

Generic steps for an ELOHA proposal –

Pre-proposal:

- ◆ Understand the region's legal and policy framework for instream flow management and identify opportunities for reform.
- ◆ Understand the water needs and interests of people in the region.
- ◆ Identify resource and capacity needs.
- ◆ Identify science and policy partners.

Proposal:

1. Identify “analysis nodes” for hydrologic foundation
 - a. Compile and geographically index (put into a GIS) existing ecological data once it has been reviewed for quality and methodological consistency (see ELOHA journal article for data guidelines)
 - b. With water managers, identify and geographically index locations in the region for which water managers may want to make allocation or other water management decisions.
2. Build the hydrologic foundation
 - a. Compile measured streamflow gaging data
 - b. Separate measured data into “baseline” and “developed-condition” hydrographs
 - c. Compile water-use data
 - d. Use regression, water accounting, or rainfall-runoff (watershed) modeling to synthesize baseline and developed-condition hydrographs for every analysis node. Hydrographs should all represent the same ≥ 30 -year time period. Ideal time step is daily. Geographically index the results.
3. Classify river segments (actually analysis nodes) according to *baseline* hydrology (gaged and synthesized, if available).
 - a. Compute hydrologic statistics using IHA or HIP (or other method).
 - b. Use a primary components analysis (PCA) (or other method) to classify the river segments according to similarity in hydrologic regime.
 - c. Use a “qualitative filter” to reduce the number of statistics to a reasonable number (≤ 6) for management.
 - d. Use geomorphology to sub-classify.
4. Compute hydrologic alteration (percent difference between baseline and developed-condition for each hydrologic statistic) for each analysis node, using IHA or HIP (or other method).
5. Develop flow alteration – ecological response relationships
 - a. Hypothesize flow-ecology relationships. An expert workshop is one approach.
 - b. Test hypotheses by plotting ecological data vs flow alteration for each flow statistic, for each type of river. Total number of plots = number of ecological indicators x number of hydrologic statistics x number of river types.
 - c. Develop monitoring plan to refine the flow-ecology relationships.

6. Conduct field investigations to better understand flow-ecology relationships and to improve instream flow management.

Other possible steps:

- ◆ Prioritize rivers or watersheds for more detailed analysis
- ◆ Use flow-ecology curves to quantify instream flow standards: Convene stakeholder groups to define acceptable ecological conditions for each river or class of river, in order to translate the flow-ecology curves into policy.
- ◆ Use flow-ecology curves to communicate implications of existing or proposed flow standards that were developed using other methods: The curves illustrate to stakeholders the tradeoffs between tightening or loosening the flow standards, in terms of impacts to the ecological services that they care about.