

What is Causal Assessment?

San Diego Creek Causal Assessment
Informational Workshop 1



The Need for Causal Assessment

- In the process of bioassessment, streams some streams will be in poor condition
- Causal assessment is the process of trying to determine what may be responsible for that condition
 - Ideally, identify a cause for the impairment
 - At least, identify things that aren't the cause

What is it?

- An approach to understand the impact of the stressors a stream is exposed to on the resident biota
- An opportunity for stakeholder interaction concerning the stream
 - Ideally bringing together the different interests concerned with the stream around a common goal

What it isn't

- Causal assessment isn't a regulatory product
 - It doesn't result in a TMDL or permit condition
- It isn't bioassessment
 - Not concerned with meeting condition thresholds
- It isn't classic hypothesis testing with statistical tests and p -values

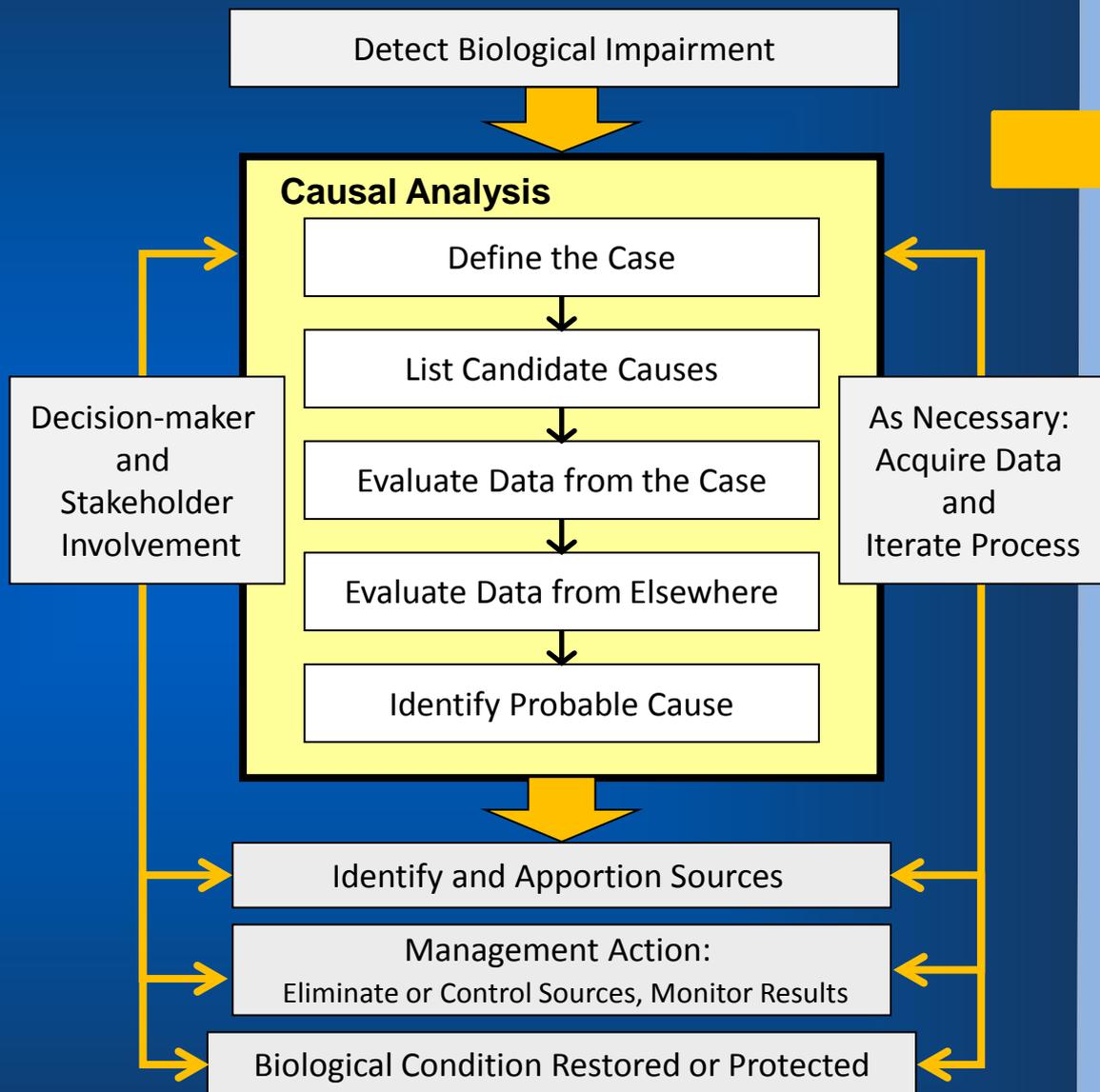
How to do Causal Assessment

- There aren't many comprehensive causal assessment options in the world
- We elected to try out US EPA's CADDIS causal assessment framework
 - Attracted by the data driven, comparator approach
- After 4 case studies, we decided it was the best option available
 - Outcomes detailed in the CA causal assessment guidance document

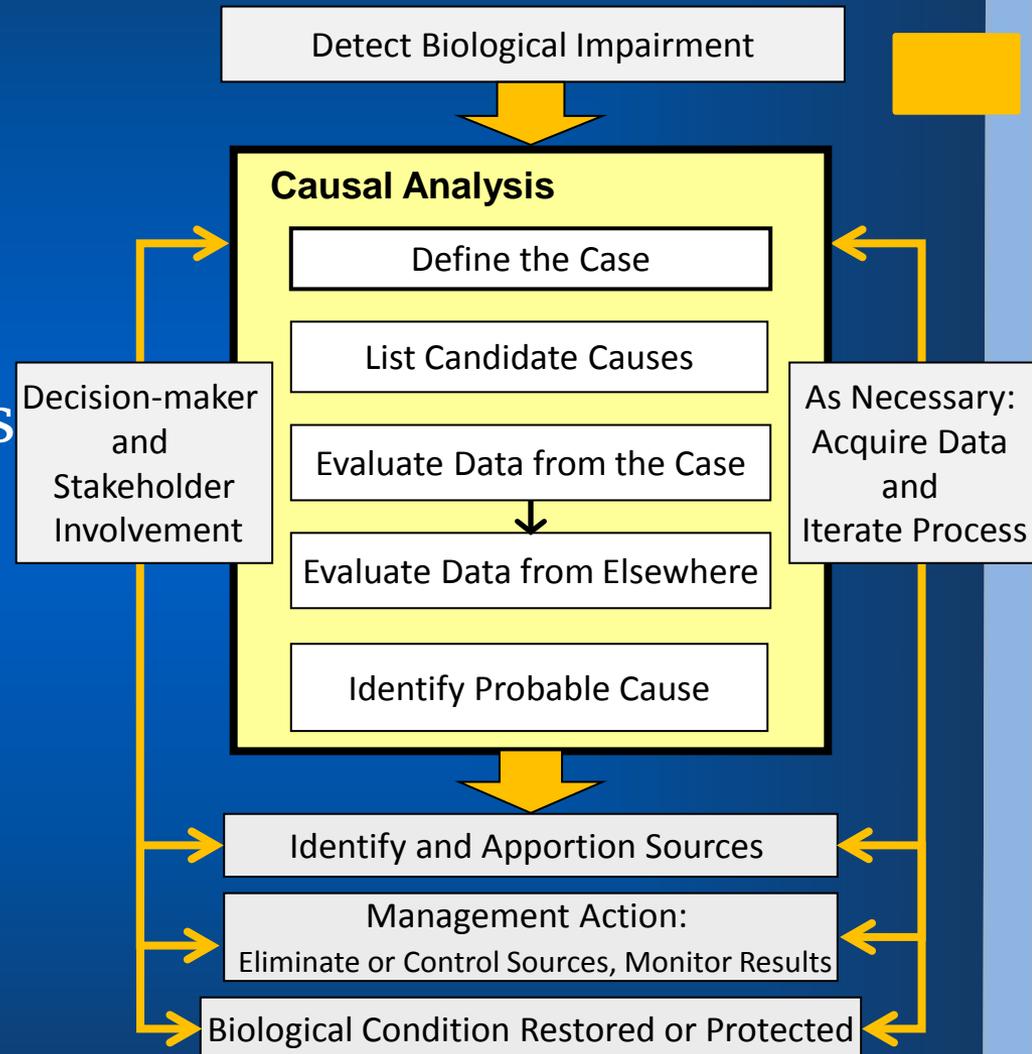
- This is the CADDIS framework

- Note that it's a framework not a tool

- It's a way to organize and guide the assessment



- Both technical and policy related concepts
 - We'll limit ourselves to the technical (i.e. yellow box)
- Strongly recommend visiting the website



Major Concepts of CADDIS

- **Centered on abductive inference**
 - The best hypothesis is identified to explain the available information rather than proving a hypothesis correct or incorrect
- **Aims to establish specific causation rather than general causation**
 - Did X cause Y?, not Could X cause Y?
- **The most likely cause is established by causal inference**
 - The interpretation of available evidence

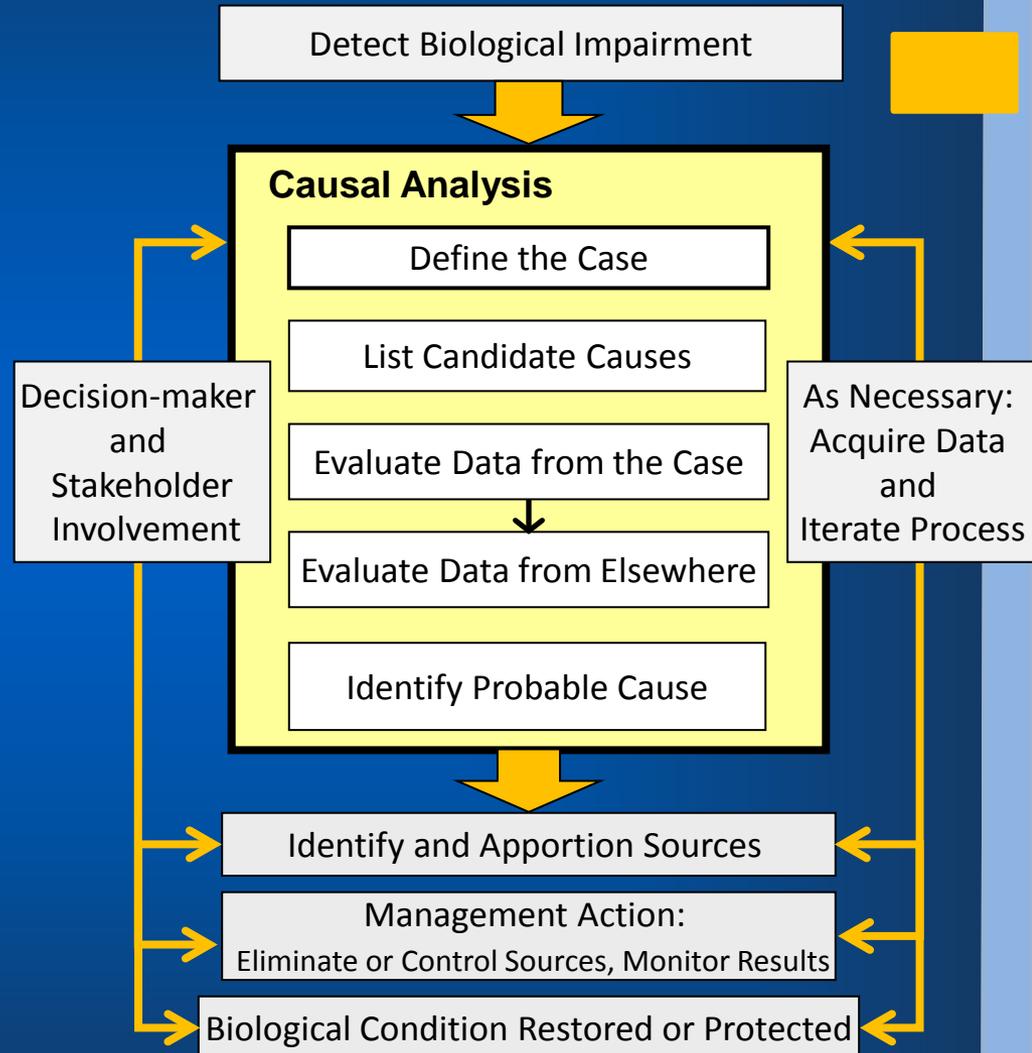
How Does it Work?

- Brainstorm potential causes for impairment
 - Ideally based upon local knowledge and experience
 - Candidate causes
- Determine how these causes may affect the biota of interest
- Evaluate each cause with multiple lines of evidence
 - The weight of evidence provides confidence in results

How Does it Work?

- **Comparative approach**
 - Contrast stressors, biota, and their inter-relationships at the test site with the same information at ecological similar sites
 - **Comparator sites**
- **Contextual approach**
 - Put the conditions at the test site in the context of observations from literature, lab tests, models, etc
- **Use both types of evidence to evaluate different potential causes**

After the Assessment



After the Assessment

- Hopefully you've identified a likely problem
 - Plus eliminated a couple
- Source attribution, management actions, compliance, etc are separate efforts
- The information from the causal assessment should inform these actions though