Regional Stream Monitoring:

The Extent of Chemical, Toxicological, and Biological Impacts in Southern California

South Fork Santa Ana River

Regionalized Watershed Monitoring Makes Sense

- Place your site(s) in context
- Regional reference condition
- Help to develop regional assessment tools
- Improves your agency's capabilities
- Cost effective

Stormwater Monitoring Coalition (www.socalsmc.org)

Regulated agencies:

- Ventura Co WPD
- Los Angeles Co FCD
- Orange Co PWD
- Riverside County FCD
- San Bernardino Co FCD
- San Diego Co DEH
- Long Beach City PWD
- Los Angeles City WPD
- CA Dept Transportation

Regulatory agencies:

- State Water Resources Control Board
- Regional Water Quality Control Boards
  - Los Angeles
  - Santa Ana
  - San Diego
- US Environmental Protection Agency

Our Three Questions

1. What is the condition of streams in our region?

2. What are the stressors that affect stream condition?

3. Are conditions getting better or worse?

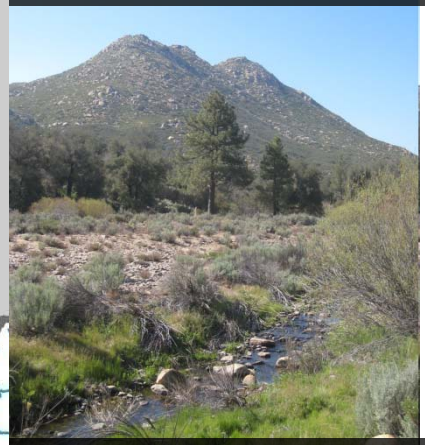
Probability Based Study Design

- Random “poll” of the environment
  - Stratified by watershed and land use
- Roughly 90 sites/yr
  - Approximately 4,500 km of stream miles
- Multiple indicators of condition
  - Chemistry, invertebrates, algae, toxicity, riparian & physical habitat

Agricultural

San Pasqual Valley

Open



Pine Valley Creek

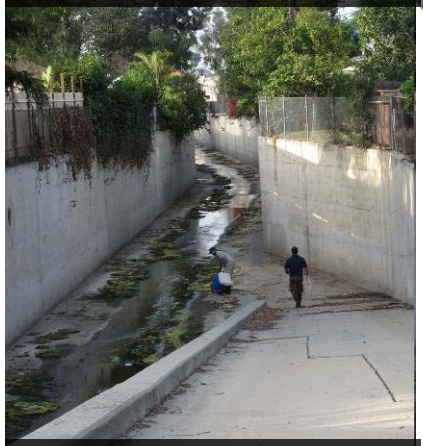
SMC Sample Draw 2009

Land use

- Agricultural (24)
- Open (37)
- Urban (29)

0 10 20 40 60 80 100 Kilometers

Urban



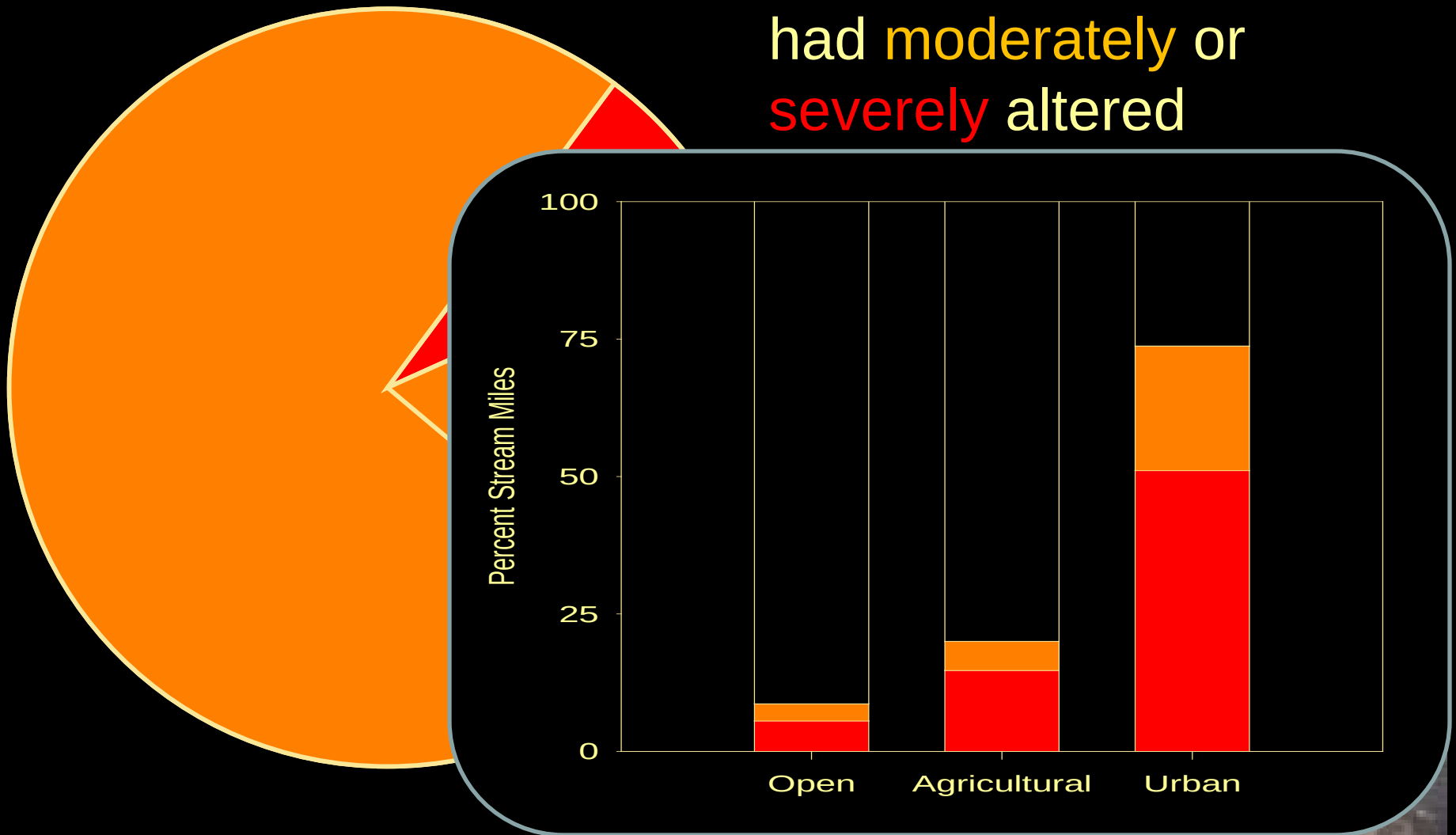
Fullerton Creek

What Did You Expect?

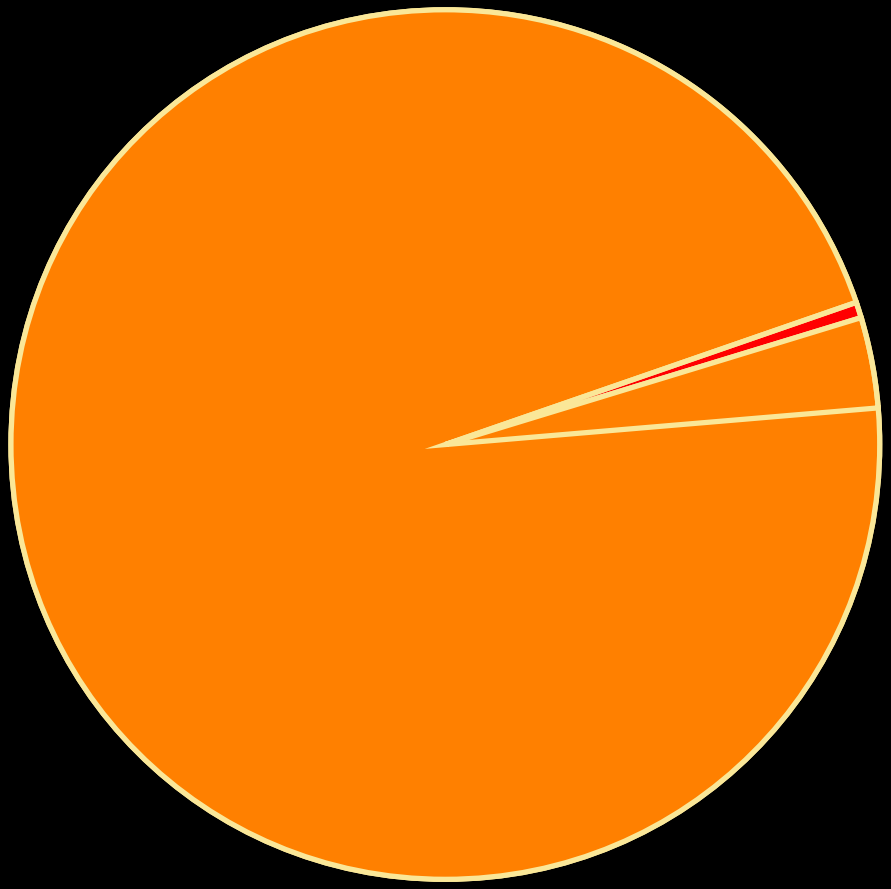
- Some results you could have guessed
  - Physical habitat in urban areas is extensively modified
- Some results surprised us
  - Extent of chemical impacts was minor
- Some results we had no idea
  - Biological condition

EXTENT OF CHANNEL ALTERATION

32% of stream miles had moderately or severely altered



EXTENT OF WATER CHEMISTRY IMPACTS
Total Copper

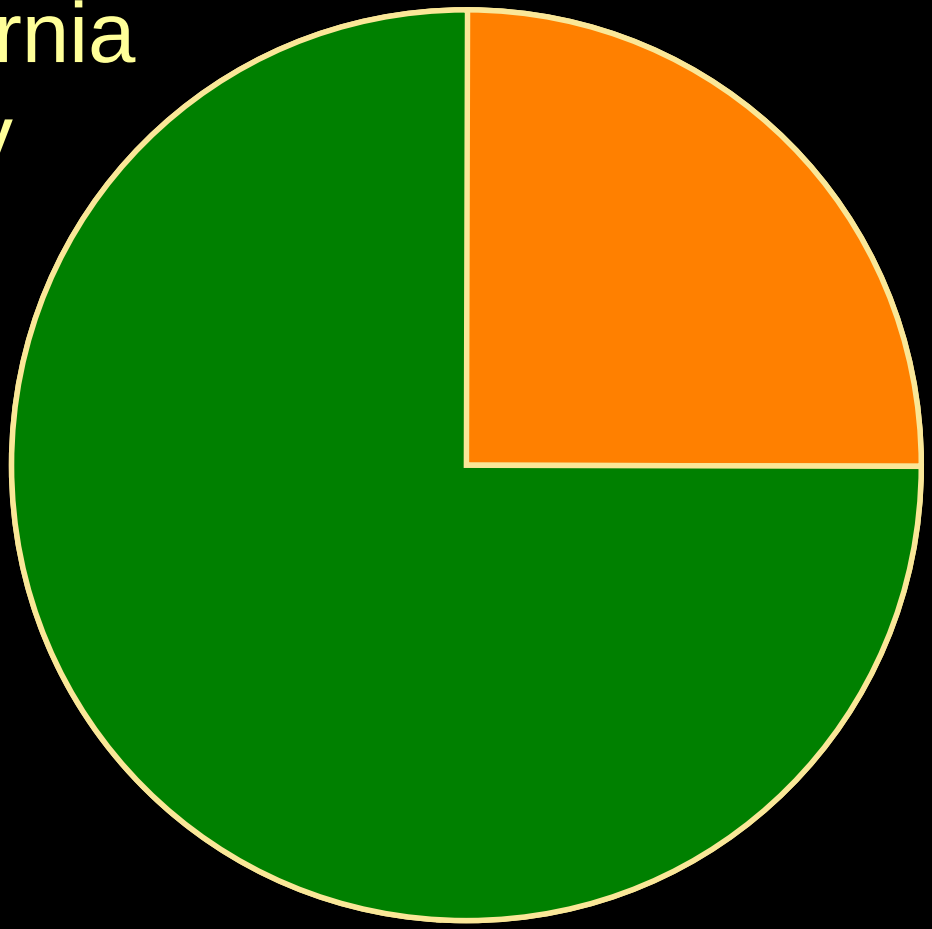


4% of stream miles exceed chronic (9 ug/L) or acute (13 ug/L) water quality criteria

*assume hardness of 100 mg/L

EXTENT OF BIOLOGICAL IMPACT

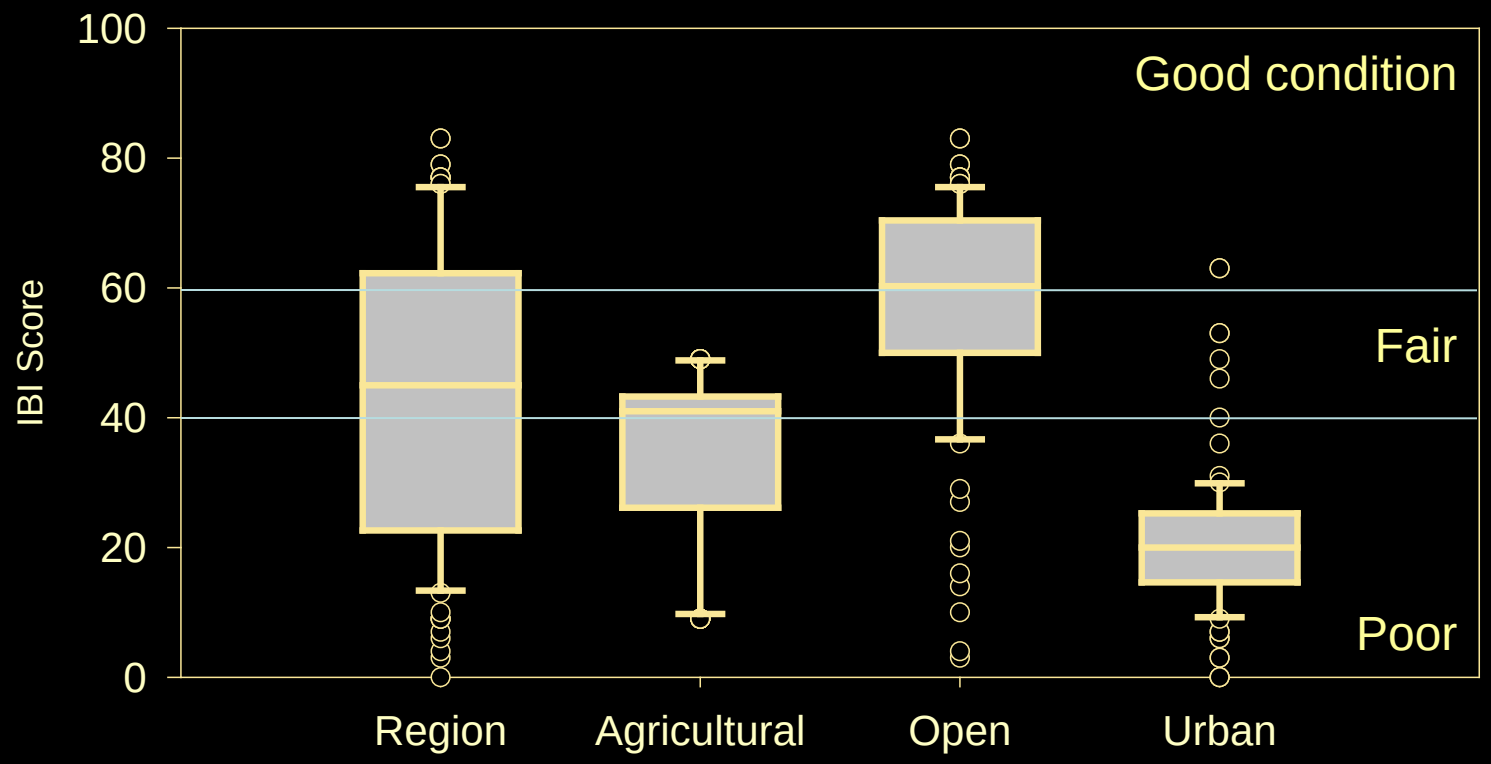
% stream-miles categorized by the Southern California Index of Biotic Integrity



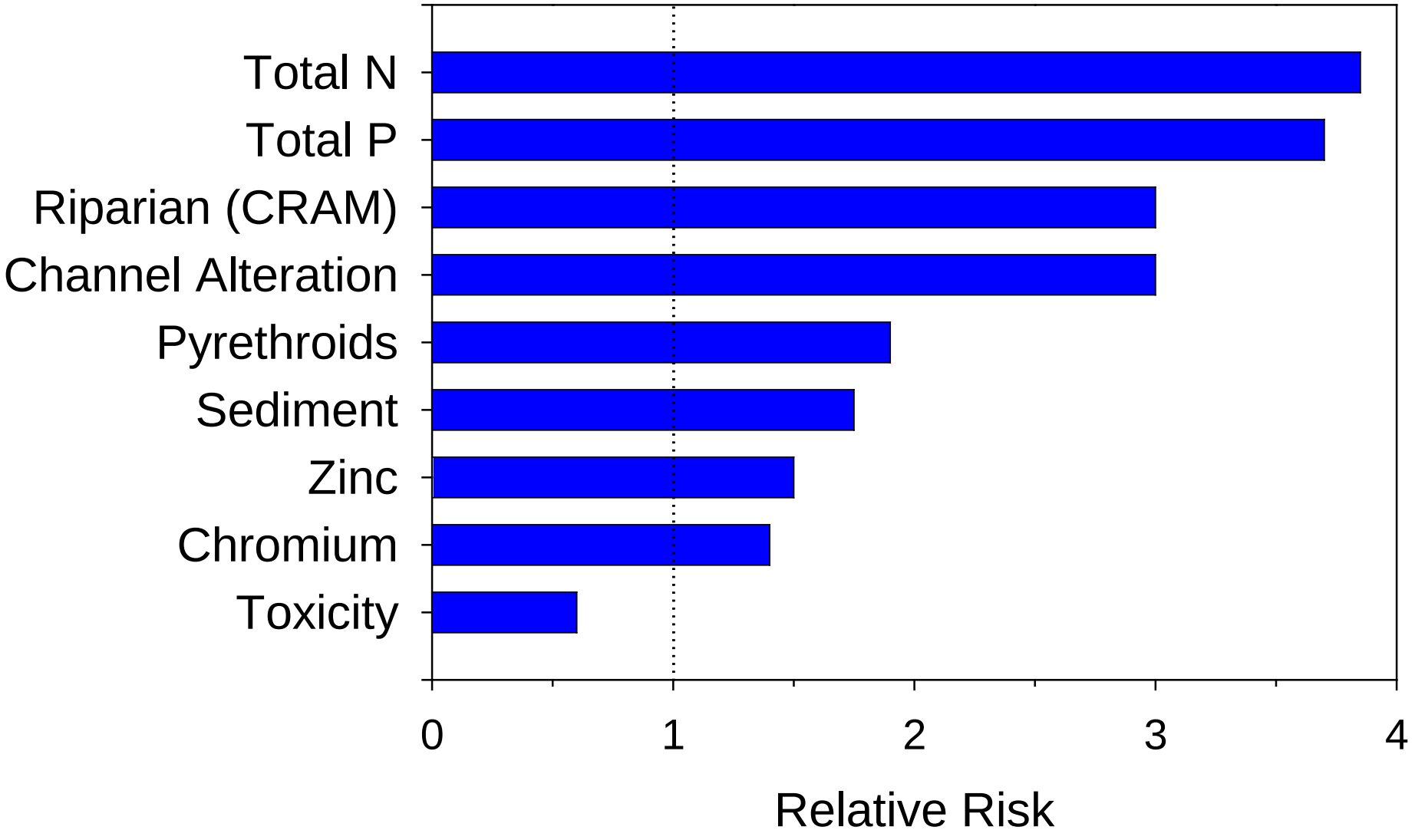
IBI Scored from 0 to 100

- Good: 60-100
- Fair: 40-60
- Poor: 0-40

Biological Integrity By Land Use



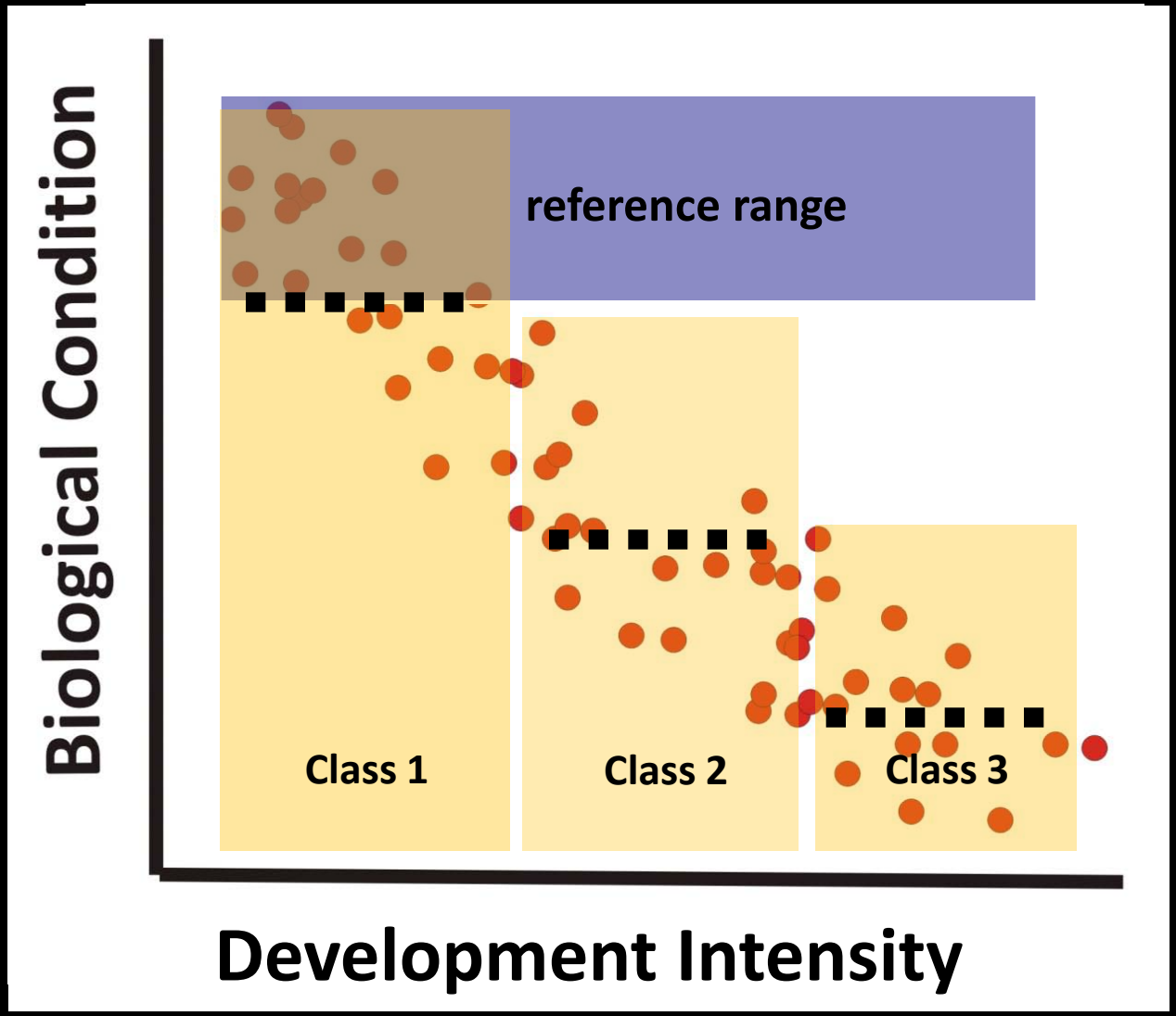
Biological Stressor Ranking



Don’t Underestimate the Impact of Biology

- California is developing biocriteria
  - NPDES compliance, 303(d) listing
- Over one-third of the statewide database will be from southern California
  - Multiple indicators at each site
- State has agreed to use a tiered approach
  - Not all waterbodies look like mountain streams

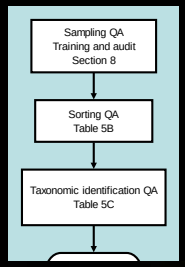
Using the Stressor Response Model for Tiered Biocriteria



Devil's Canyon, San Gabriel River

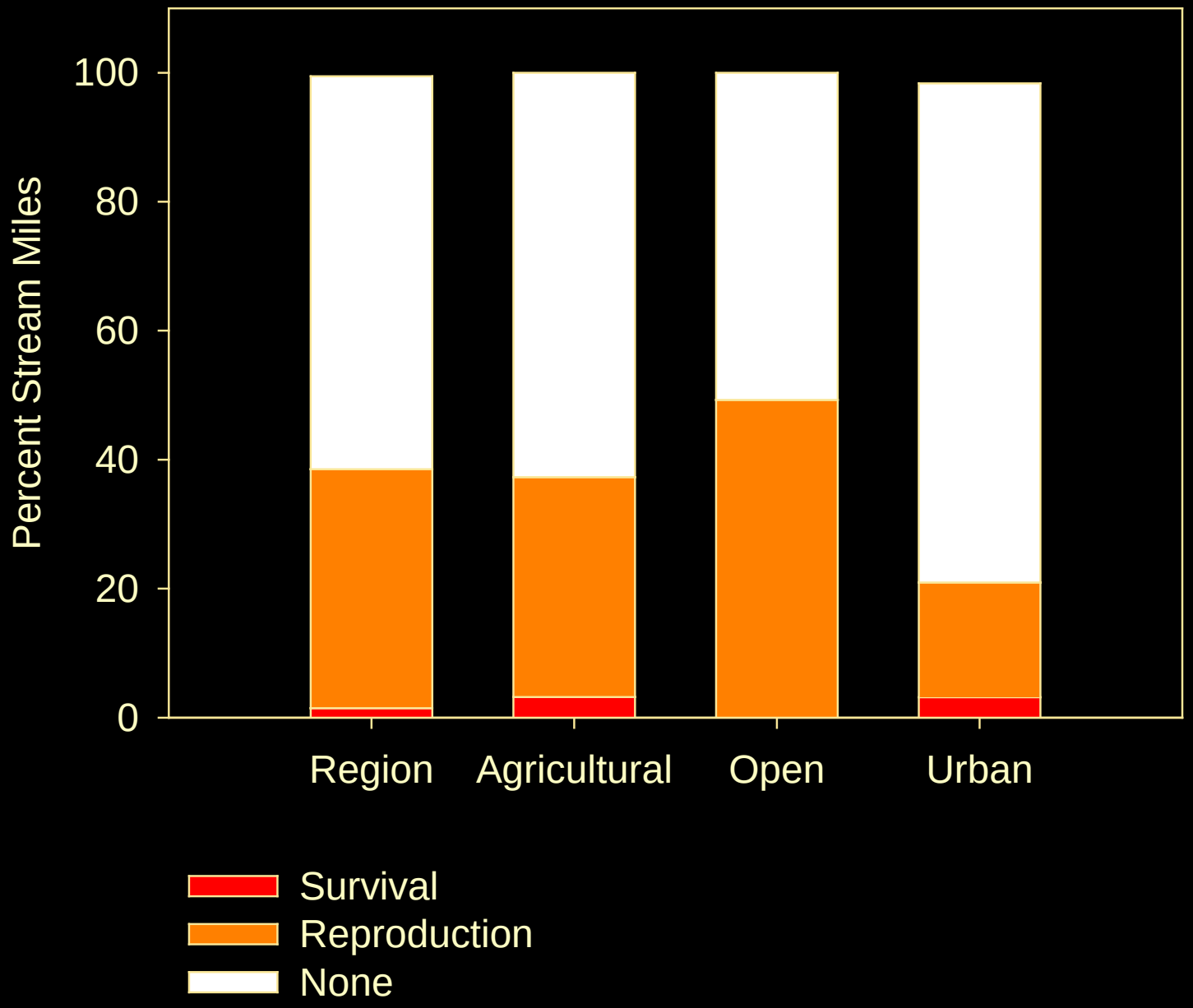
The “Intangible” Benefits

- Training and auditing of field crews
- Developed QA protocols
  - model for all bioassessment in CA (and NV)

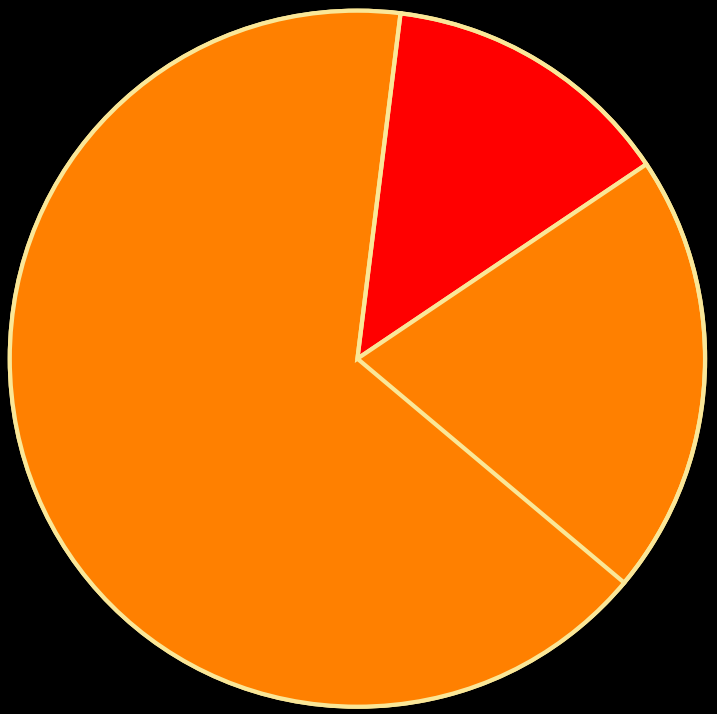


- Mapping of local resources
- Data sharing protocols
- Framework for research partnerships

Water column toxicity



STREAM CONDITION
Macroalgae Cover



34% of stream miles had moderate (30-50%) or heavy (50-100%) algae cover

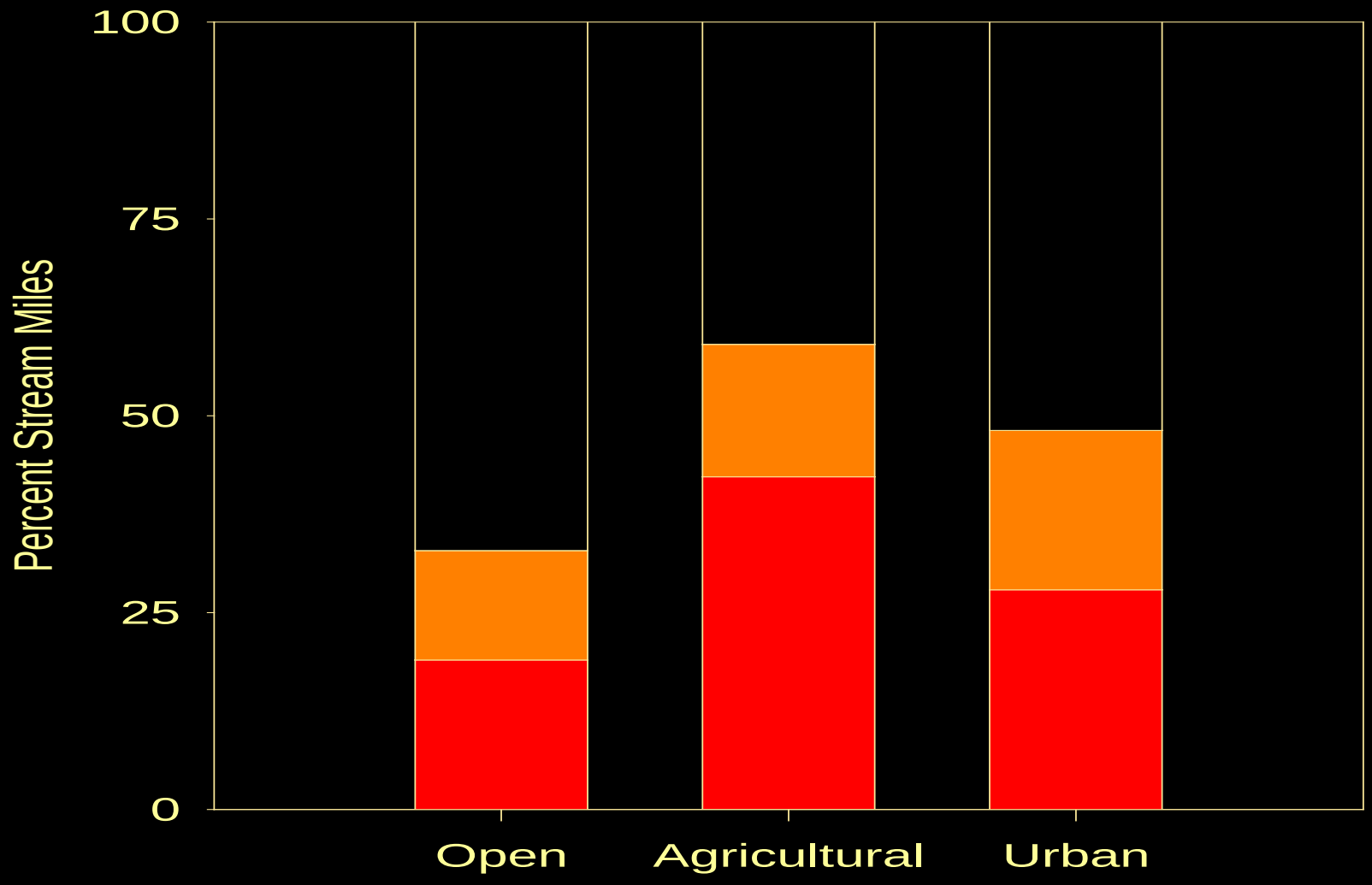
15% cover

Mill Creek

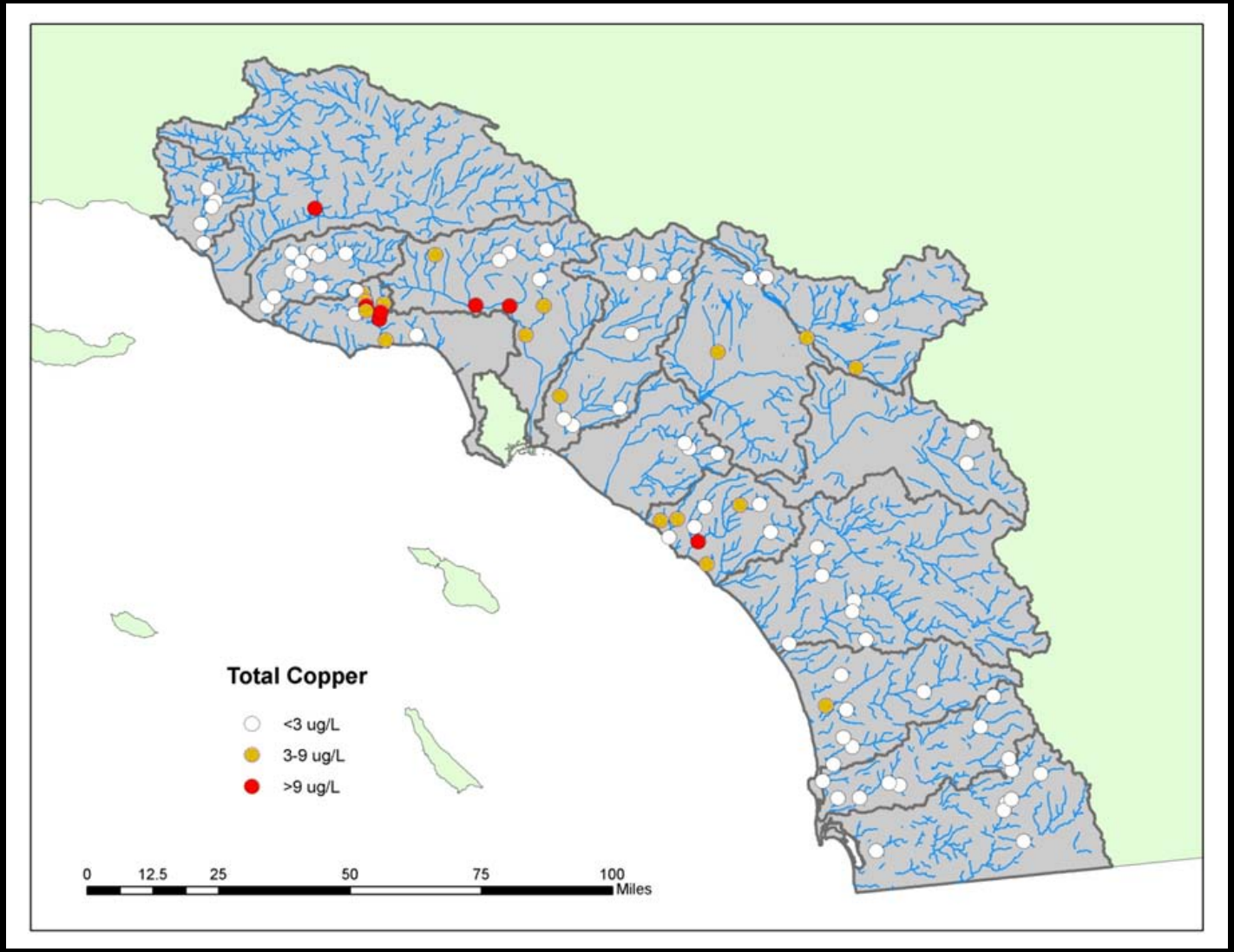
50% cover

Ventura River

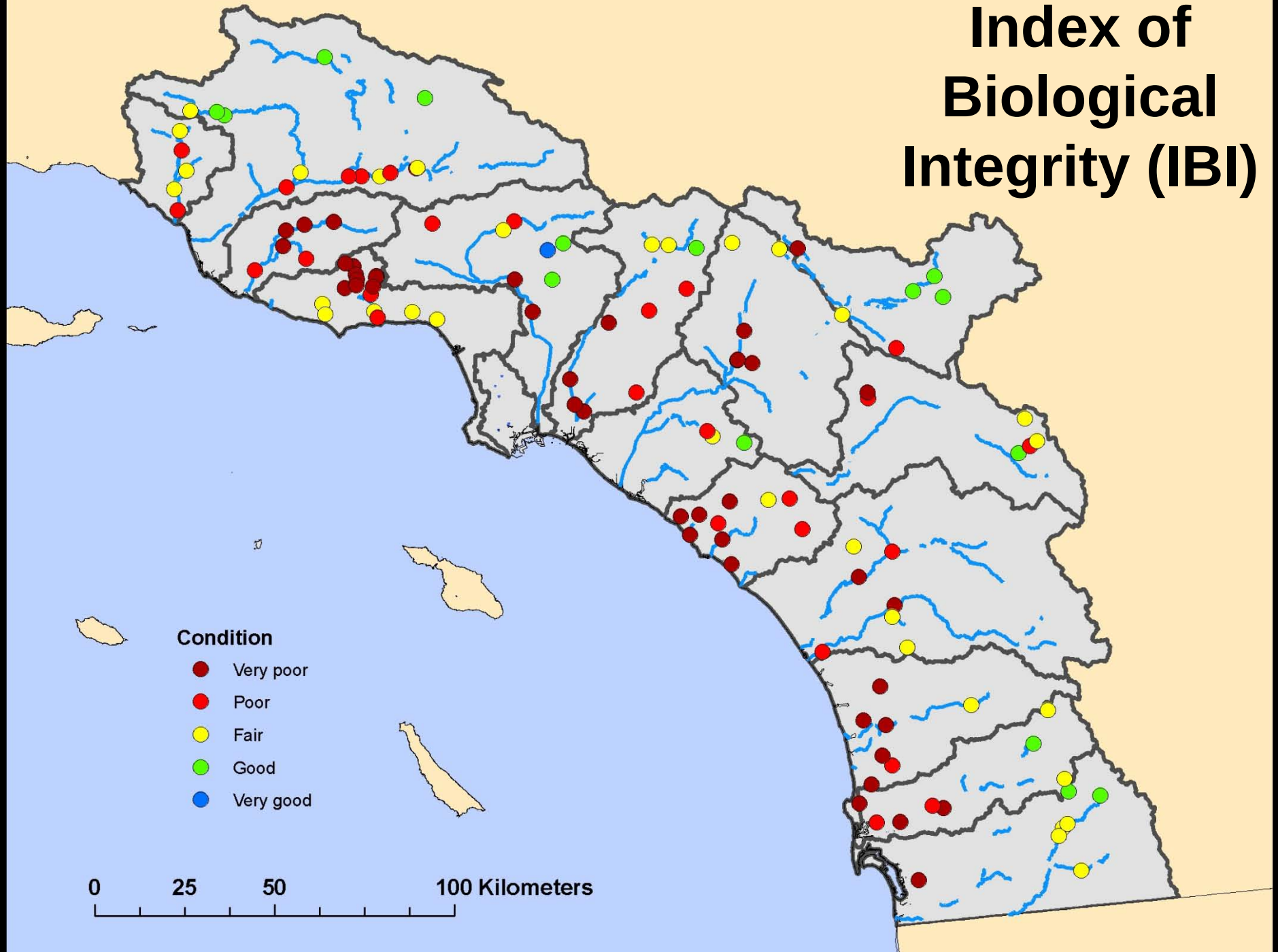
Macroalgae Cover



STREAM CONDITION
Total Copper



Index of Biological Integrity (IBI)



Its Difficult To Connect Monitoring Programs

- Incompatible designs
- Measure different indicators
- Use different methods
- Rely on different QA requirements
- Sharing data is a headache