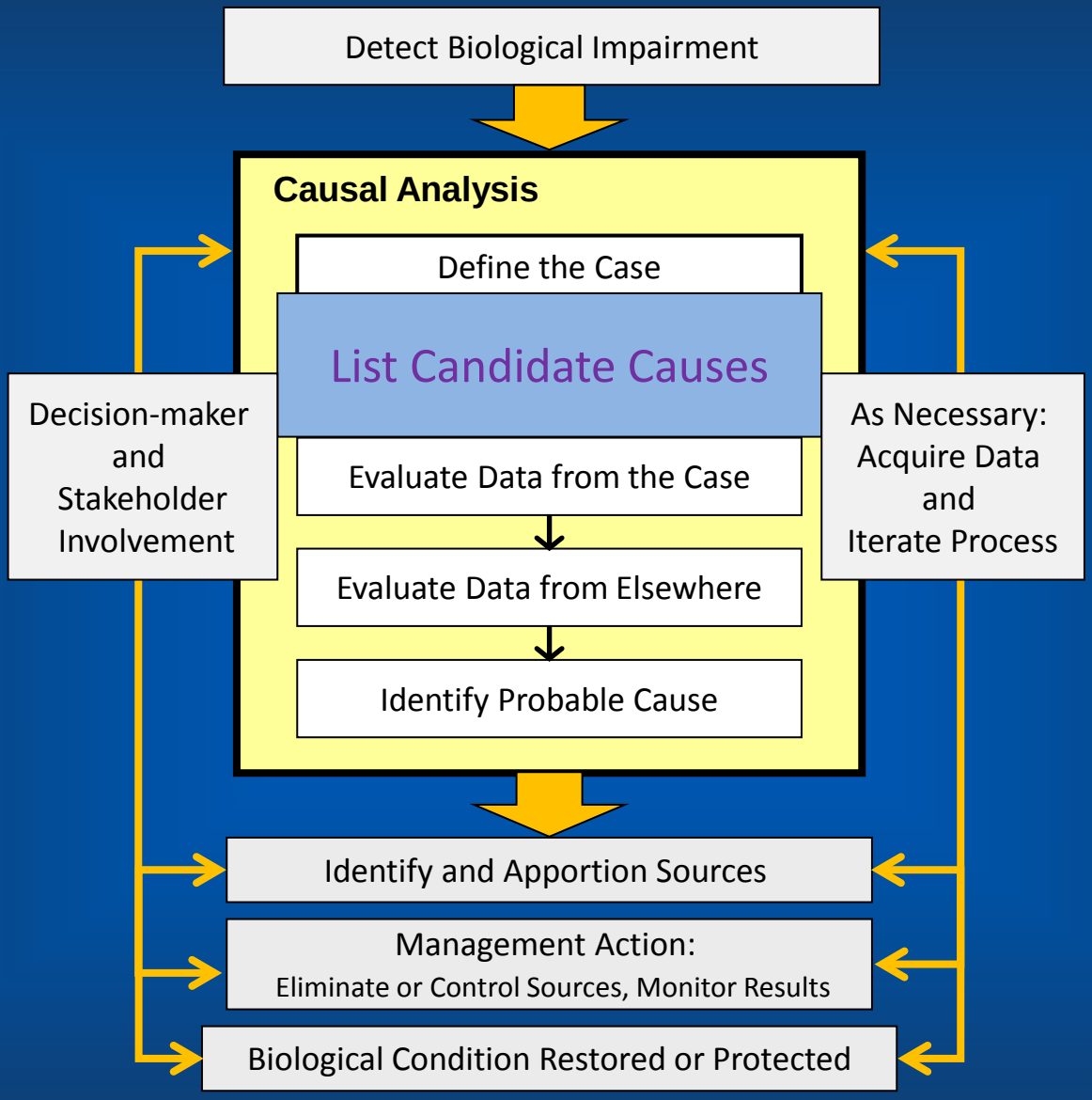
San Diego Creek Causal Assessment

Candidate Cause Conceptual Models

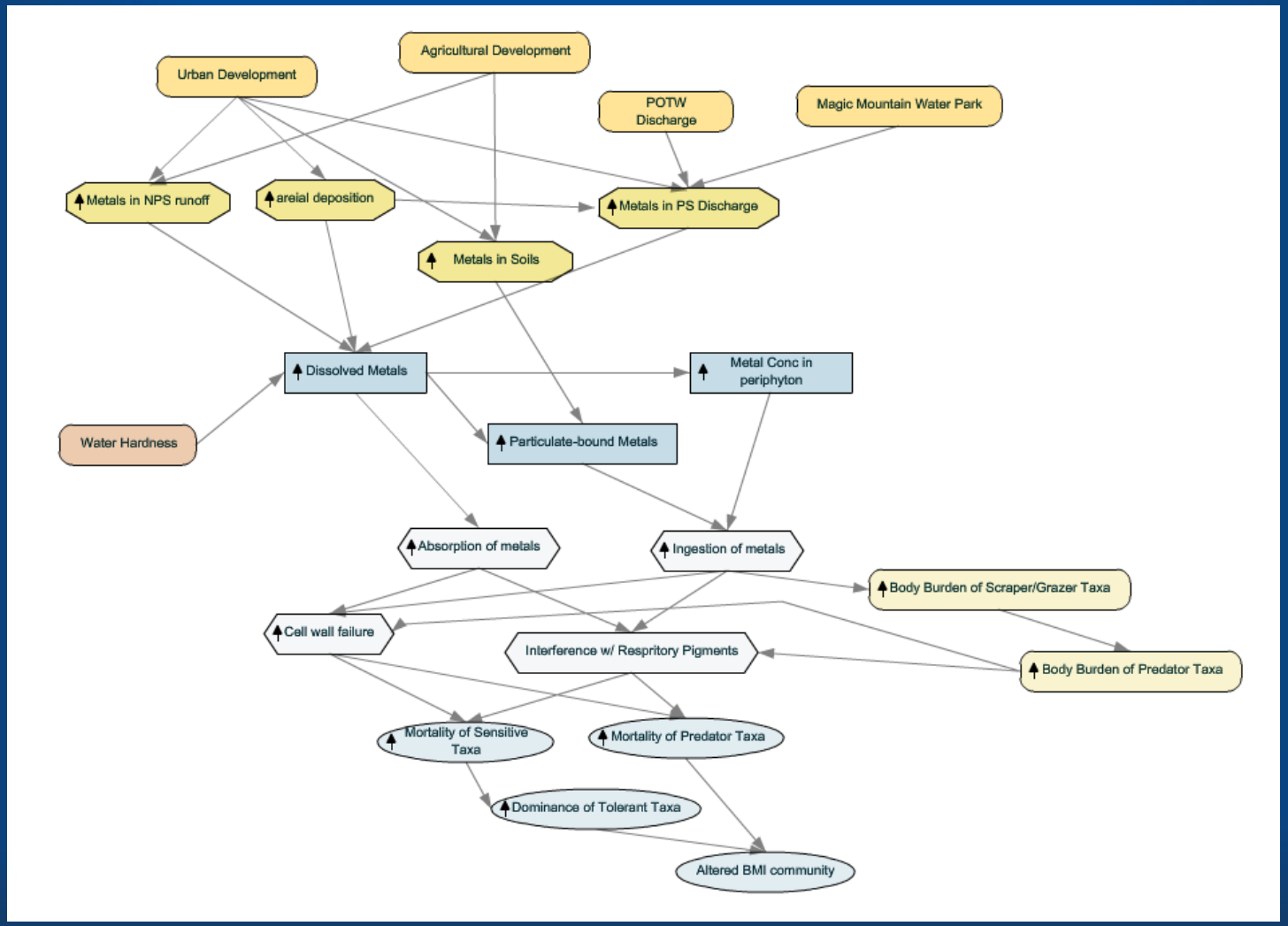
April 23, 2015


Detect Biological Impairment
Causal Analysis
Define the Case
List Candidate Causes
Evaluate Data from the Case
Evaluate Data from Elsewhere
Identify Probable Cause
Decision-maker and Stakeholder Involvement
As Necessary: Acquire Data and Iterate Process
Identify and Apportion Sources
Management Action:
Eliminate or Control Sources, Monitor Results
Biological Condition Restored or Protected

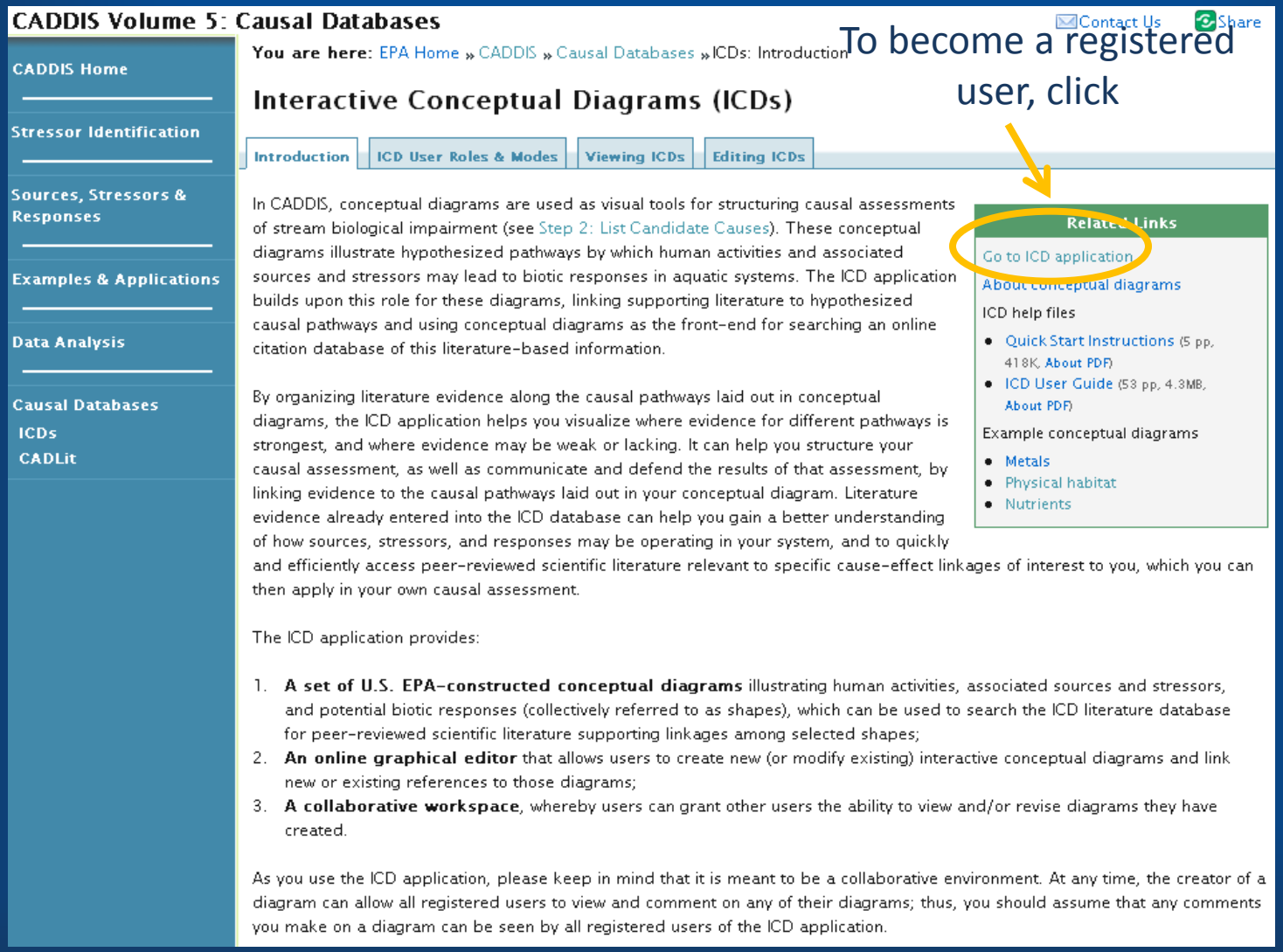
Conceptual Models

- 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



To become a registered user, click

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

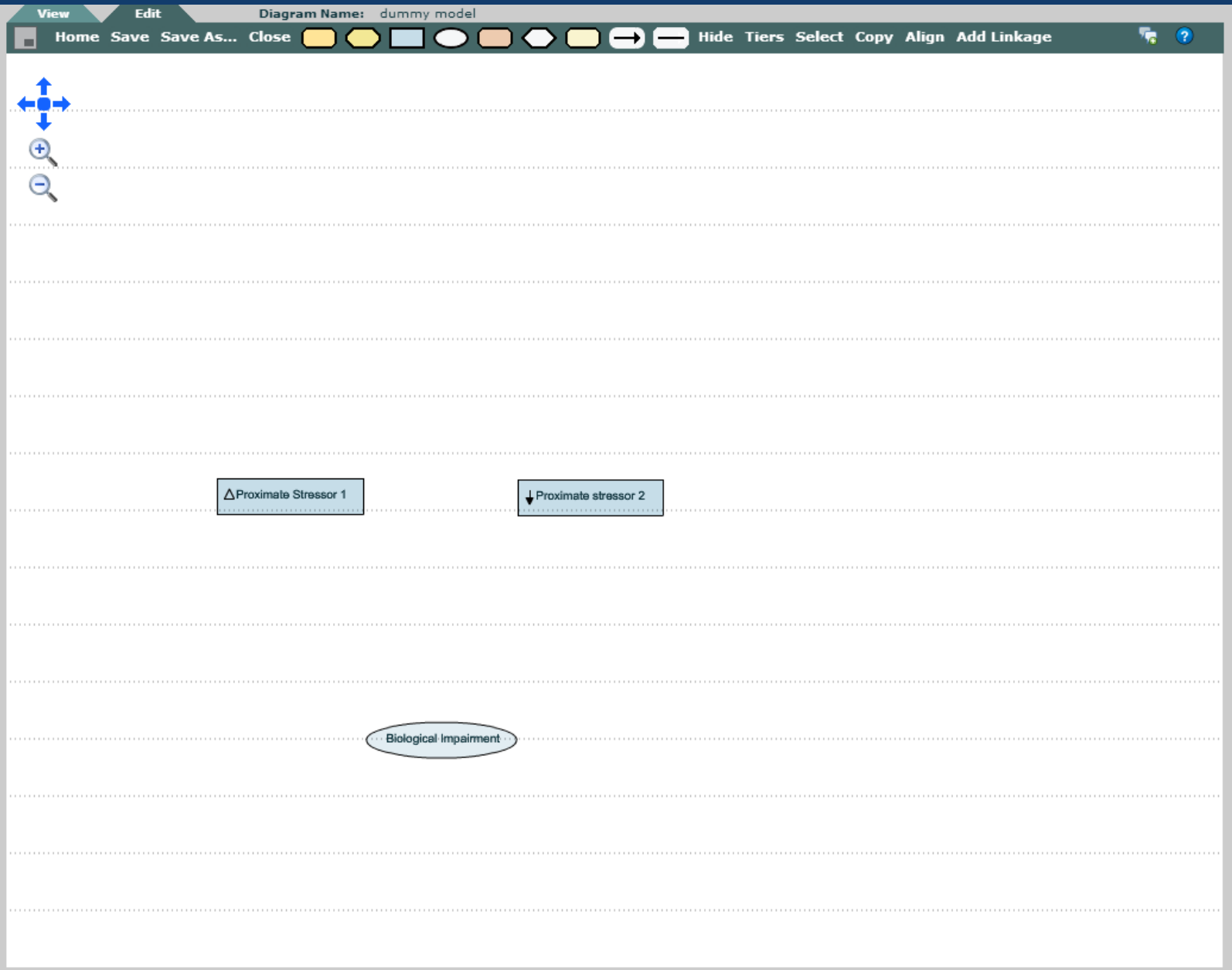
Candidate Cause/ Conceptual Diagram	Proximate Stressor	Data Available	Data Source	Data Within the Case Lines of Evidence		Data From Outside the Case Lines of Evidence		
				Spatial Co-Occurrence	Stressor-Response From the Field	Reference Condition Comparison	Stressor Response From the Field	Stressor 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 (mg $CaCO_3$ 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 course 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 Toxic Algal Compounds			No data available	No data available	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 (mm) 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

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

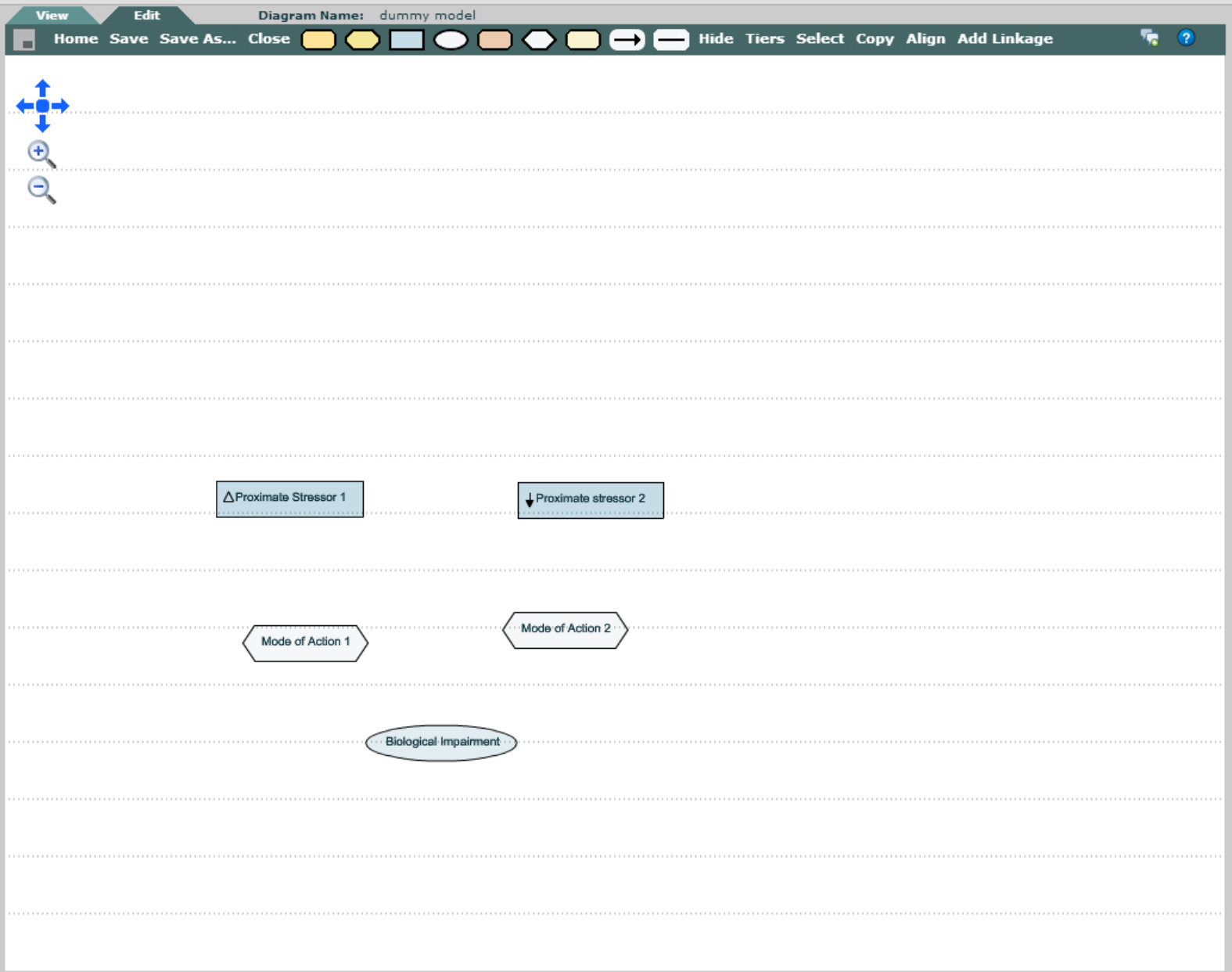
How to Build a Model

- 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
Hide Tiers Select Copy Align Add Linkage
Proximate Stressor 1
Proximate stressor 2
Biological Impairment

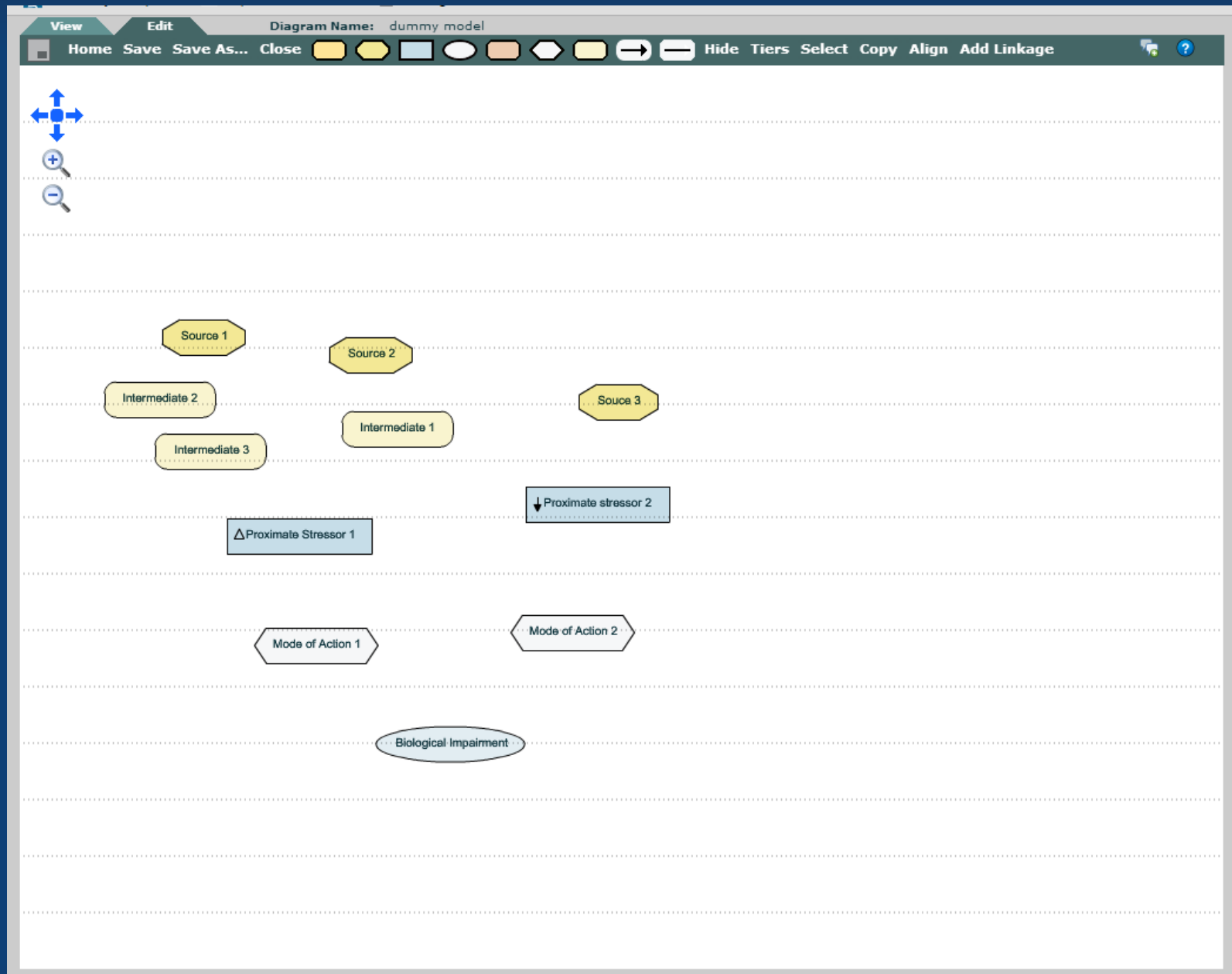
How to Build a Model

- 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
Hide Tiers Select Copy Align Add Linkage
Proximate Stressor 1
Proximate stressor 2
Mode of Action 1
Mode of Action 2
Biological Impairment

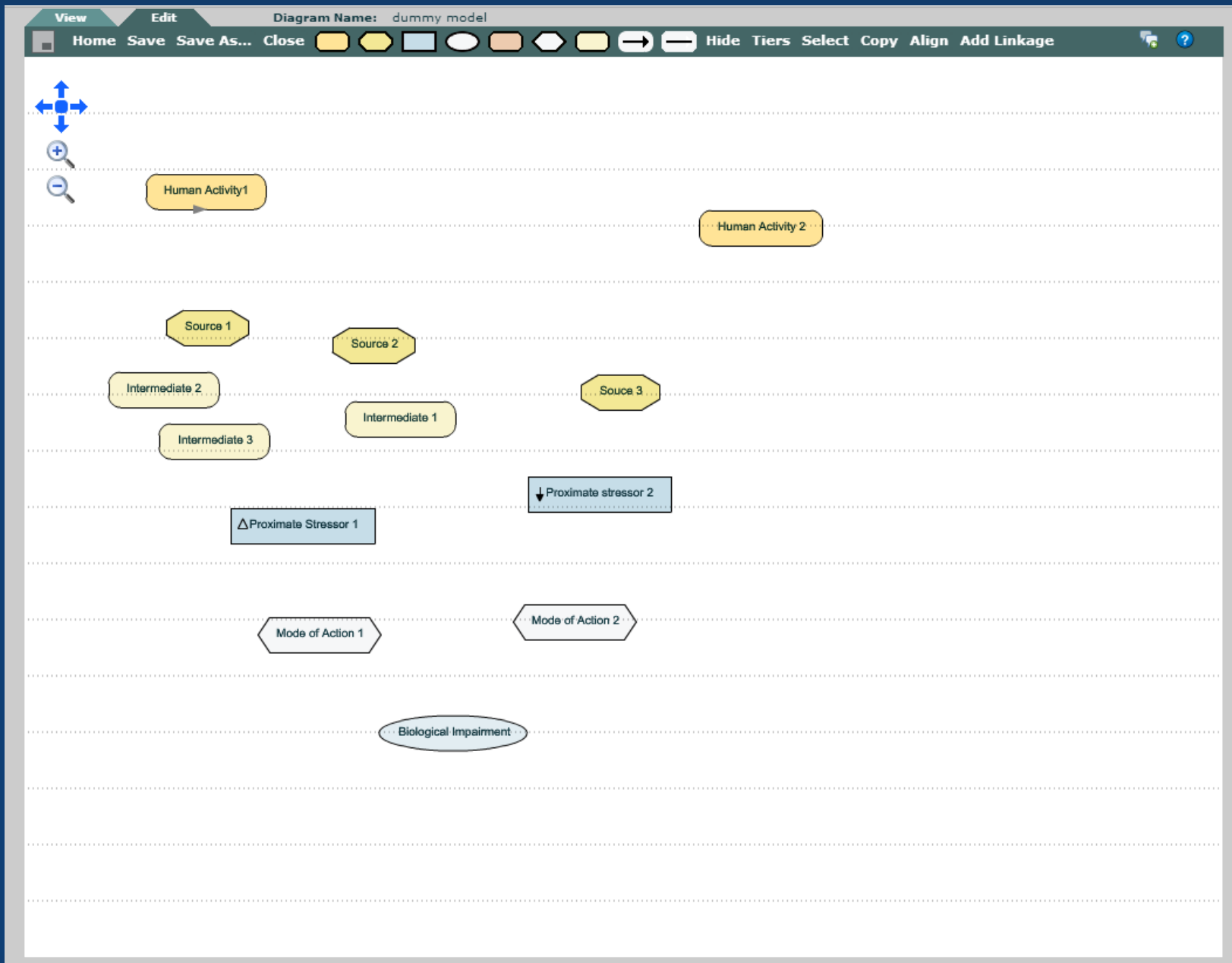
How to Build a Model

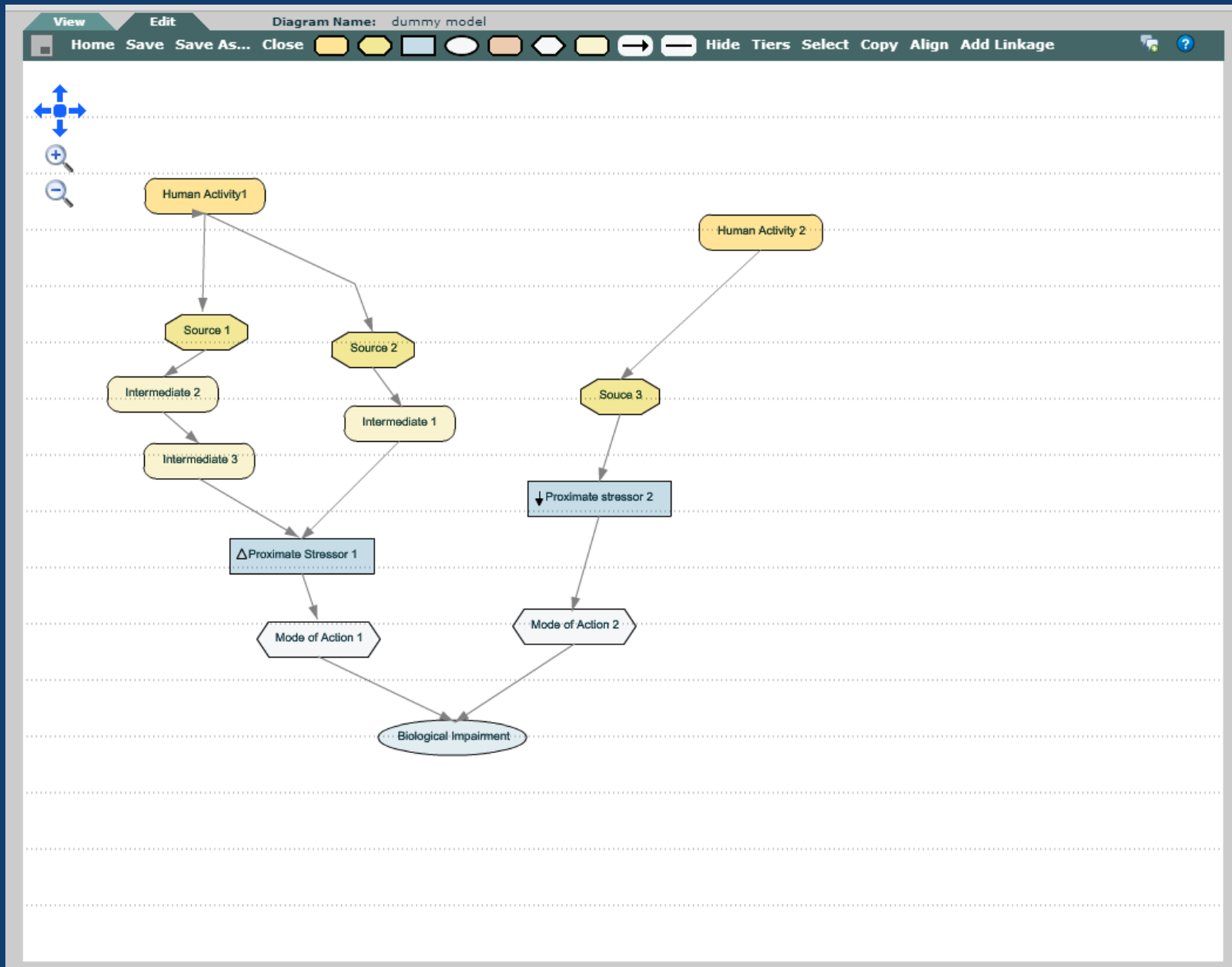
- Start with proximate stressors
  - Tend to be the basic organizational unit of the assessment
- How do they affect biology?
  - Way to double check your proximate causes
- Add sources and pathways
  - Going to be somewhat watershed/case specific
- Add the human drivers
  - Gives a management context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


View
Edit
Diagram Name: dummy model
Home Save Save As... Close
Hide Tiers Select Copy Align Add Linkage
Source 1
Source 2
Intermediate 2
Souce 3
Intermediate 1
Intermediate 3
Proximate stressor 2
ΔProximate Stressor 1
Mode of Action 1
Mode of Action 2
Biological Impairment

How to Build a Model

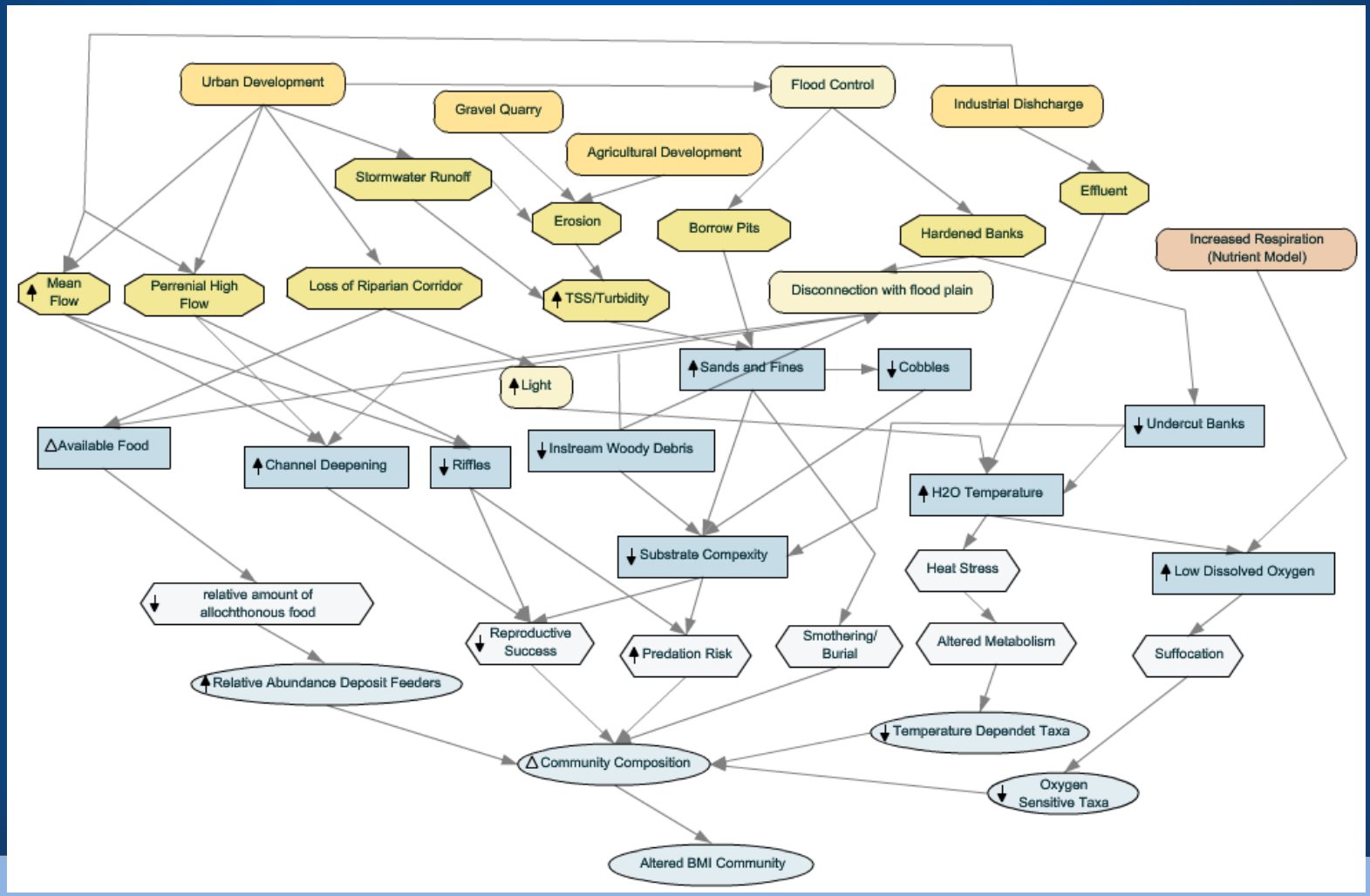
- Start with proximate stressors
  - Tend to be the basic organizational unit of the assessment
- How do they affect biology?
  - Way to double check your proximate causes
- Add sources and pathways
  - Going to be somewhat watershed/case specific
- Add the human drivers
  - Gives a management context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


View
Edit
Diagram Name: dummy model
Home Save Save As... Close
Hide Tiers Select Copy Align Add Linkage
Human Activity1
Human Activity 2
Source 1
Source 2
Souce 3
Intermediate 2
Intermediate 1
Intermediate 3
Proximate stressor 2
Proximate Stressor 1
Mode of Action 1
Mode of Action 2
Biological Impairment


View
Edit
Diagram Name: dummy model
Home Save Save As... Close
Hide Tiers Select Copy Align Add Linkage
Human Activity1
Human Activity 2
Source 1
Source 2
Intermediate 2
Intermediate 1
Souce 3
Intermediate 3
Proximate stressor 2
ΔProximate 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