

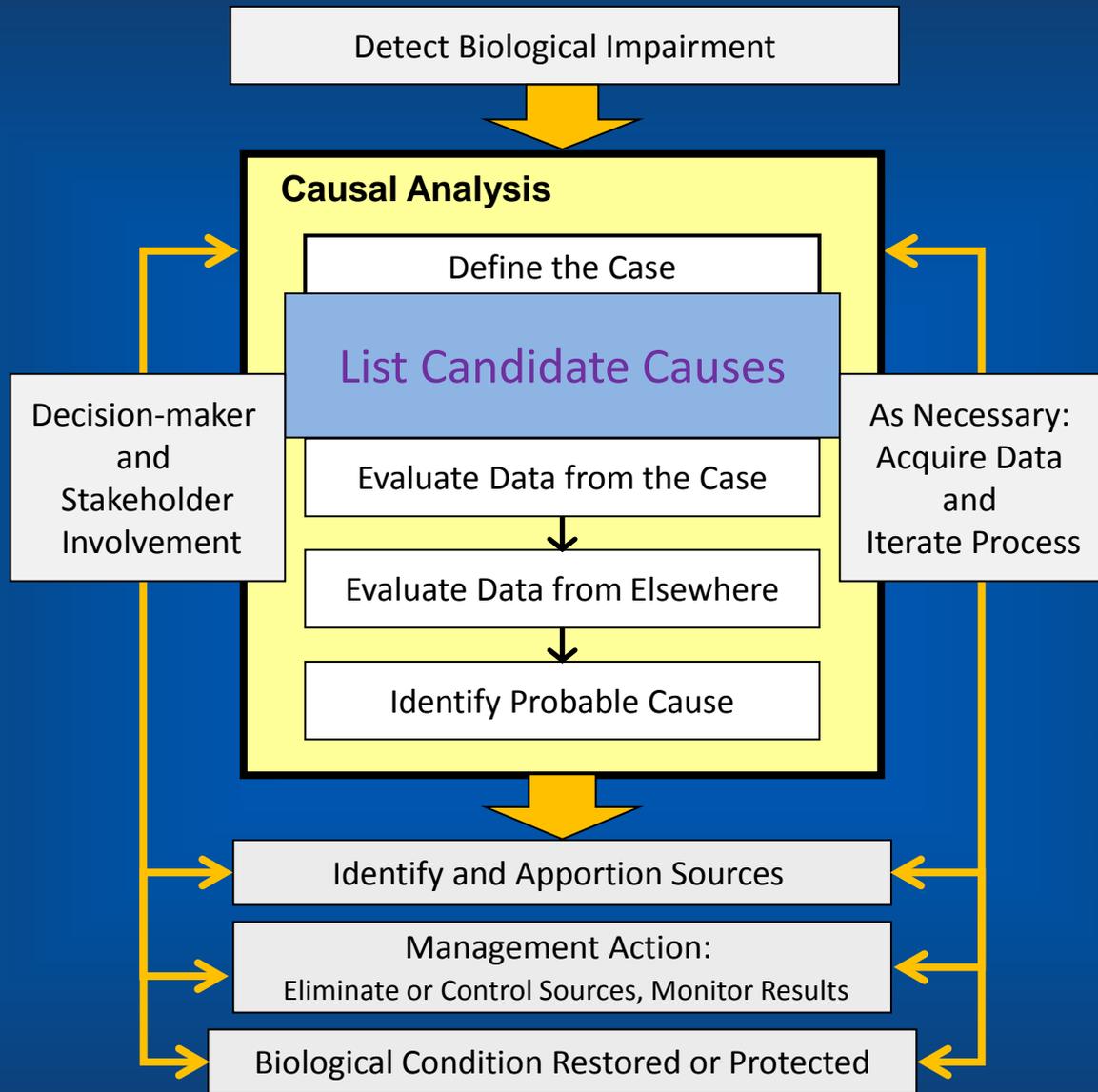


San Diego Creek Causal Assessment

Candidate Cause Conceptual Models

April 23, 2015

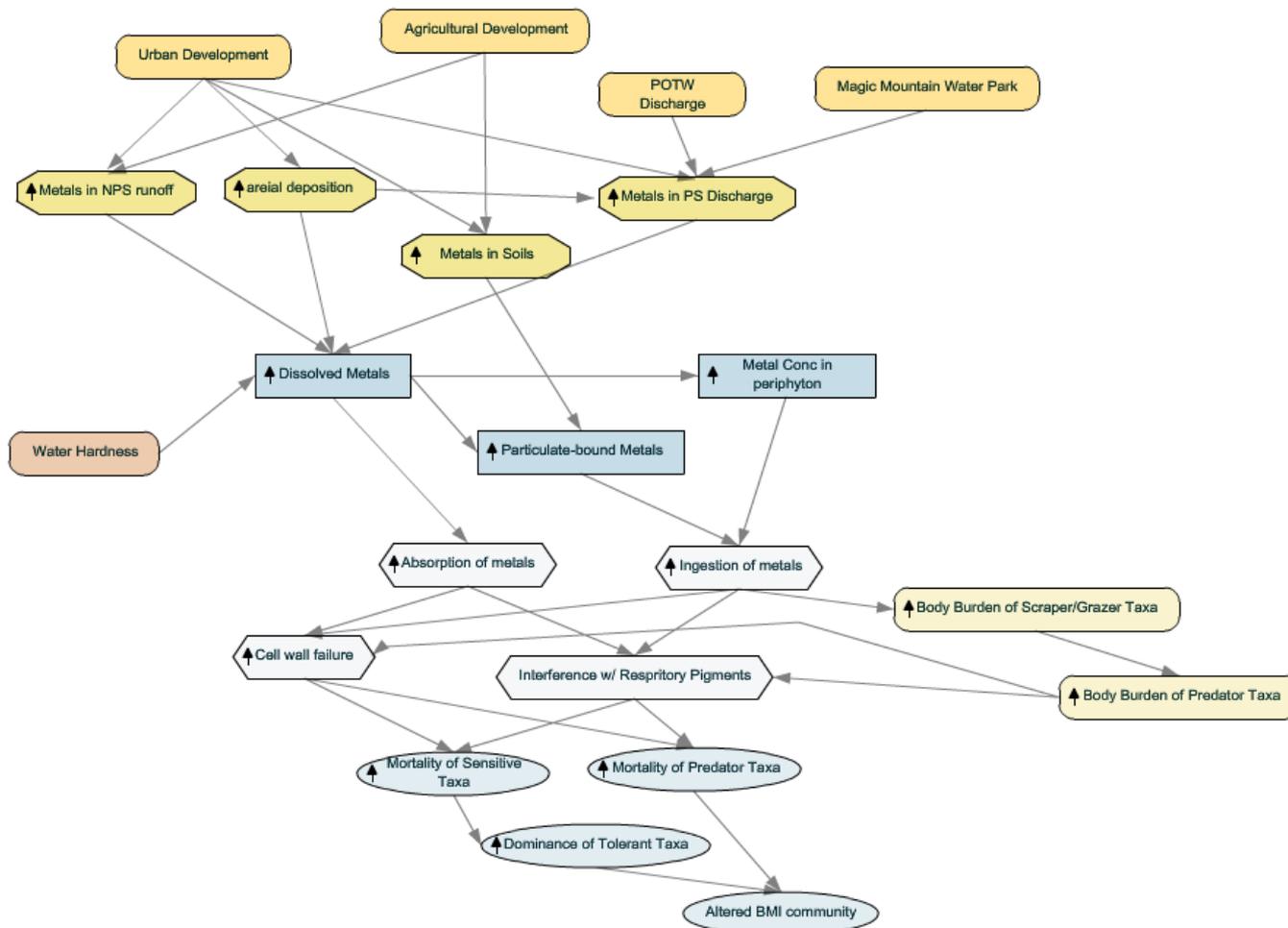




Conceptual Models

- A conceptual model is made for each candidate cause
 - Links the sources to factors to proximate stressor to the mode of action to the altered biology
- A way to visually organize the assessment
 - A good sanity check for each candidate cause
- Can be built from scratch or using the CADDIS library

Santa Clara River – Heavy Metals



CADDIS Library/ICD System

CADDIS Volume 5: Causal Databases

CADDIS Home

Stressor Identification

Sources, Stressors & Responses

Examples & Applications

Data Analysis

Causal Databases

ICDs

CADLit

You are here: [EPA Home](#) » [CADDIS](#) » [Causal Databases](#) » [ICDs: Introduction](#)

Interactive Conceptual Diagrams (ICDs)

[Introduction](#) | [ICD User Roles & Modes](#) | [Viewing ICDs](#) | [Editing ICDs](#)

In CADDIS, conceptual diagrams are used as visual tools for structuring causal assessments of stream biological impairment (see [Step 2: List Candidate Causes](#)). These conceptual diagrams illustrate hypothesized pathways by which human activities and associated sources and stressors may lead to biotic responses in aquatic systems. The ICD application builds upon this role for these diagrams, linking supporting literature to hypothesized causal pathways and using conceptual diagrams as the front-end for searching an online citation database of this literature-based information.

By organizing literature evidence along the causal pathways laid out in conceptual diagrams, the ICD application helps you visualize where evidence for different pathways is strongest, and where evidence may be weak or lacking. It can help you structure your causal assessment, as well as communicate and defend the results of that assessment, by linking evidence to the causal pathways laid out in your conceptual diagram. Literature evidence already entered into the ICD database can help you gain a better understanding of how sources, stressors, and responses may be operating in your system, and to quickly and efficiently access peer-reviewed scientific literature relevant to specific cause-effect linkages of interest to you, which you can then apply in your own causal assessment.

The ICD application provides:

1. **A set of U.S. EPA-constructed conceptual diagrams** illustrating human activities, associated sources and stressors, and potential biotic responses (collectively referred to as shapes), which can be used to search the ICD literature database for peer-reviewed scientific literature supporting linkages among selected shapes;
2. **An online graphical editor** that allows users to create new (or modify existing) interactive conceptual diagrams and link new or existing references to those diagrams;
3. **A collaborative workspace**, whereby users can grant other users the ability to view and/or revise diagrams they have created.

As you use the ICD application, please keep in mind that it is meant to be a collaborative environment. At any time, the creator of a diagram can allow all registered users to view and comment on any of their diagrams; thus, you should assume that any comments you make on a diagram can be seen by all registered users of the ICD application.

To become a registered user, click

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Related Links

[Go to ICD application](#)

[About conceptual diagrams](#)

ICD help files

- [Quick Start Instructions](#) (5 pp, 418K, [About PDF](#))
- [ICD User Guide](#) (53 pp, 4.3MB, [About PDF](#))

Example conceptual diagrams

- [Metals](#)
- [Physical habitat](#)
- [Nutrients](#)

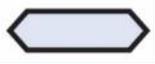
Assembling the Data

- The models and the proximate stressors provide the needs for the data list
 - Helpful to document sources
- The amounts and types of data will inform the lines of evidence than can be used

Assembling the Data

| Candidate Cause/ Conceptual Diagram | Proximate Stressor | Data Available | Data Source | Data Within the Case Lines of Evidence | | Data From Outside the Case Lines of Evidence | | |
|---|--------------------------------------|--|--|--|--|---|--|--------------------------------|
| | | | | Spatial Co-Occurrence | Stressor-Response From the Field | Reference Condition Comparison | Stressor Response From the Field | Stressor Response From the Lab |
| Elevated Conductivity | Increased Conductivity | Point Measurement of Conductivity (mmhos cm^{-1}) during biological sampling | NPDES Monitoring | Comparison of MLS to individual comparator sites. | Spearman's rank correlations with percent non-insect taxa, percent tolerant taxa, percent collector-gatherer abundance, and percent amphipod abundance among MLS and the comparator sites. | Comparison of MLS to environmentally similar reference sites. | Relative risk calculation at stressor level observed at MLS for percent non-insect taxa, percent tolerant taxa, percent collector-gatherer abundance, and percent amphipod abundance using stressor and biological data from environmental similar sites to establish the expectation. | No data available |
| | Increased TDS | Mean of grab sample measurements of Dissolved Solids (mg L^{-1}) and Hardness ($\text{mg CaCO}_3 \text{L}^{-1}$) collected January - May | NPDES Monitoring | Comparison of MLS to individual comparator sites. | Spearman's rank correlations with percent non-insect taxa, percent tolerant taxa, percent collector-gatherer abundance, and percent amphipod abundance among MLS and the comparator sites. | No data available | No data available | No data available |
| Increased Nutrients | Change in Food Source | Euclidean distance from MLS location in nMDS comparison of sites based upon the occurrence of coarse particulate organic matter, macrophyte, filamentous algae, woody debris, and fine sediments. Bray-Curtis similarity to MLS site based upon algal community structure. | NPDES Monitoring and Algal Community Special Study | Comparison of MLS to individual comparator sites in multivariate space | Spearman's rank correlations with percent non-insect taxa, percent tolerant taxa, percent collector-gatherer abundance, and percent amphipod abundance among the comparator sites. | No data available | No data available | No data available |
| | Increase in Algal Mats | Percent of reach with filamentous algae present at time of biological sampling. Mean microalgal mat thickness (cm) within the reach during | NPDES Monitoring | Comparison of MLS to individual comparator sites. | Spearman's rank correlations with percent non-insect taxa, percent tolerant taxa, percent collector-gatherer abundance, and percent amphipod abundance among MLS | No data available | Relative risk calculation at % of filamentous algae observed at MLS for percent non-insect taxa, percent tolerant taxa, percent collector-gatherer abundance, and percent amphipod abundance using stressor and | No data available |
| | Increase in Toxic Algal Compounds | | | No data available | No data available | No data available | No data available | No data available |

Model Components

- **Proximate stressor** 
 - The thing most directly affecting the biology
- **Biological response** 
 - Response to the stressor
- **Mode of action** 
 - How the stressor leads to the biological response
- **Additional step** 
 - How the source leads to the proximate stressor
- **Source** 
 - The source of the stressor
- **Human activity** 
 - The reason for the source
- **Modifying factor** 
 - An outside factor that influences a stressor or additional step

How to Build a Model

- **Start with proximate stressors**
 - Tend to be the basic organizational unit of the assessment
- **How do they affect biology?**
 - Way to double check your proximate causes
- **Add sources and pathways**
 - Going to be somewhat watershed/case specific
- **Add the human drivers**
 - Gives a management context
 - Do you have the right stakeholders in the room?

View

Edit

Diagram Name: dummy model

Home

Save

Save As...

Close



△ Proximate Stressor 1

↓ Proximate stressor 2

· Biological Impairment ·

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Close



Hide Tiers

Select

Copy

Align

Add Linkage

?

?



△ Proximate Stressor 1

↓ Proximate stressor 2

Mode of Action 1

Mode of Action 2

Biological Impairment

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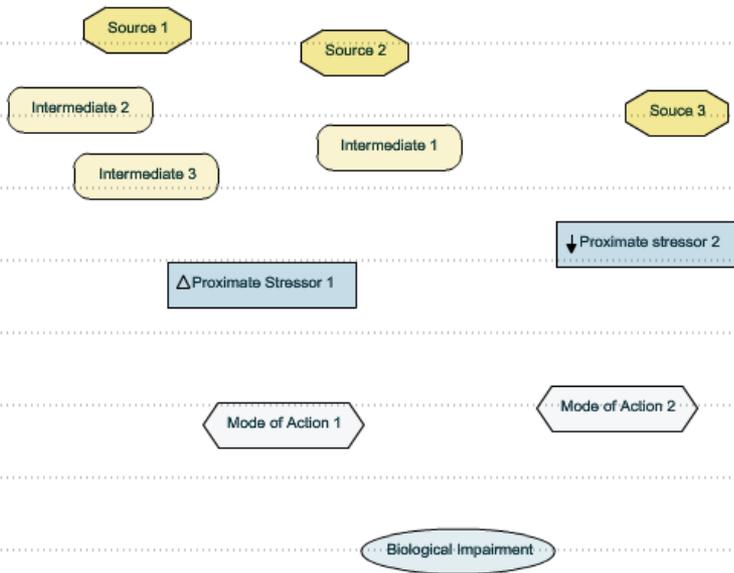


Home

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Close



Hide Tiers Select Copy Align Add Linkage



Human Activity1

Human Activity 2

Source 1

Source 2

Intermediate 2

Source 3

Intermediate 3

Intermediate 1

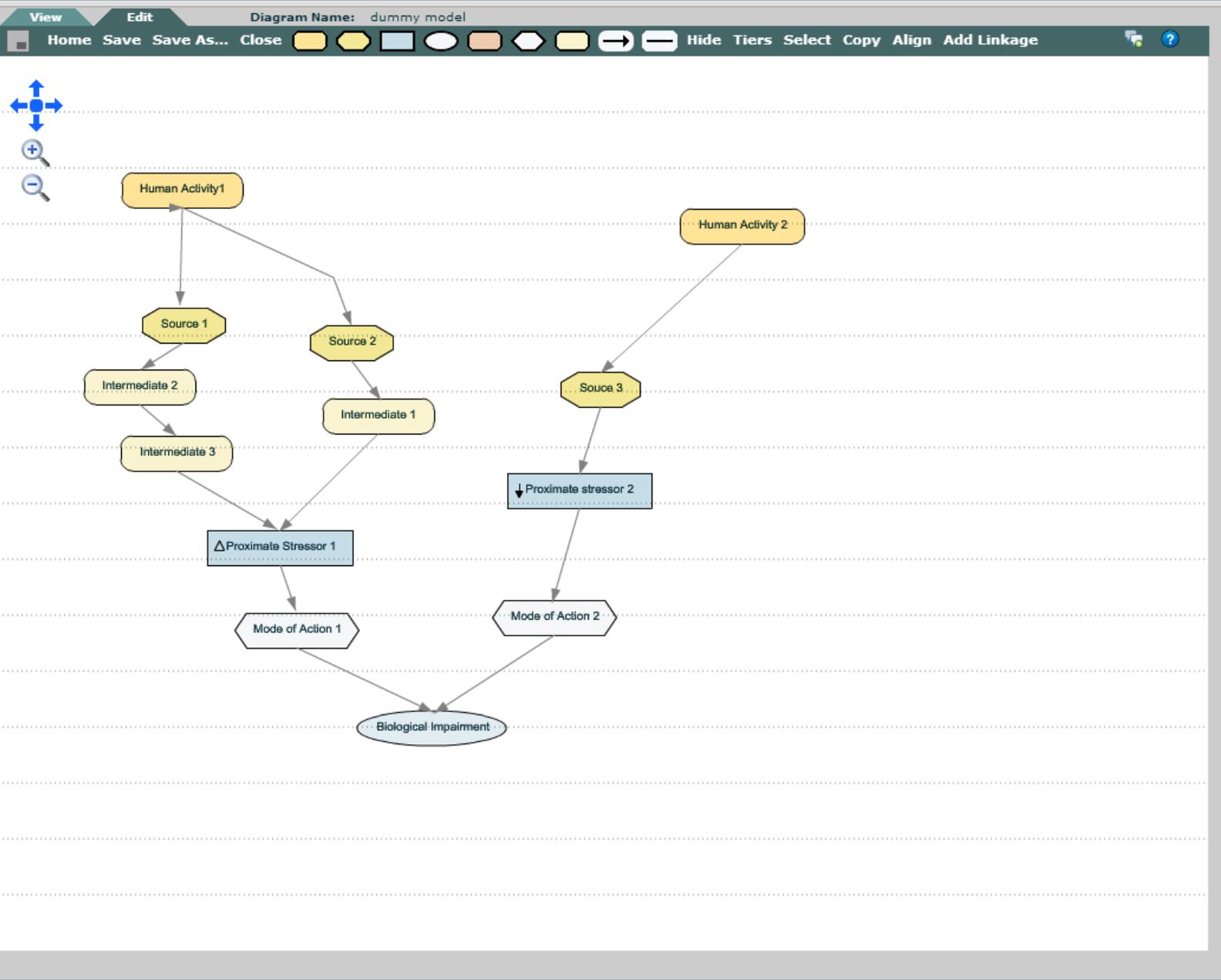
↓ Proximate stressor 2

△ Proximate Stressor 1

Mode of Action 1

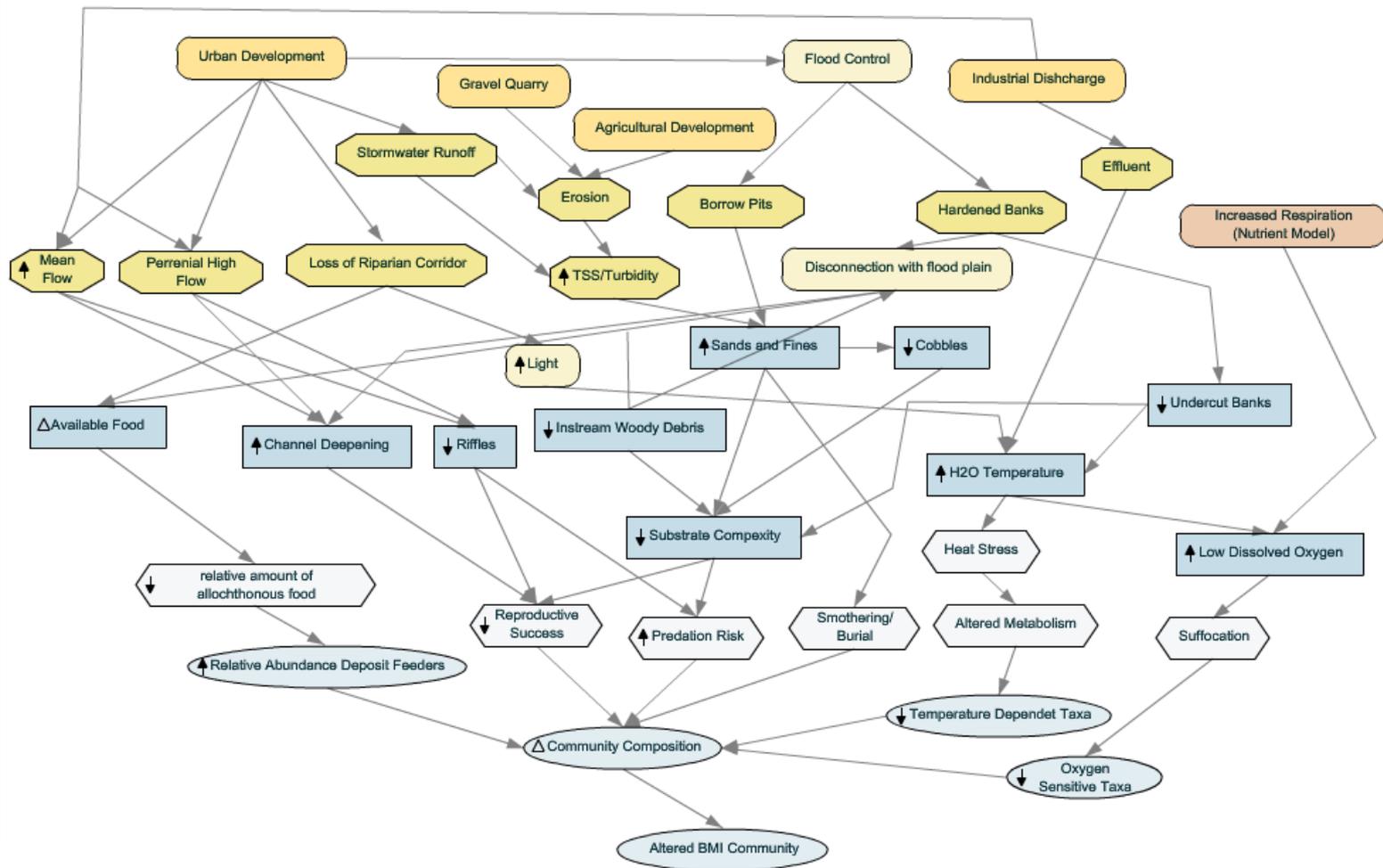
Mode of Action 2

Biological Impairment



Keep CC Models Simple

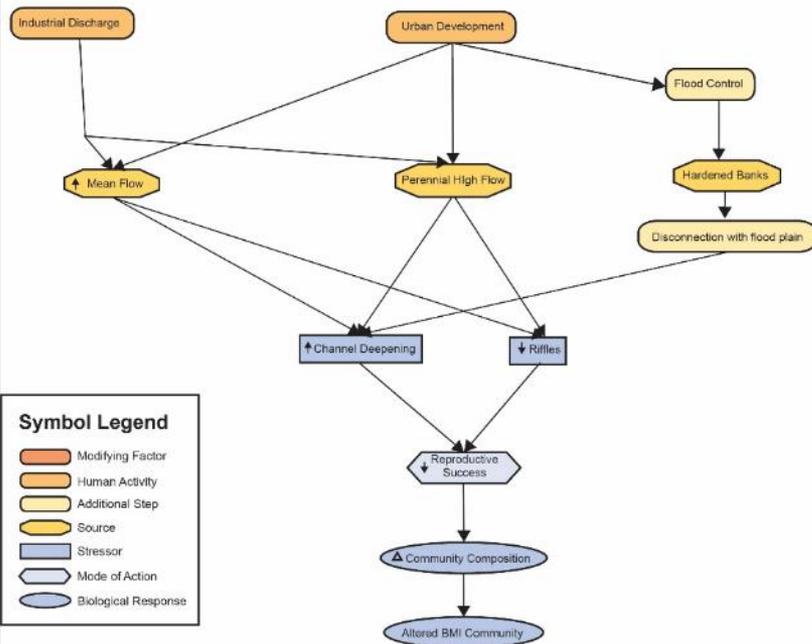
San Diego River Altered Physical Habitat



Keep CC Models Simple

San Diego River Altered Physical Habitat

Loss of Shallow Habitat *San Diego River*



Smothering *San Diego River*

