Developing a Screening Causal Assessment Framework for California's Waters

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OC Public Works

SCCWRP Established 1969

Today's Talk

I. What is causal assessment

II. Selecting comparator sites

III. Screening causal assessment tools

IV. Potential applications of causal assessment tools

V. Next Steps

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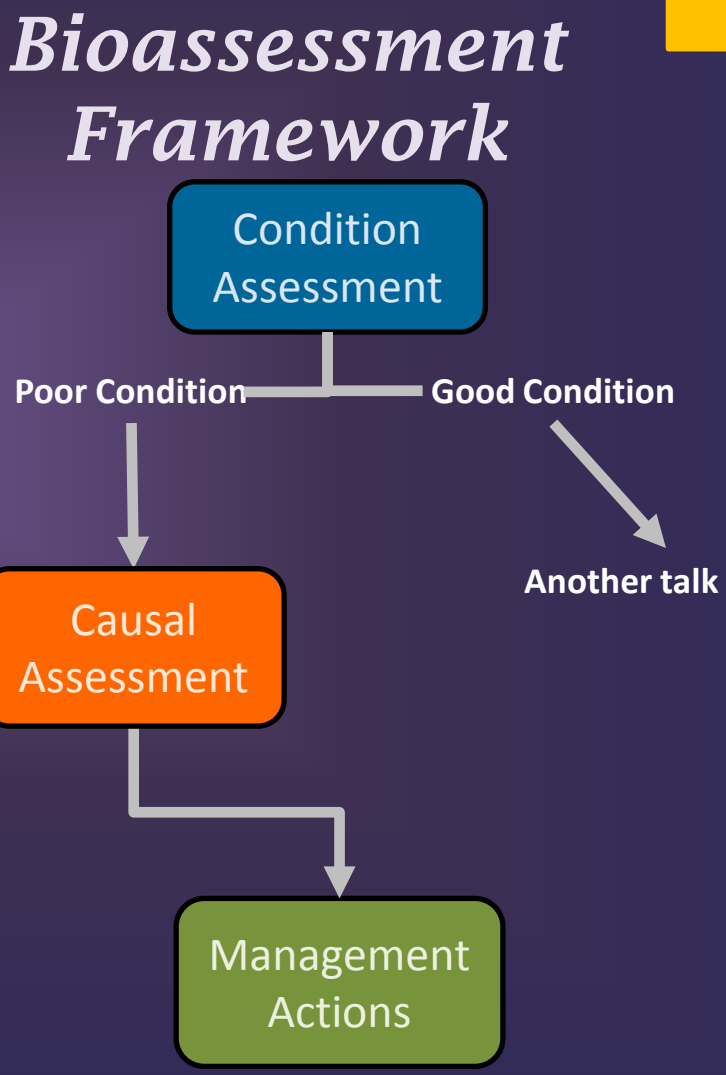
Causal Assessment

What is it?

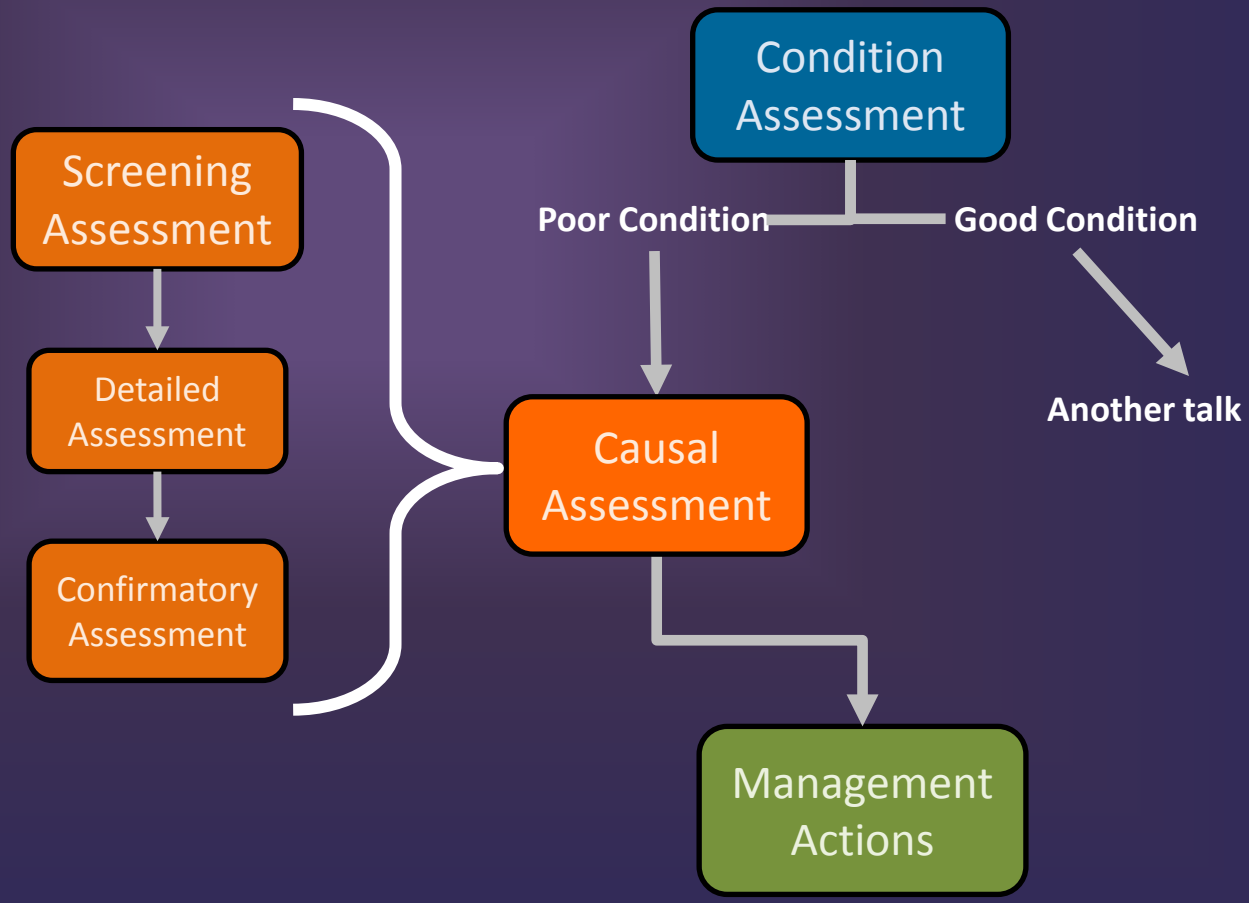
- Identifying the cause(s) behind impaired biota
- Provides a link between condition & management actions
  - Multiple tiers and approaches to assessment



Causal Assessment

What is it?

Bioassessment Framework



Causal Assessment
What is it?

- We are building off of EPA's CADDIS framework (epa.gov/caddis)
- Key is to compare and contrast biota and stressors at test site to other field observations
  - Comparator sites
- The goal is to narrow a list of potential stressors to the most likely causes

Causal Assessment
Challenges

- Selection of comparator sites
  - What makes good comparators?
- Use comparator data to identify likely and unlikely stressors
  - How to do this quickly, consistently, and at large numbers of sites?
- Communication of results to stakeholders
  - How to easily communicate complex results?

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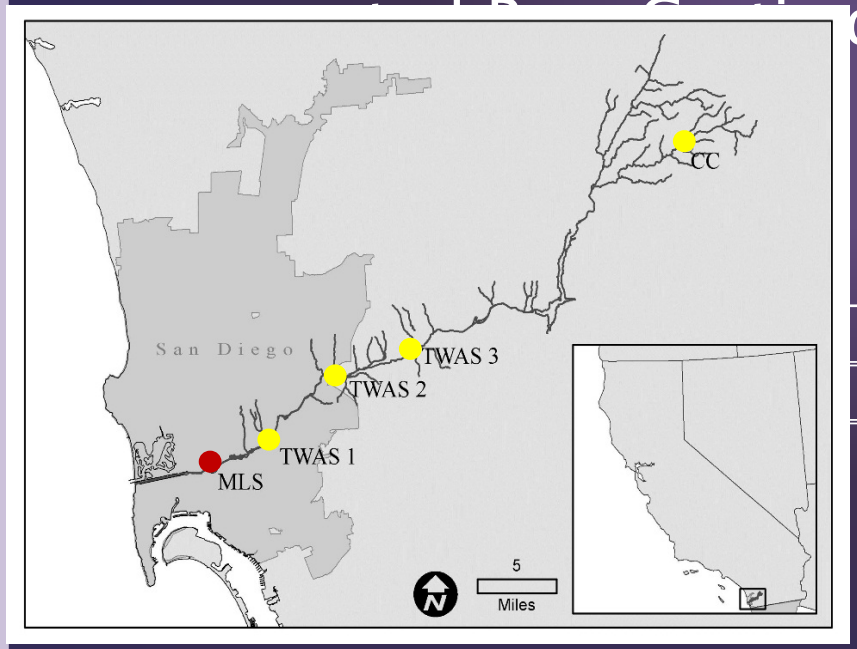
Good Comparator Criteria

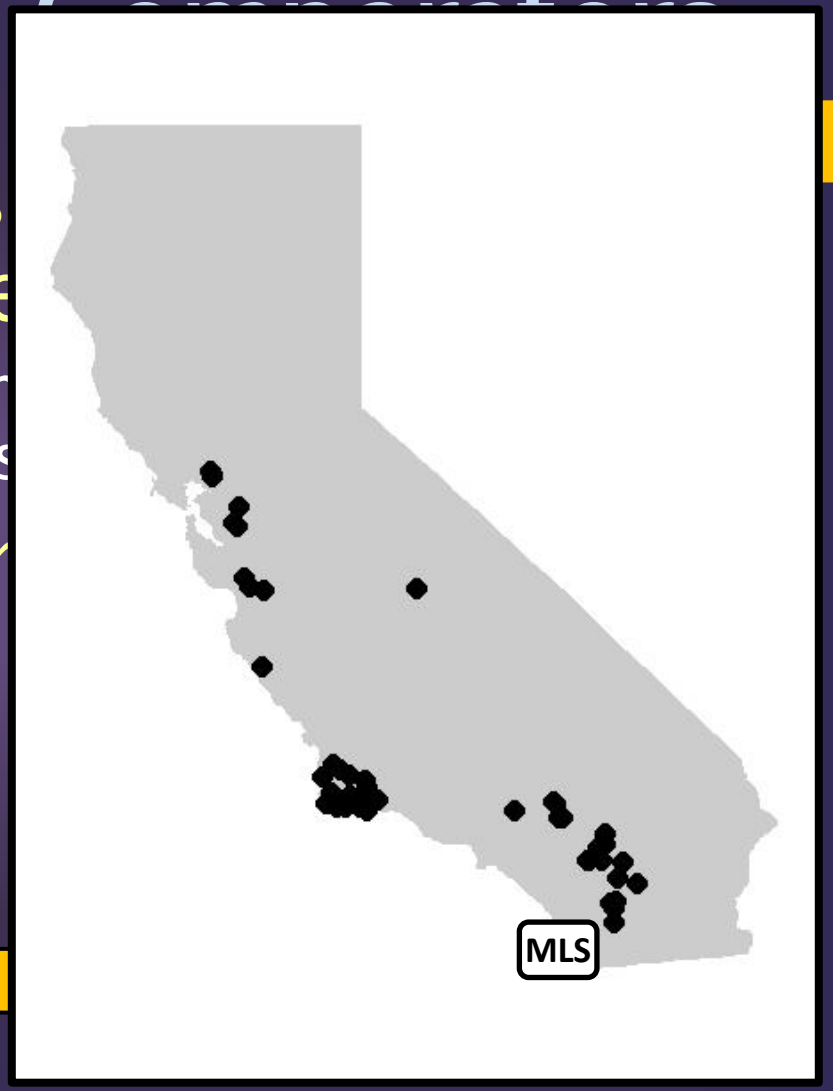
A group of sites that:

- Biologically similar communities in the absence of disturbance
- Comprise a gradient in condition better and, possibly worse, than the test site
  - Ideally including sites that meet management goals
- Contain a sufficient number of sites to allow for estimation of variance

Selecting Good C

- Calculate expected s
  sites from every pote
  - Use condition assessmer
    diss
    er





Hydroptila	0.28	0.65	0.07
Chironominae	0.4	0.32	0.98

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Screening Tools

- An evaluation of common, broad classes of stressors
  - Invertebrate and algal endpoints
- Analyses that can be done rapidly and at large numbers of sites
  - Causal assessment that is as common as condition assessment
- Used to prioritize subsequent actions
  - Eliminate or highlight stressor classes to focus on

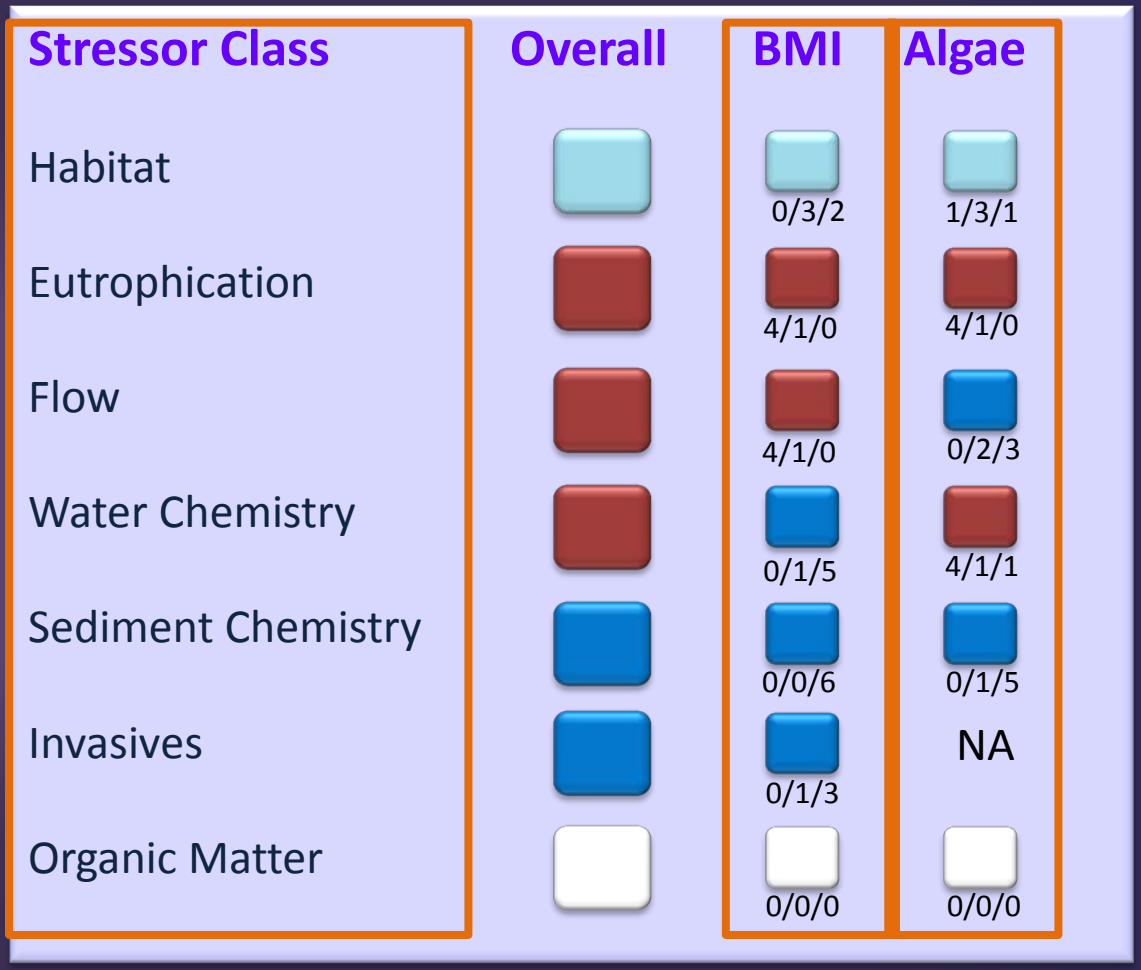
Site: SMCHypothetical

Condition Assessment

CSCI – 0.4
Expected range (0.39 – 0.63)
H20 – 32
Expected range (28 – 50)

Rapid Screening Bioassessment Dashboard

Causal Assessment



LOE summary: # of likely/# of indeterminate/# of unlikely

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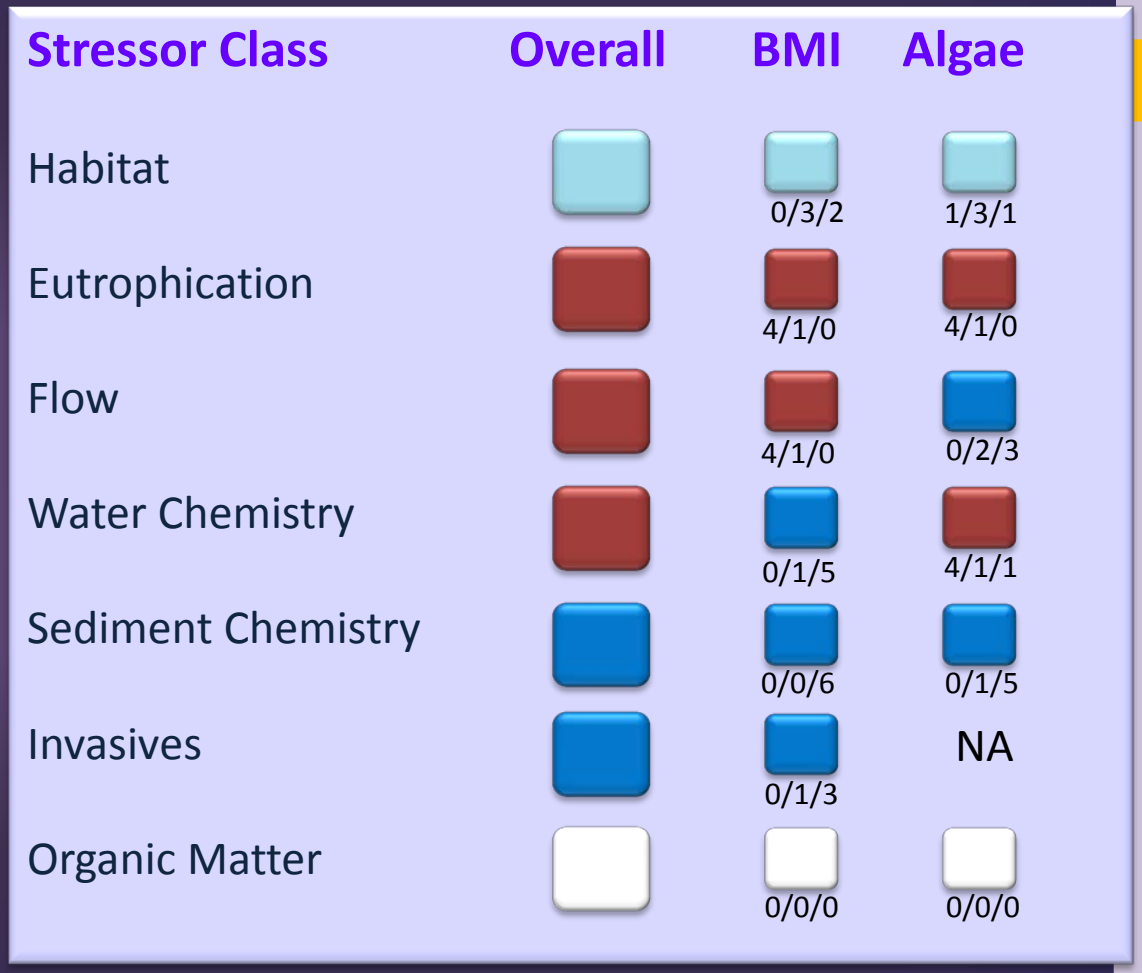

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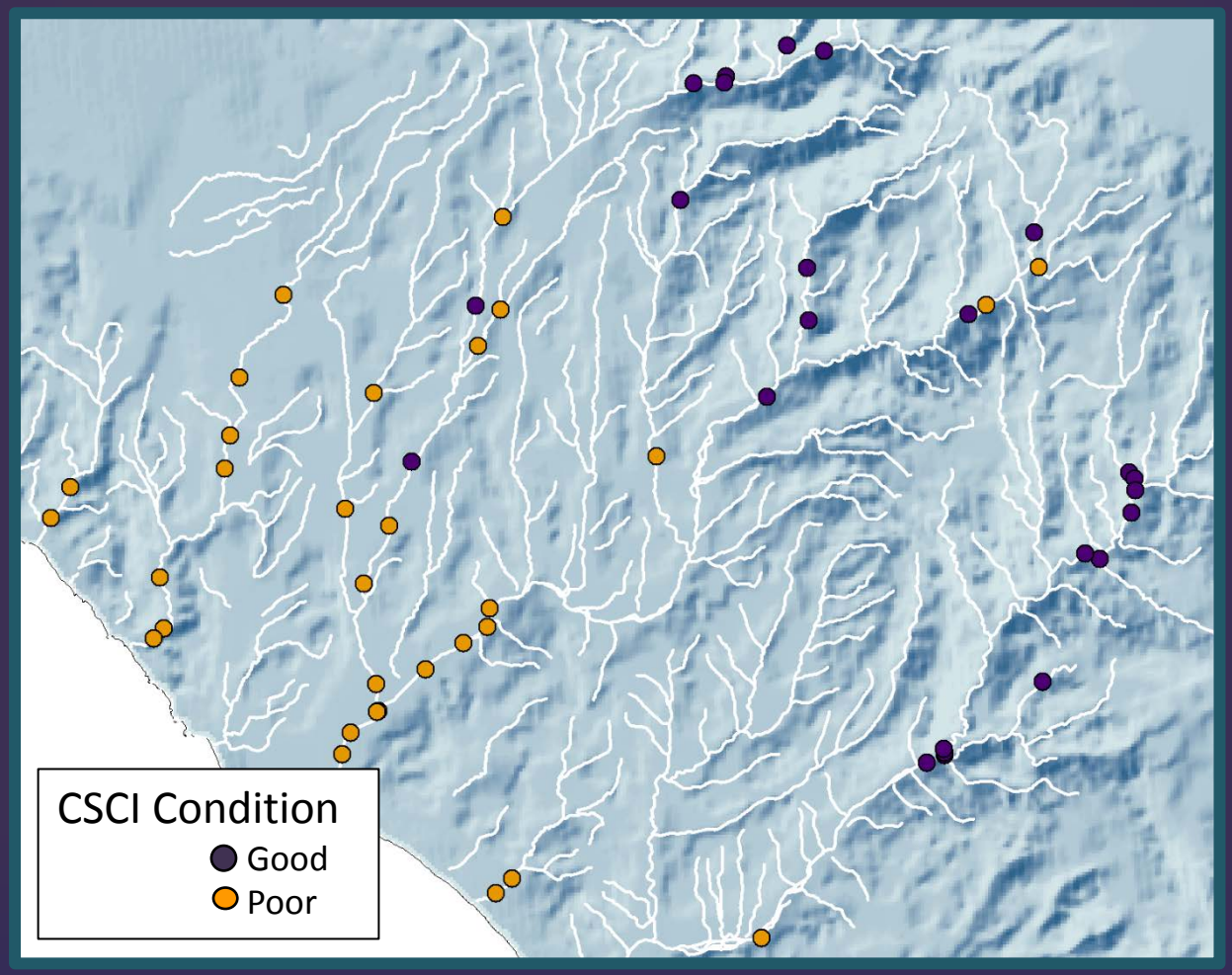
Integrating Across a Watershed



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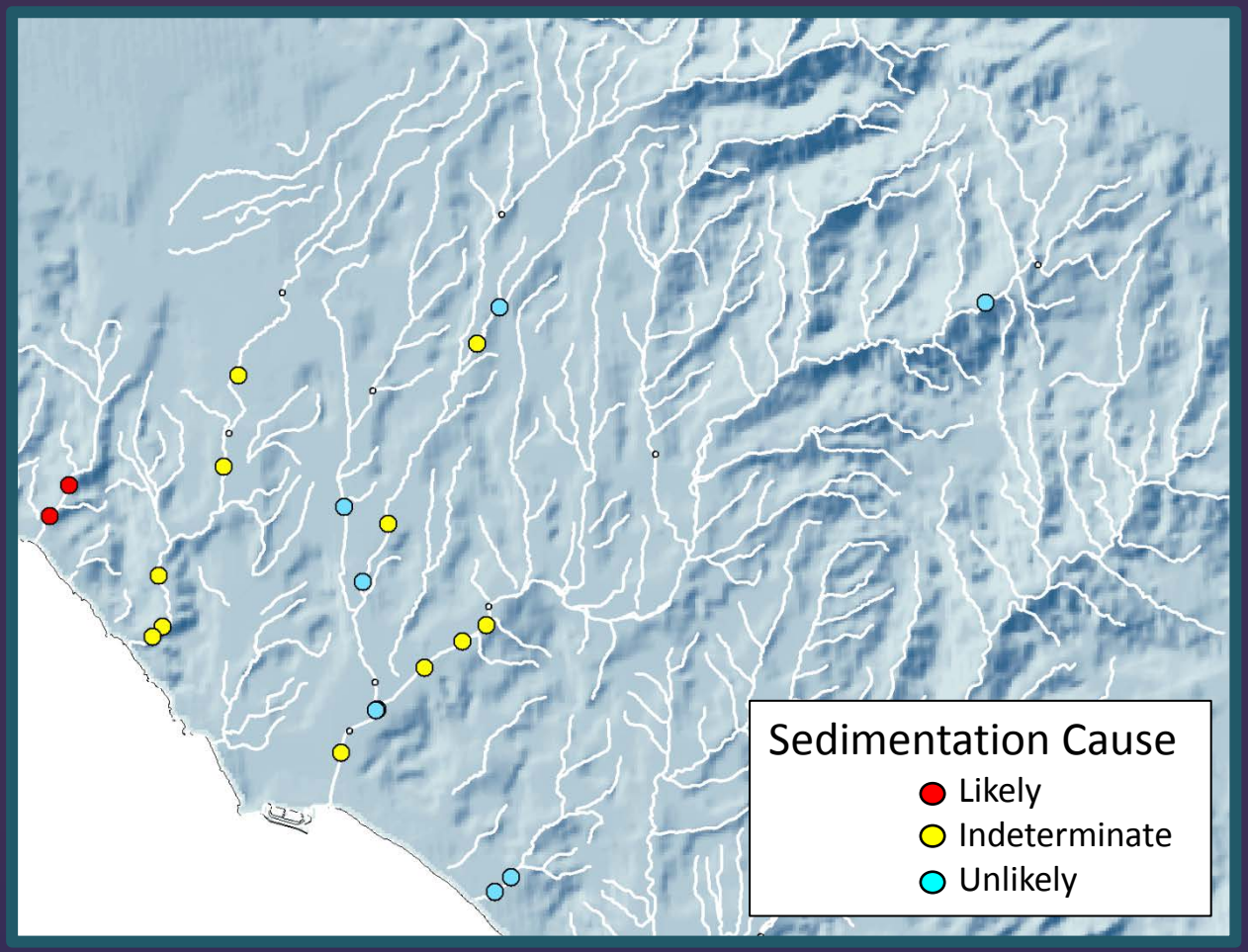

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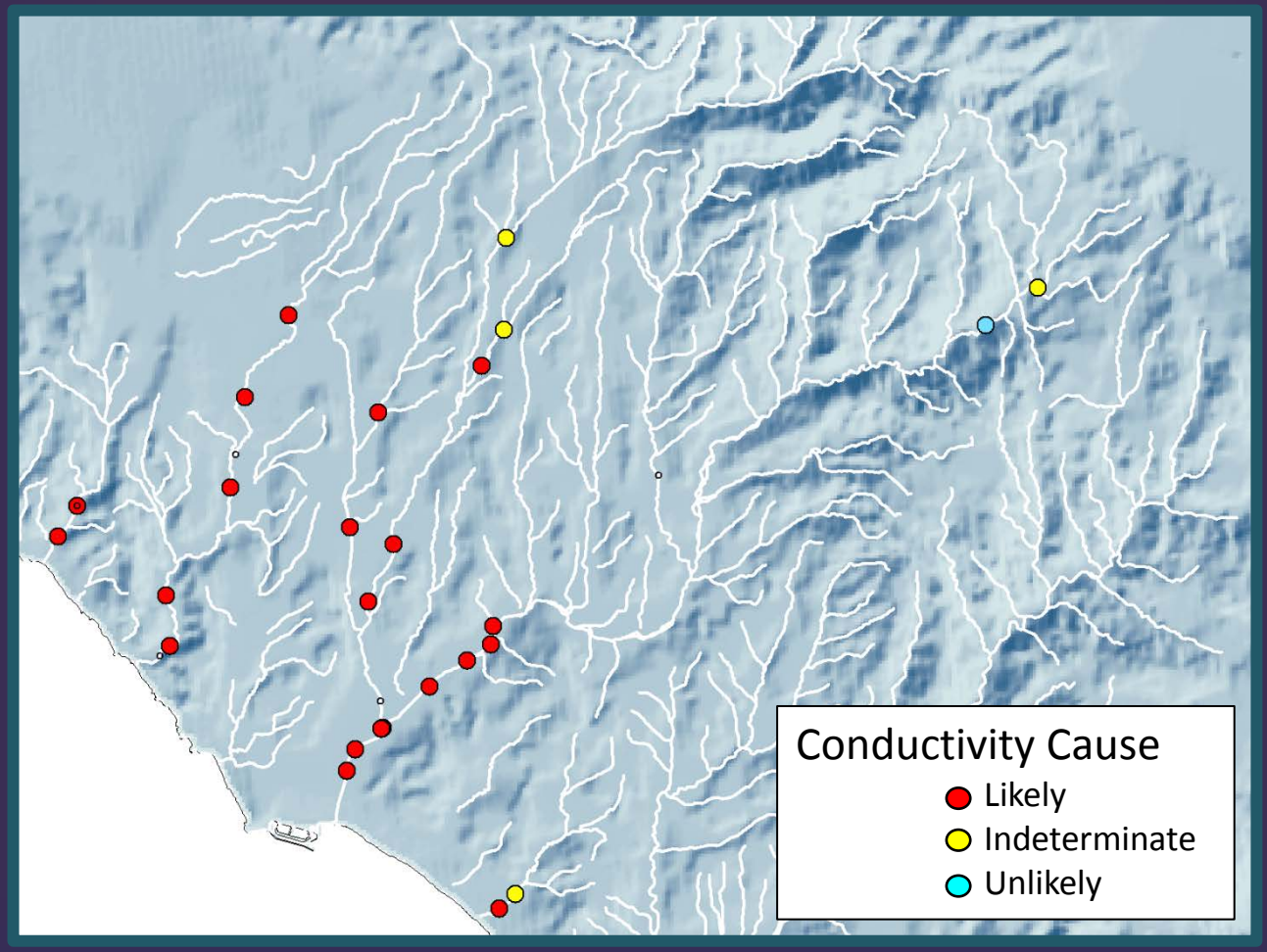

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Applications of These Tools

- Water Quality Improvement Plan for South Orange County
  - developed to address “urban stream syndrome”
- Holistic approach
  - watershed-scale perspective combined with focus on stream system value and function
- Focus on concepts of “condition” rather than individual water quality values
  - closer relationship to beneficial uses
  - better aligned with Ocean Plan and Basin Plan

Applications of These Tools

- WQIP recognizes complex interrelationships of stressors influencing health of inland waters
  - Common for two or more overlapping stressors to be present within a given reach

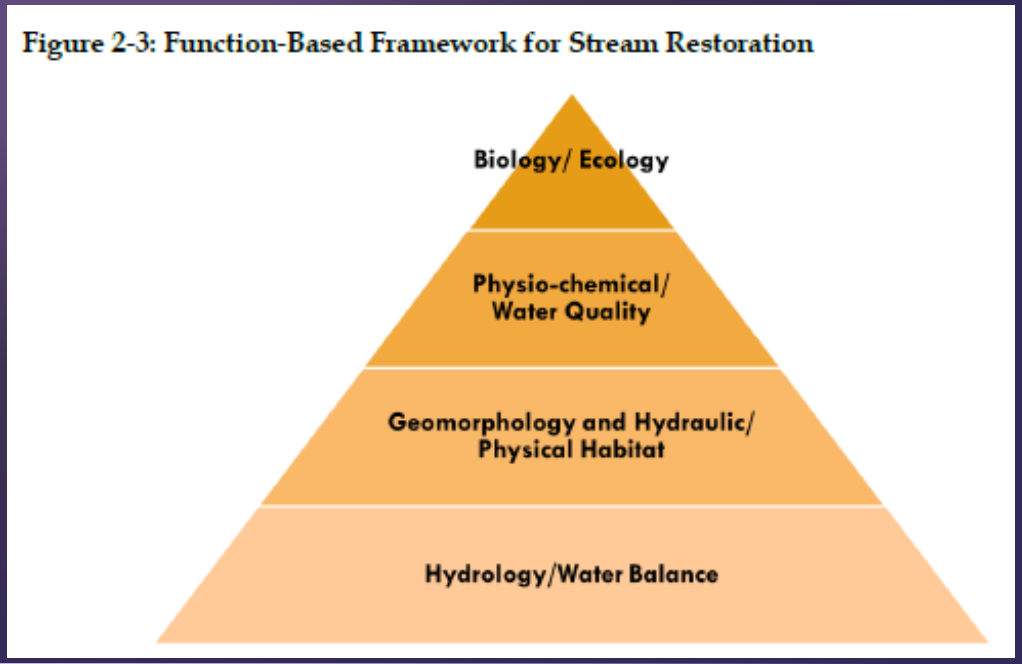
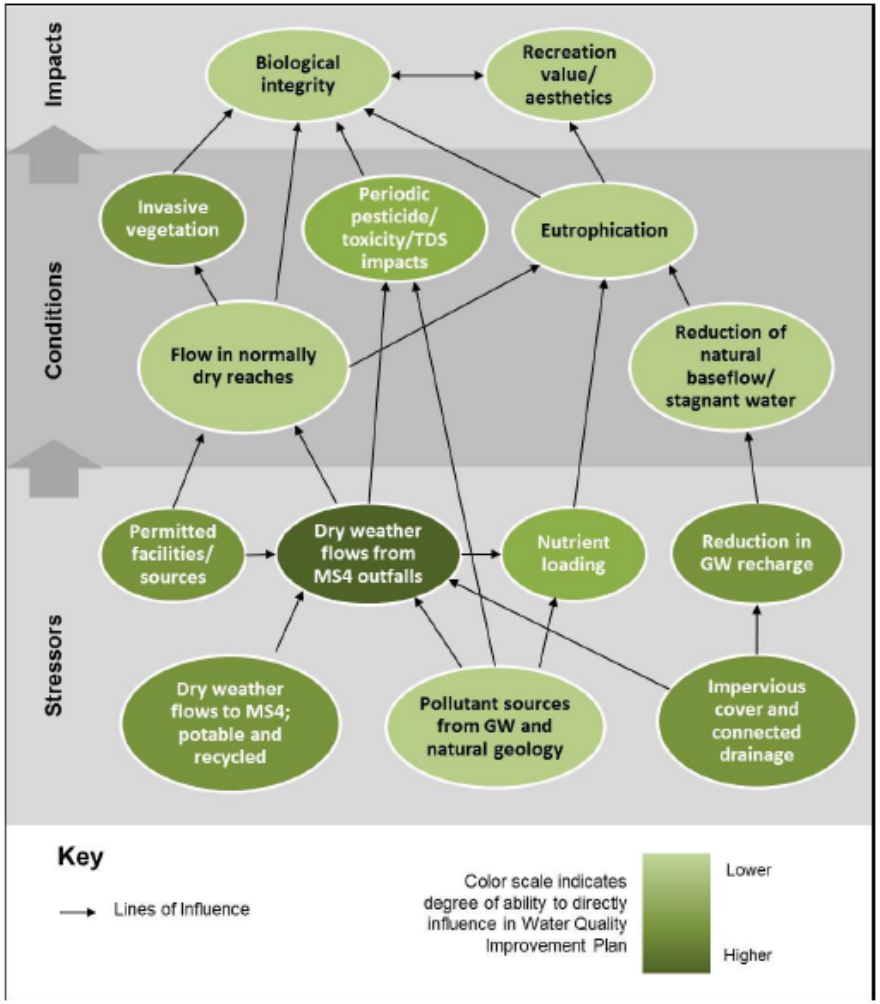


Figure 2-3 from South OC WQIP – adapted from Harman (2014)

Applications of These Tools

- WQIP figure 2-5
  - Flow chart of causal linkages in dry weather
  - Lighter to darker colors indicate degree of ability for management actions and strategies to directly influence the condition or stressor

Figure 2-5: Causal Linkages – Dry Weather Stream Functions



Applications of These Tools

- South OC WQIP "seeks to focus management actions where they will have the most direct effectiveness toward valued outcomes"
  - Development of rapid screening causal assessment tools will help integrate and interpret complex datasets, resulting in more precise prioritization and follow-up actions

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Conclusions

- We have an approach to select comparator sites
  - In publication
- We have a framework for rapid causal assessment
  - Needs to be fully fleshed out
- Together, these tools will help integrate and interpret data
  - Prioritize water bodies for follow up actions

Next Steps

- Opportunities to build out the modules for each stressor
  - e.g., Biostimulatory-Biointegrity policy -> Eutrophication
  - Hydromod Policy -> Flow
- We are looking for potential case studies to apply these tools
  - Especially outside of SoCal

Thank you

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