**Ecology and EPA are developing a Pollutant Loading Assessment (PLA) to understand the relationship of water, sediment, and fish tissue quality to the overall health of the Green/Duwamish watershed. The goal of this assessment is to determine ways to reduce ongoing sources of pollution in the watershed.**

The PLA will develop a watershed-based computerized "model" to help people understand what is polluting the river and where it comes from. This tool and future monitoring data will provide information to support cleanup and water quality decision-making in the Green/Duwamish watershed.

- Example decision making:
  - Cleanup: long term monitoring
  - Water quality: permitting/BMPs; water quality standards implementation tools

What questions are we trying to answer?

Manipulation of independent variables to derive "Management Scenarios"

Media-Specific Data	Regulatory Tools
Management Scenarios	
Control Actions	Geographic Differences
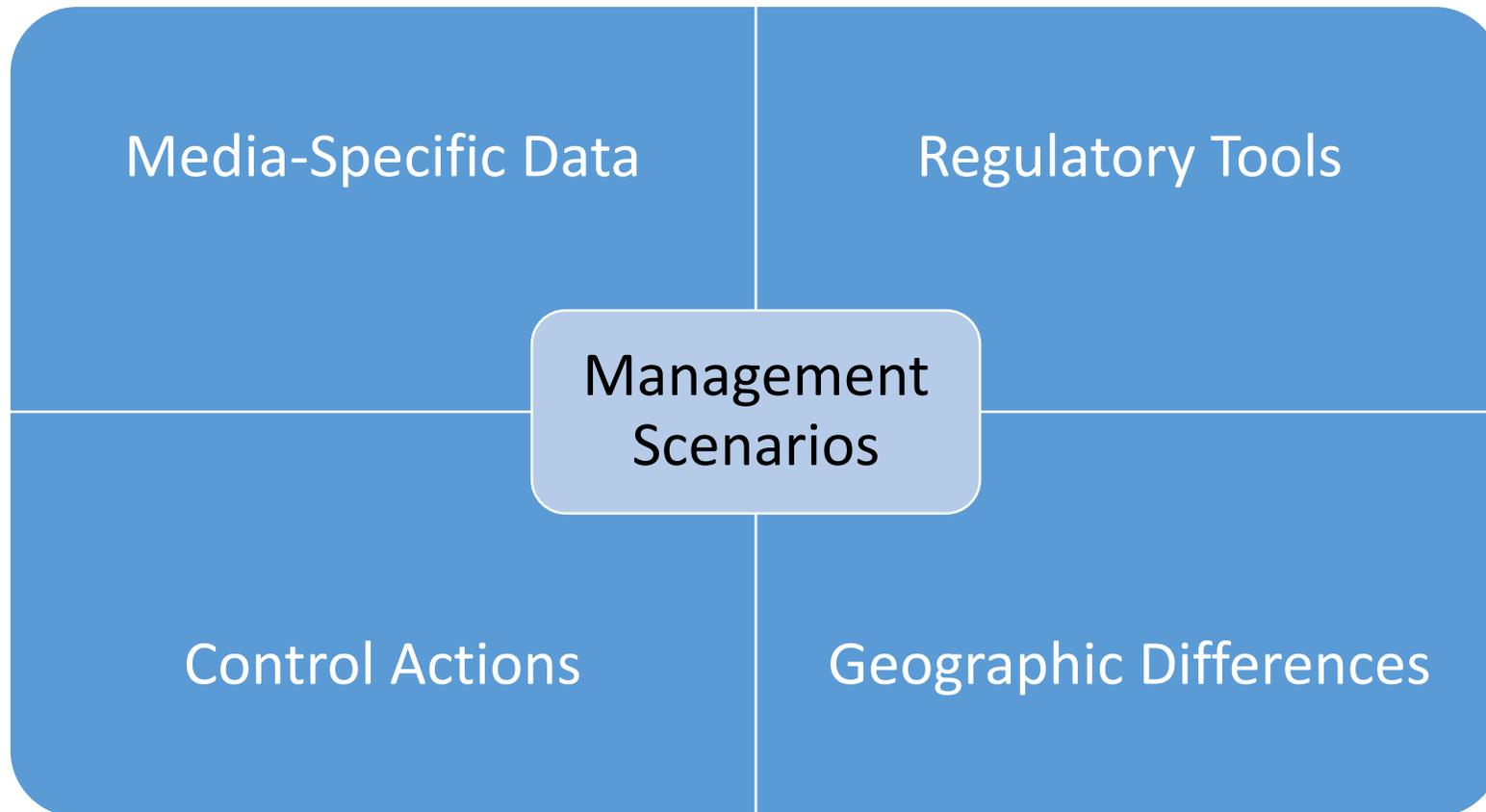
What questions are we trying to answer?

- Surface water (whole, filtered, suspended solids)
- Air (dep, gas)
- Bed sediments
- Tissue (edible, whole, poo)
- Stormwater (whole, solids)
- Groundwater
- Hydrologic...

Media-Specific Data

Regulatory Tools...

Management Scenarios

Control Actions...

Geography

- Tributaries
- Jurisdictions
- River Mile Segments
- Land uses
- Transportation corridors...

Green/Duwamish Pollutant Loading Assessment – What questions are we trying to answer?

- Step 1 "Baseline": What % of the pollutant load is from: CSOs, bed sediments, LDW stormwater runoff, various watershed flows, Elliott Bay, other?

Using an existing model (or models), we will conduct a SCREENING ANALYSIS to help us understand which pollutant transport pathways have a greater impact than others on the modeled outcome.

What pathways should we include in the model screening analysis?

- CSO discharges,
- Bed sediments,
- LDW stormwater runoff,
- Watershed flows (baseflow, storm events, dam releases)
- Elliott Bay (incl. East and West Waterways),
- LDW groundwater

Green/Duwamish Pollutant Loading Assessment – What questions are we trying to answer?

- Step 2 "Planned Actions": What is the effect of planned sediment cleanup and CSO control actions? (on water, tissue, bed sediments and suspended solids)
  - Will we meet standards? If not…
- Step 3 "Prioritize Pathways":
  a. What % of the remaining pollutant load is from: controlled CSOs, bed sediments, LDW stormwater runoff, various watershed flows, Elliott Bay, other?
  b. Which pathway has the most impact* to LDW bed sediments? To water column? To tissue? To suspended solids?
  c. How much pollutant reduction (per pathway) is needed to meet Water Quality Standards and attain designated uses?

Green/Duwamish Pollutant Loading Assessment – What questions are we trying to answer?

Examples of additional questions about the priority pathway(s):

- Step 4: If LDW stormwater runoff is most impactful…
  a. What level of treatment is needed to meet standards?
  b. What is the highest attainable condition that can be achieved by implementing stormwater AKART?

In order to evaluate whether or not a water quality standards variance is appropriate and allowable, we need to know if the designated uses and associated numeric criteria can be achieved by implementing AKART. If not, we need to know what the highest interim use and condition are.

Green/Duwamish Pollutant Loading Assessment – What questions are we trying to answer?

Example potential future adaptive use of the modeling tool:

- Step 5+: Stormwater management questions:
  - What are the predicted improvements if the air deposition fraction to stormwater runoff is addressed?
  - What are the predicted improvements if the solids fraction(s) of stormwater runoff is addressed?
  - What are the predicted improvements if seasonal first flush is addressed?

In order to answer questions like these, we would need additional studies and data collection to improve our temporal and geographic understanding of pollutant sources to stormwater.
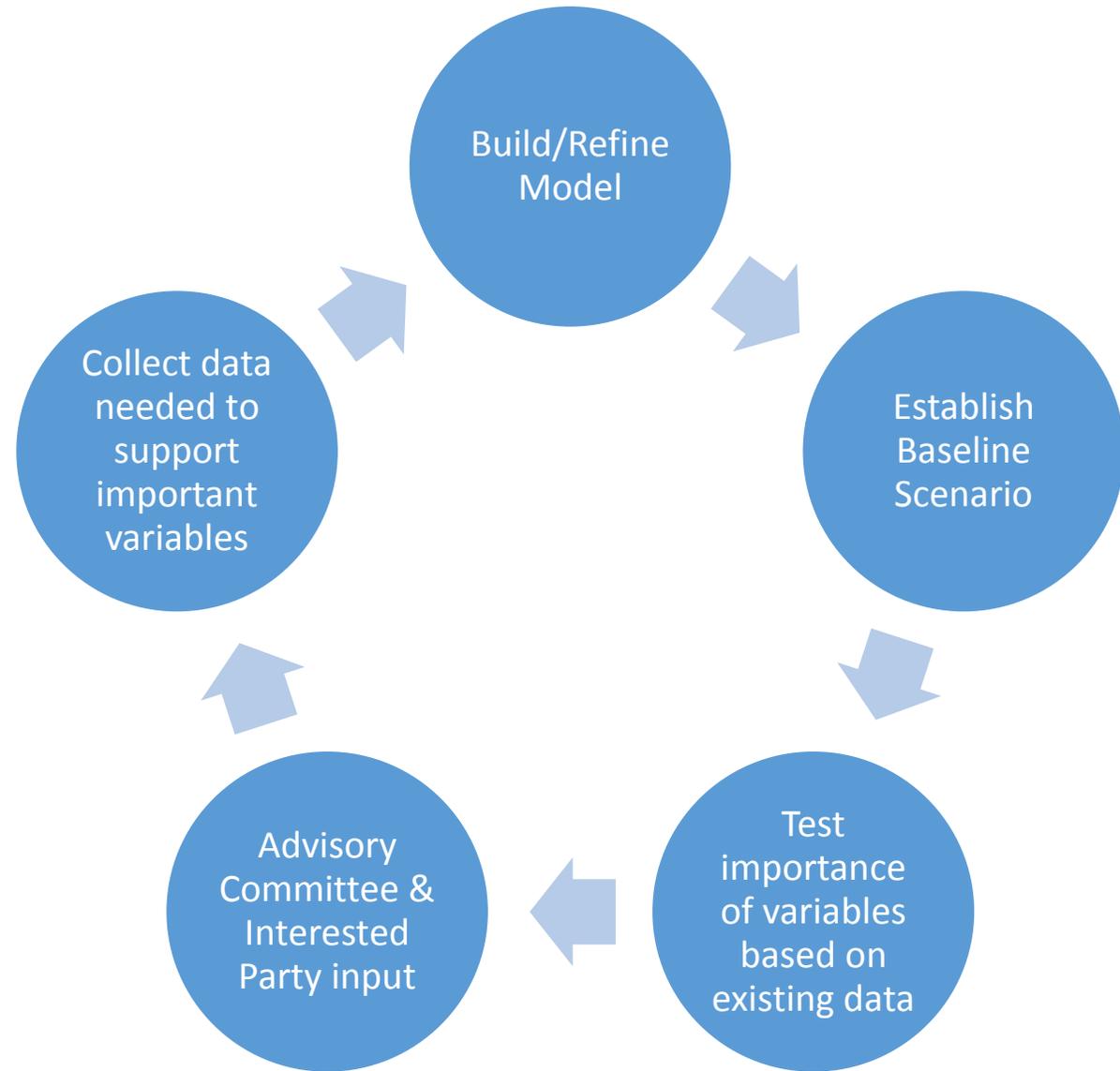
Which Pathways should we Screen?

- CSO discharges,
- Bed sediments,
- LDW stormwater runoff,
- Watershed flows (baseflow, storm events, dam releases)
- Elliott Bay (incl. East and West Waterways),
- LDW groundwater

Pathways of Pollution to the Lower Duwamish Waterway
a conceptual model