



Creating Conceptual Diagrams

A worksheet and guide

The purpose of this worksheet is to determine the key message and science communication style to create an engaging and informative conceptual diagram.

1. Identify your audience and medium

Define a) the target audience: e.g., interested public, students, resource managers, scientists (more than one type of audience can be targeted) and b) the medium in which this diagram will be used (e.g., written report, web page, science communication product).

Target audience:

Primary: Informed stakeholders including TRPA governing board members, Lahontan Board members, local business community, politicians, chambers of commerce, county commissioners, South Lake Tahoe city council, local jurisdictions, environmental organizations.

Secondary: general public

Tertiary: science community

Medium:

Science Communication Products: diagram(s) will be presented to key stakeholders, included in more public-friendly/facing communication products, agency websites and environmental condition status and trend reports. A multi-page public-outreach pamphlet may also eventually be produced.

2. Develop an issue statement

Write one simple, declarative sentence (active title) that answers the following question: What is the main message?

The conceptual diagram depicts the key issues associated with assessment of the health of Lake Tahoe's nearshore environment, including nearshore definition, pollutant sources that degrade nearshore quality, transport mechanisms and relative loading rates, as well as beneficial use/water quality impacts.

3. Prioritize the key features

List the features needed to describe your message e.g., major habitats or structures (structure), important linkages or pathways (function). Prioritization is needed because only the top 3–7 features can be included on any one conceptual diagram.

1. Physiography - sub-alpine lake surrounded by steep slopes; undeveloped uplands characterized by coniferous forests; urban development concentrated close to the shores

2. Beneficial uses – water of extraordinary ecological and aesthetic quality (ultra-oligotrophic ecologic status); contact (swimming, boating, kayaking, stand-up paddle) and non-contact recreation (beach dwellers, fisherman); drinking water source (lake intakes)
3. Specific sources of pollutants and transport mechanisms –
 - a. Urban runoff from impervious surfaces & discharge pipes (roadways, parking lots, etc)
 - b. Fertilizer/Turf runoff and groundwater leaching
 - c. Stream inputs (stream channel erosion)
 - d. Forest upland runoff into stream (forest roads, burned forest area)
 - e. Boats (aquatic invasive hitchhikers)
 - f. Atmospheric inputs
 - i. Out-of-basin
 - ii. In-basin (vehicle emissions and road dust, residential wood combustion)
 - g. Harmful micro-organisms (geese, pet waste, human)
 - h. Sewage exfiltration
4. Associated impacts
 - a. Degraded nearshore aesthetic quality (periphyton on rocks, lower transmissivity)
 - b. Aquatic invasive species (milfoil, curly leaf pond weed, bass/bluegill, Asian clams, crayfish)
5. Contrast nearshore quality near development with undeveloped up to lake
 - a. Depict loss of riparian/soil natural function (impervious cover/development)
 - b. Depict native aquatic plants and animals off of undeveloped areas, better light transmissivity and no periphyton
 - c. Can a transition in quality be depicted?
6. Nearshore definition – visual depiction that the nearshore is a transition zone between terrestrial and the pelagic lake Tahoe extends from the shoreline at existing lake surface elevation to a depth contour where the thermocline intersects the lake bed in mid-summer; but in any case, with a minimum lateral distance of 350 feet lakeward from the existing shoreline. Cross-section included to illustrate key points
7. Key natural processes affecting variability of nearshore
 - a. Vertical mixing
 - b. Currents
 - c. Wind and Wave action
 - d. Thermal stratification
 - e. Sun light (illustrate how light is absorbed or scattered as a result of suspended particles and algae)

4. Identify and prioritize the major drivers

List the drivers or threats that will be depicted on the conceptual diagram (forcing function).

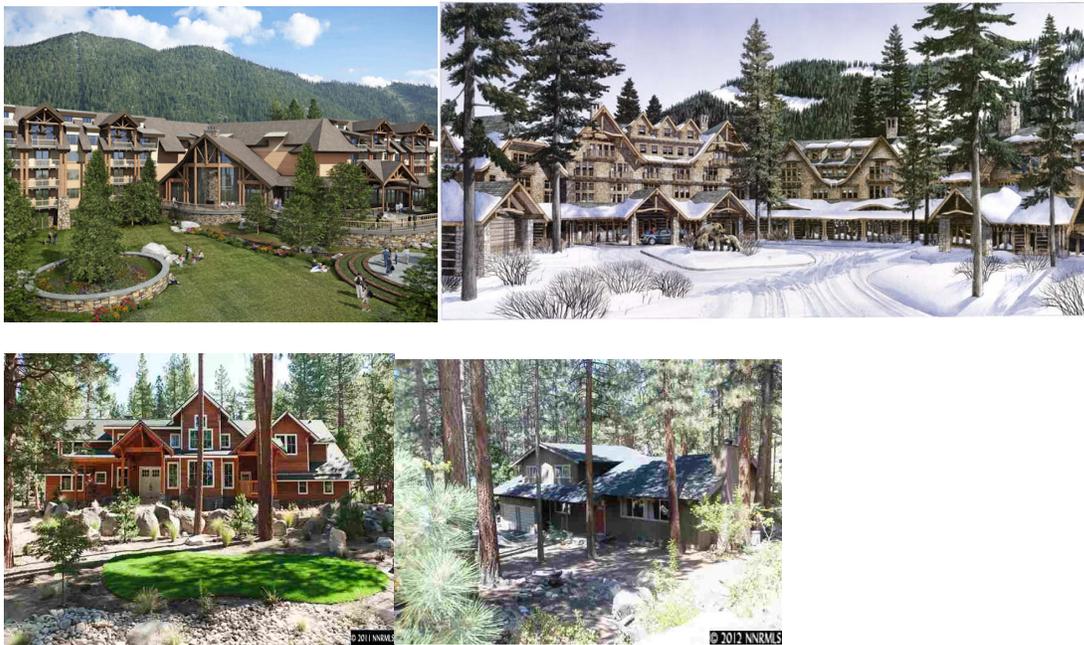
Prioritization is needed because only the top 1–5 drivers/threats can be included on any one conceptual diagram.

See key features above, which are listed in order of priority. Please note that this is subject to change based on the final conceptual model developed by the science team.

5. Develop a short list of symbols

List the symbols that will enhance the audience's ability to understand the location and context of the conceptual diagram. Symbols can represent various species of plants and animals or they can be human-built structures. Browse the IAN symbol libraries (<http://ian.umces.edu/symbols>) for inspiration for this symbol list, but new symbols may be needed.

I don't think there is a need to get too accurate or specific on most items, but from what I saw many of the symbols should suffice. For example, I don't think we need to get down to the species of periphyton or crayfish. And the SUV you already have should suffice. Distinct veg types is a level of detailed too refined, but having riparian species (willow, alder, aspen) near the stream makes sense. It would also be nice to have the building reflect the style at Lake Tahoe, which is somewhat distinct from what I saw in the library. Here's a few images that might help visualize the mountain chalet/cabin type building...



I didn't review all of the 200+ symbols in the library but here are some ideas for what might be additions.

- Burnt tree stand
- impervious cover
- Turf
- Native organisms and fishery - specifics?
- Non-native organisms and fishery - Asian clam, Bass/bluegill (warm water fish), Eurasian Milfoil, Curly leaf pond weed, Crayfish
- Attached Periphyton / filamentous algae

- Beneficial uses - beach goers, swimmers, boaters, kayakers, standup paddle, drinking water intake/pumphouse
- Nearshore processes (see above, wave action, littoral currents)
- Others?

6. Choose an ecosystem base and style

Consider the message, available space, and appropriate context within the document or medium in which the conceptual diagram will appear. Note: this may take some experimentation.

There are six major types of ecosystem bases: 2D cross-sections, 2D maps, 3D maps, 3D oblique, 3D scenes, and comparisons which can be 2D or 3D. The IAN symbol libraries have over 400 ecosystem bases that can be easily adapted to suit your needs, or provide further inspiration.

List the key ecosystem features that you want portrayed, for example, a river, mudflat, reef, mountain, glacier, watershed, or small scale habitat. Then choose your preferred ecosystem style from the examples on the following pages.

I would rely on your expertise for what the best visual depiction of all the key features would be. It is possible that we could do two graphics if it would be too busy to put all the information on one or if some components would be better to display on one and some on another.

Ecosystem style:

Ecosystem: 3D Snapshot/Scene; Aerial + cutaway. Cross-section to show submerged nearshore issues (AIS, periphyton, turbid water). See PDF version for example base types.

Key ecosystem features:

Depicting Lake Tahoe Nearshore environment, with surrounding land use (towns, forest, residential areas, paved and unpaved roads) and ecosystem features including streams, surrounding mountains, cleared forest areas...