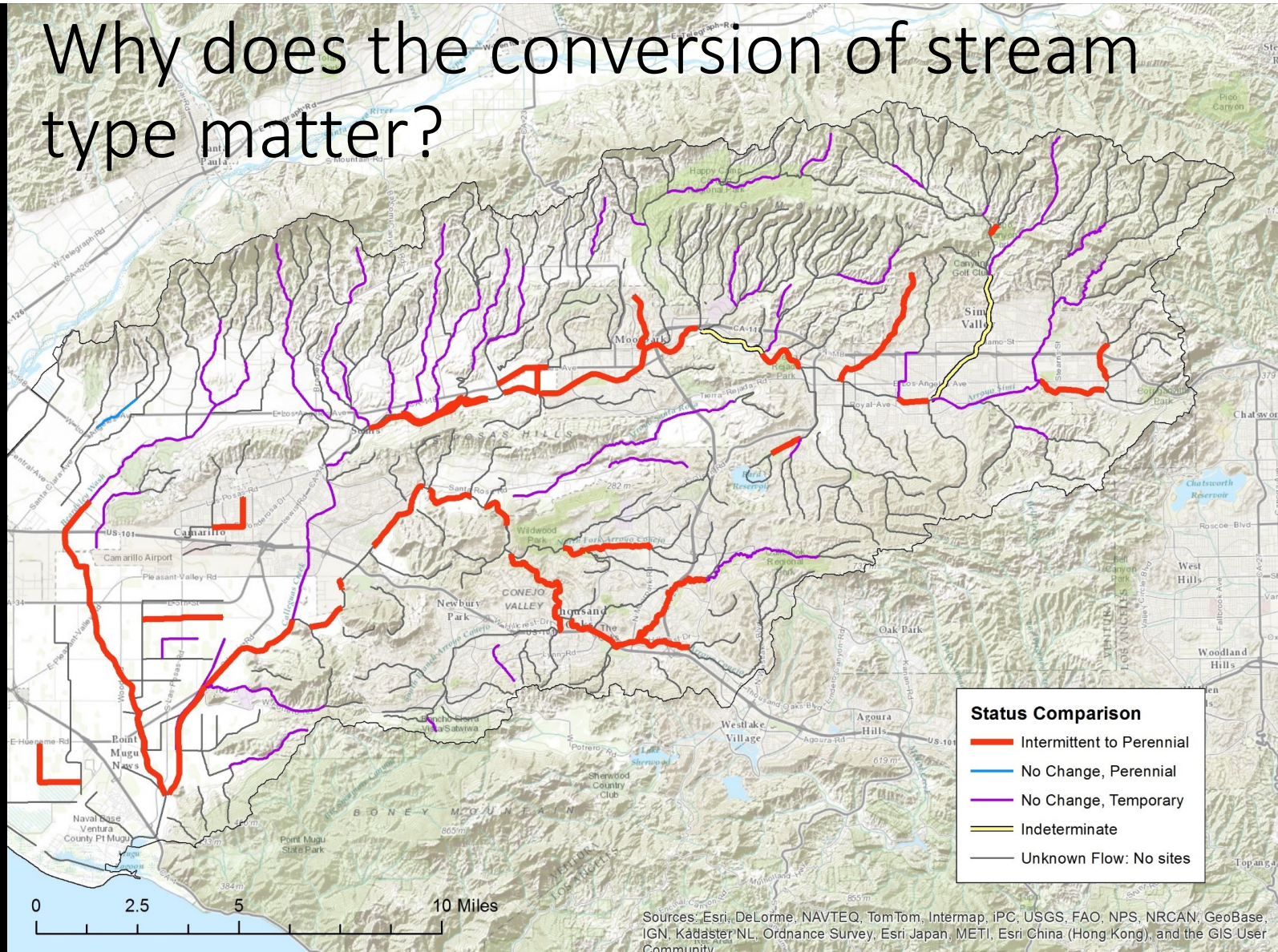
Perennialization



Jeronimo Creek, Mission Viejo



Why does the conversion of stream type matter?



What tools do we have to assess nonperennial streams?

Tools to characterize hydrology

- Models predict stream flows

Tools to characterize geography

- Maps apply models to predict location

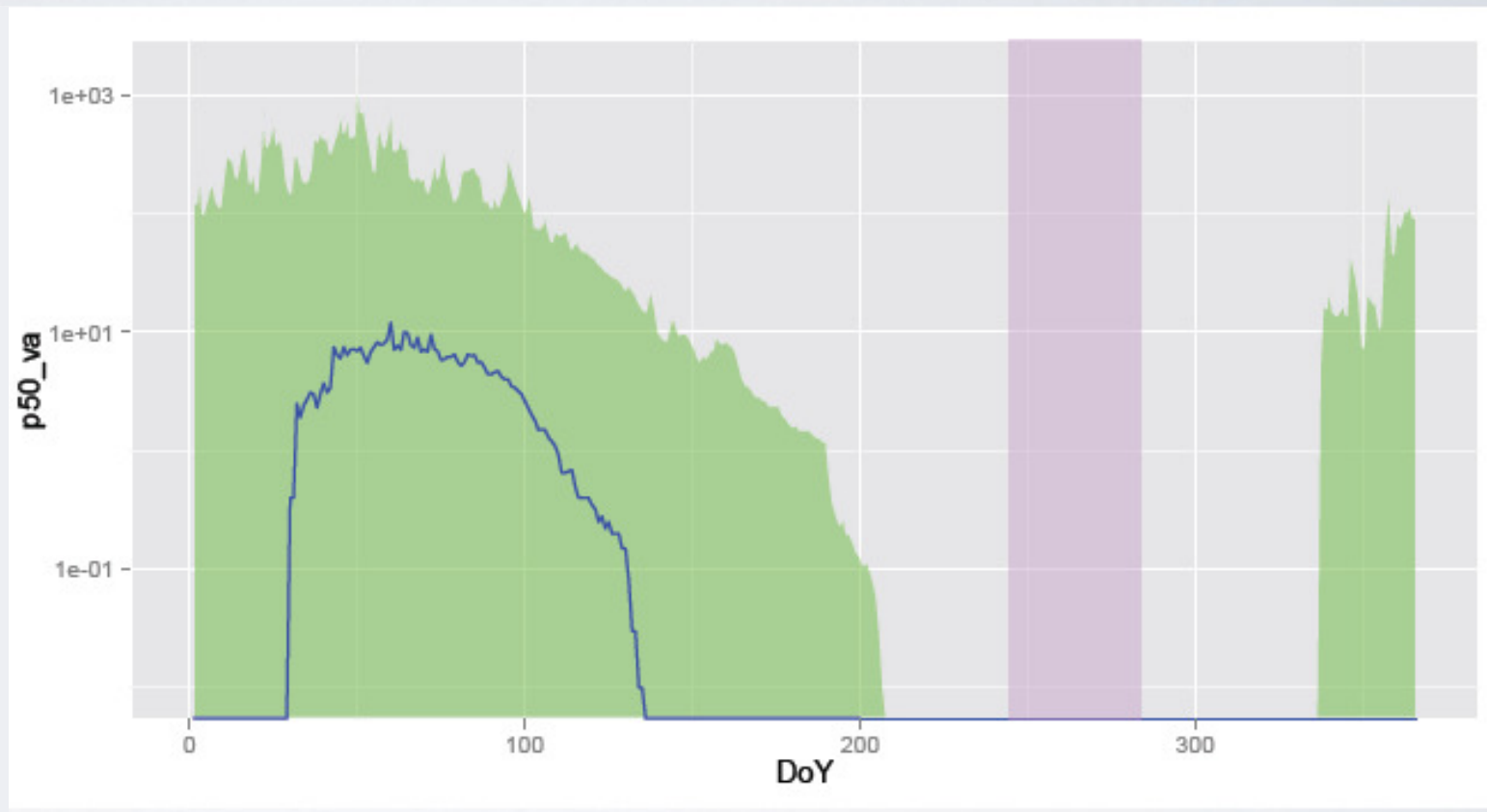
Tools to characterize biology

- Assessment indices evaluate biological condition

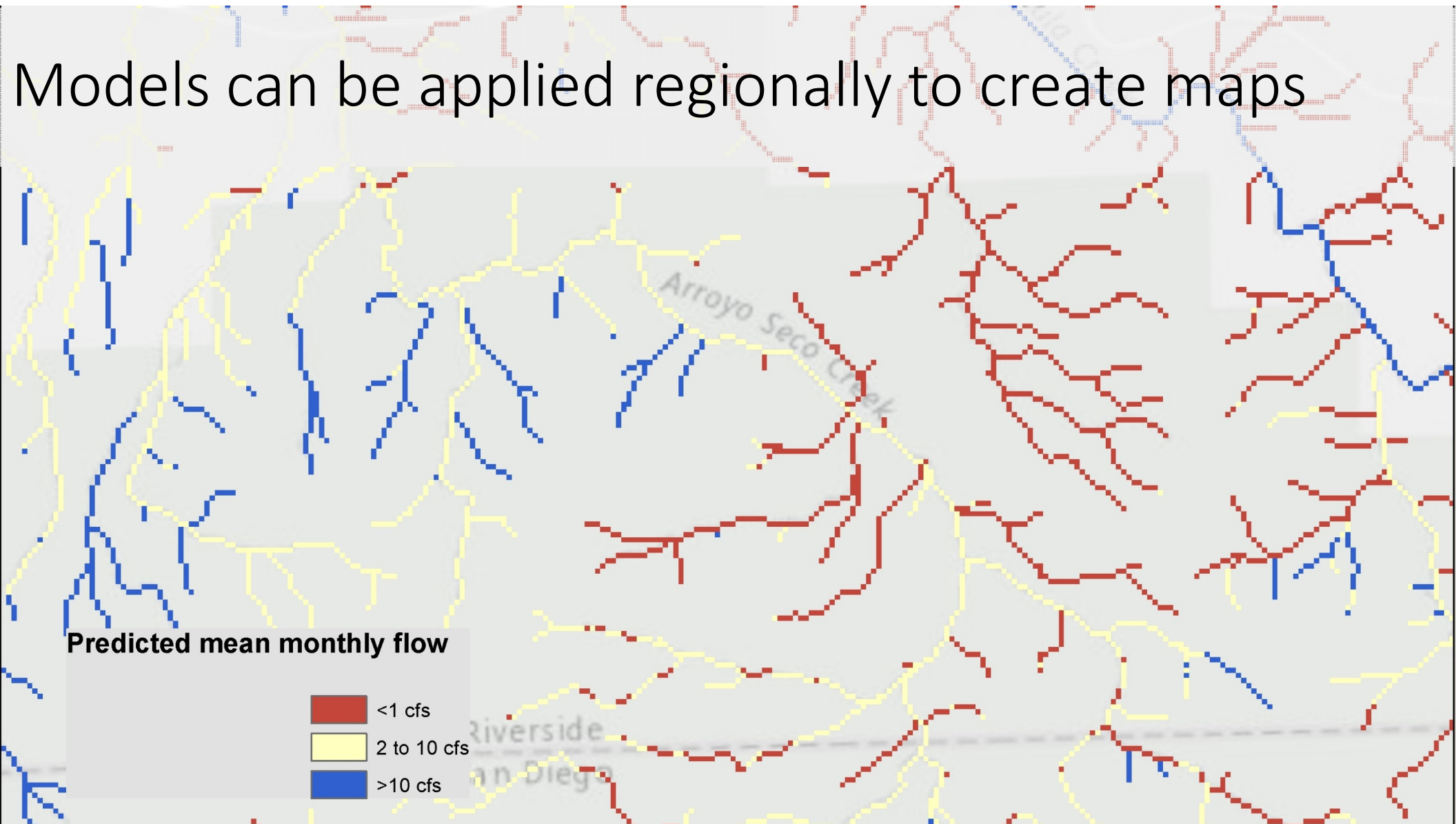
Models can predict probability of drying from environmental factors

Model flow as a function of:

- Catchment area
- Precipitation
- Temperature
- Geology
- Soil type
- Slope
- Aspect
- Etc.



Models can be applied regionally to create maps

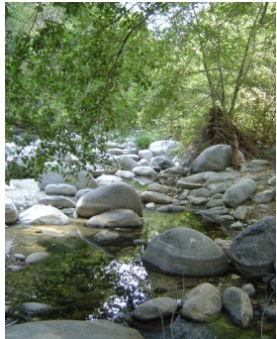


Assessment tools: Different indicators for different stream types

Wetter



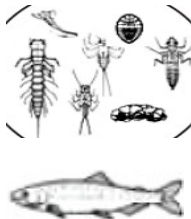
Drier



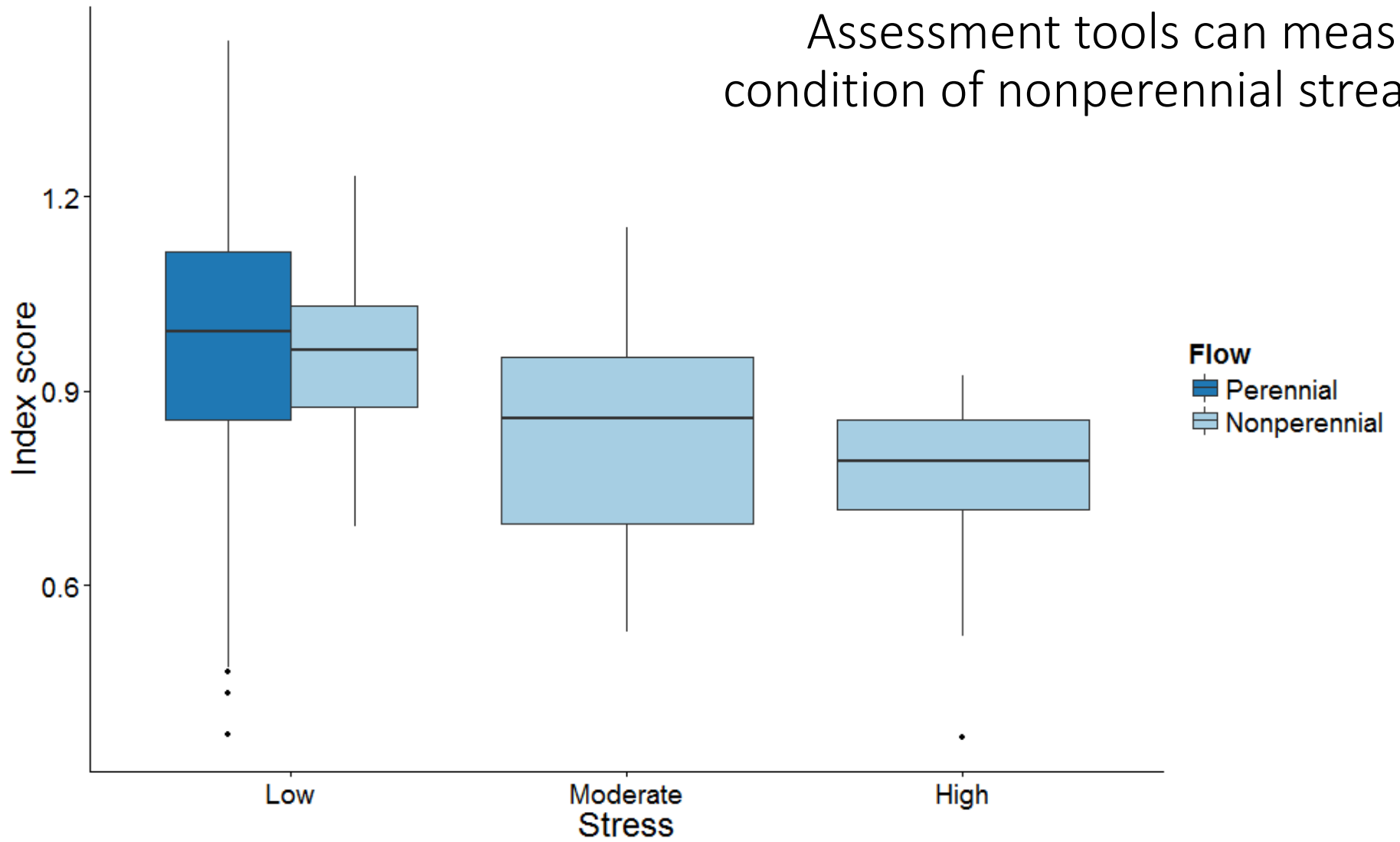
Flows 12 months per year

6 months per year

<1 day /year



Assessment tools can measure condition of nonperennial streams



Relevance to a wetlands policy

We have tools we can use right now

- We can estimate natural hydrologic regime
- We can characterize and locate nonperennial streams in a region
- We can measure biological condition

Challenge is to set the right goals for nonperennial streams

Which Reference Site is the Right Target?



Questions?



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raphaelm@sccwrp.org

