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One Health: Cumulative impact assessment and actions in the context of environmental justice

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Key definitions

Cumulative Impacts *is the total effect from the combination of multiple stressors on environment and community.*

Cumulative Impact Assessment *is the structured process to understand and analyze the combined effects of those stressors for informed decision-making.*

Note: EPA distinguishes Cumulative Impacts from "Cumulative Risks"

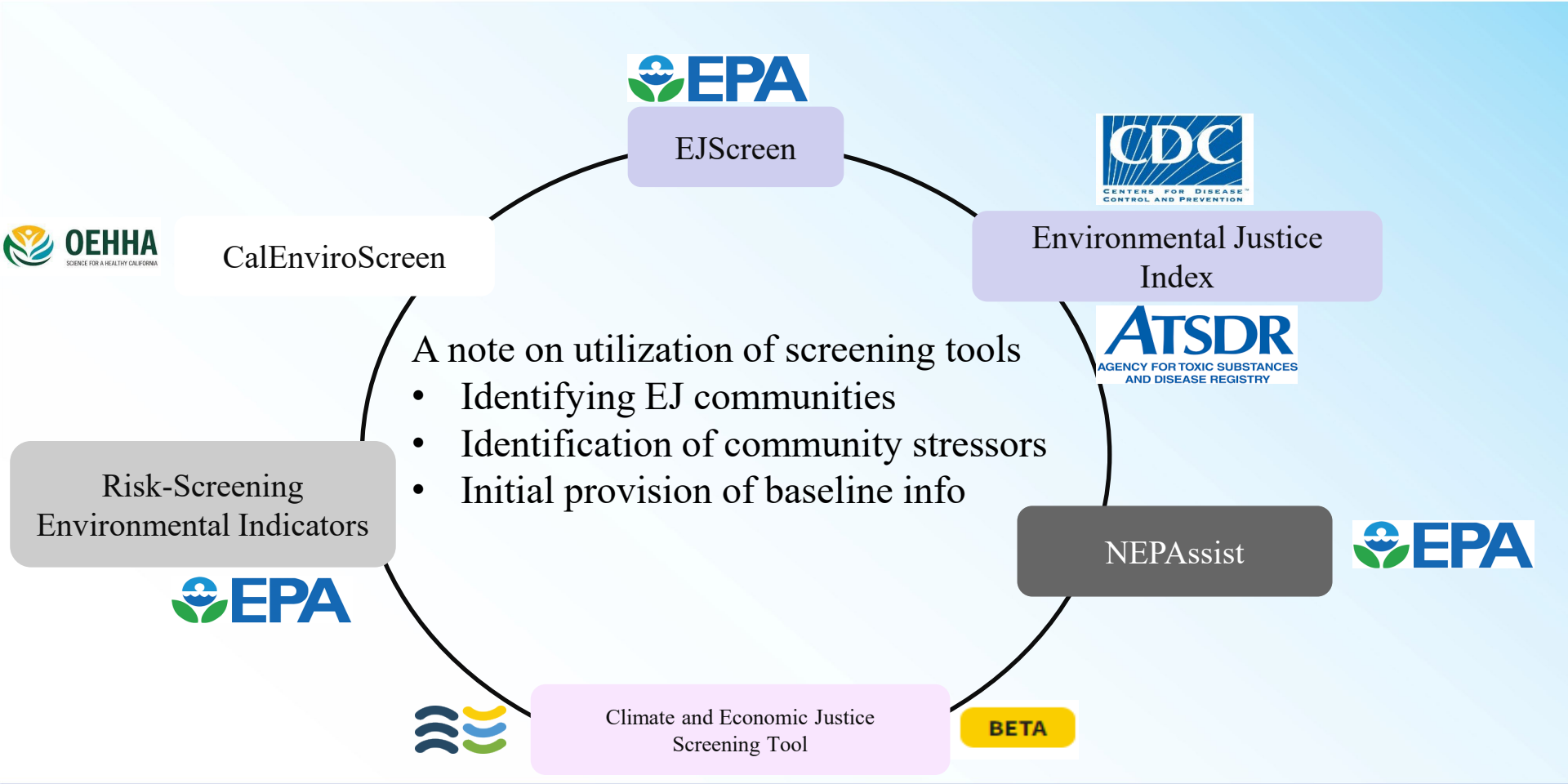
Framework for CIA in EJ context can draw from:

- NEPA and state CIA
- Urban planning frameworks
- Airshed and watershed frameworks
- Risk assessment frameworks for multiple stressors
- Causal analysis frameworks (prospective and retrospective)

Environmental Justice Communities

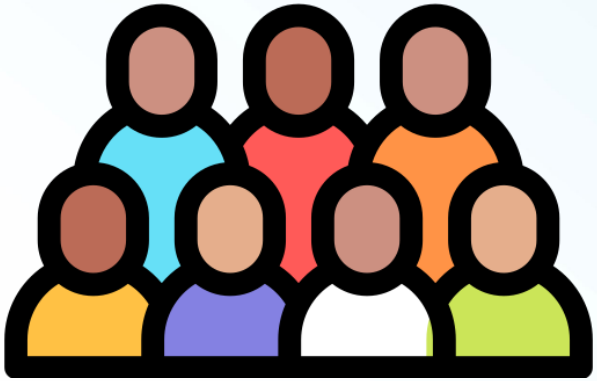
CIA Challenge and Opportunity: Multiple Stakeholders

A Framework Integrating CIA within Stakeholder and Communication Processes



White House Council on Environmental Quality (CEQ)

CIA approaches may involve different initial drivers



Effects- or condition-based

(e.g., health effects, pollutant, environmental)

We will illustrate this aspect

Stressor/source-based

(e.g., siting / permitting / remediation)

Conceptual Approach to CIA

Four technical steps for CIA

1. Develop conceptual model of relationships

2. Conduct a risk/impact assessment for project-specific stressors

3. Screen stressors within the region for potential additivity or interaction

4. Quantify/evaluate “cumulative impacts”

Step 1: Conceptual model of relationships

- Relate project-specific stressors to the communities of interest
- Establish receptors and endpoints
- Tailored to needed level of complexity

Review, communicate, make decisions as appropriate for next steps in assessment and/or regulatory process

Step 2: Conduct an impact assessment for the project-specific stressors

- Define exposure regimes using standard methods, including spatial representations as appropriate

- Determine incremental impacts and place in context with baseline risks and benchmarks for impact/risk.

Step 3: Screen stressors within the region for potential for additivity or interaction

Screen based on:

- Same pollutant in baseline
- Same or similar types of health or environmental effects, outcomes, and/or concerns

Accomplished by:

- Review baseline information
- Comparisons with reference values and conditions
- Community engagement
- Expert elicitation

Step 4: “Quantify/evaluate” cumulative impacts

“Quantify” based on:

- Health risk/impact estimates with incremental contributions of project added to the appropriate baseline levels
- Individual and combined risk/impact levels using risk metrics
- **Ecosystem services !!!**

Rationale and examples:

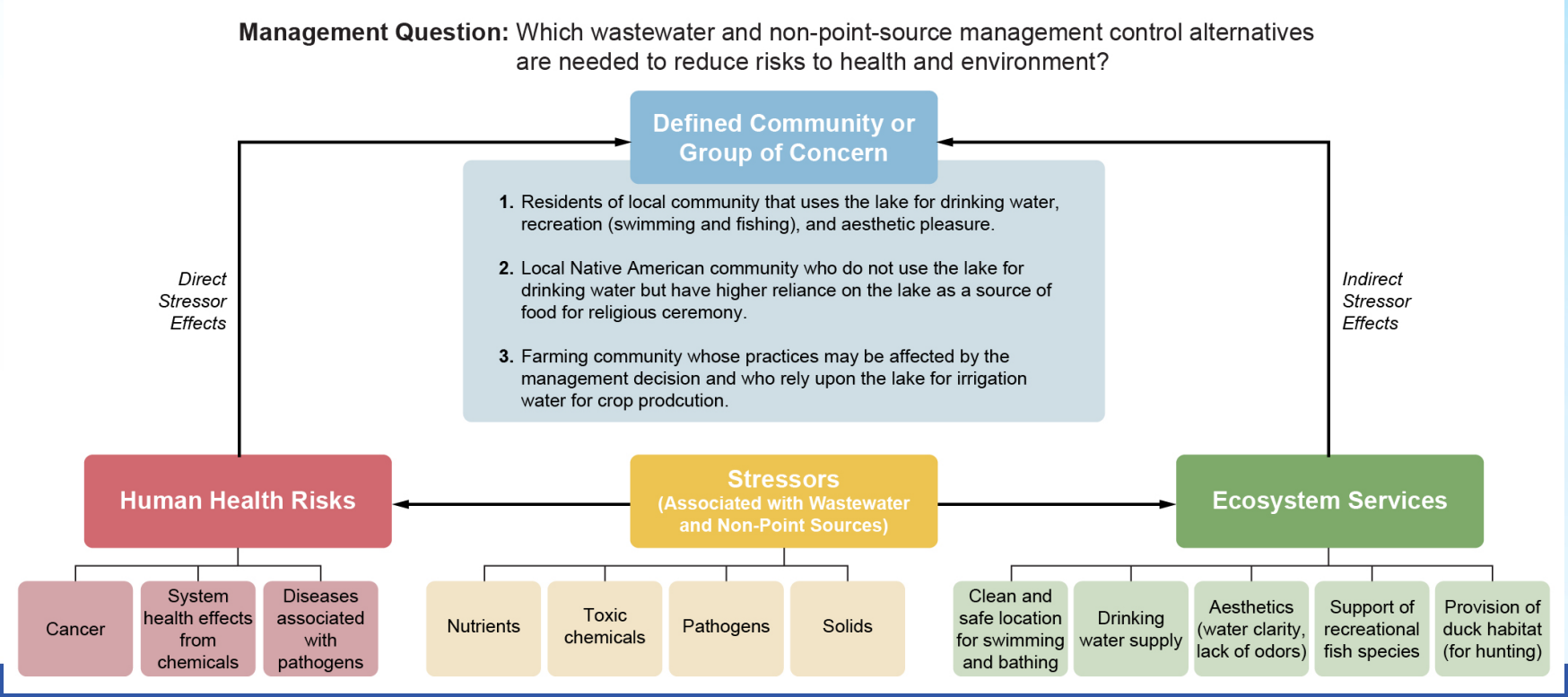
- Cancer and systemic health can be directly related to defined risk levels and organized around specific pollutants and endpoints
- The combined effects of different factors can be better illustrated using relative risk and other metrics

A Simple Example

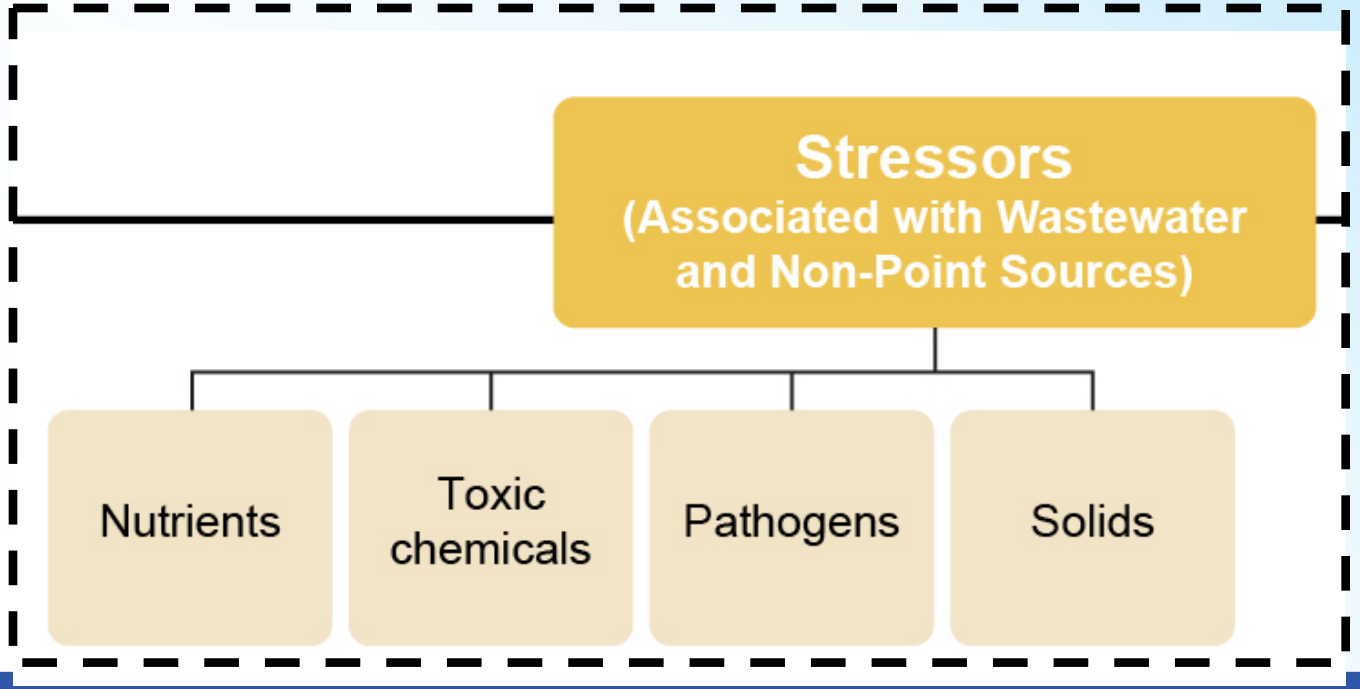
This case involves:

- Plan to upgrade infrastructure to improve water quality
- Relative Risk (impact) Model (RRM) to evaluate multiple stressors and cumulative impacts
- Approach based on defined populations, including EJ communities, considering both potential direct impacts as well impacts on the environment and associated ecosystem services

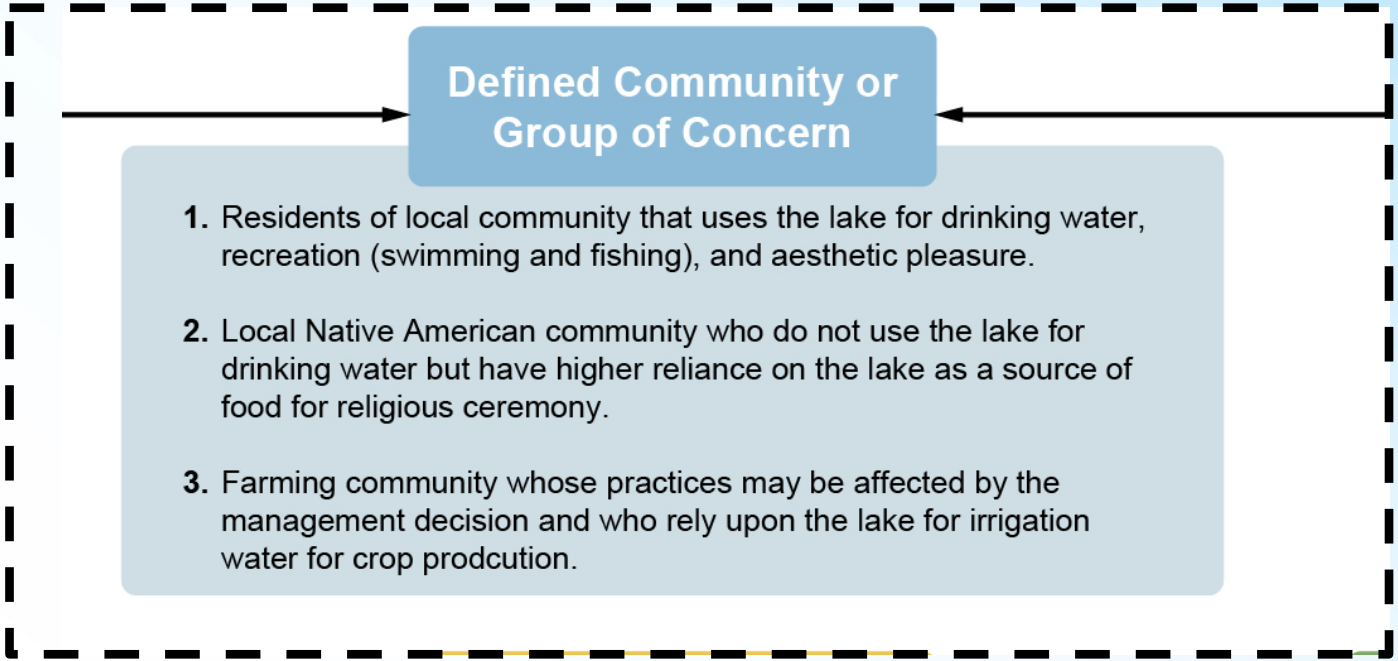
The example regarding infrastructure improvement and changes in stressors and impacts



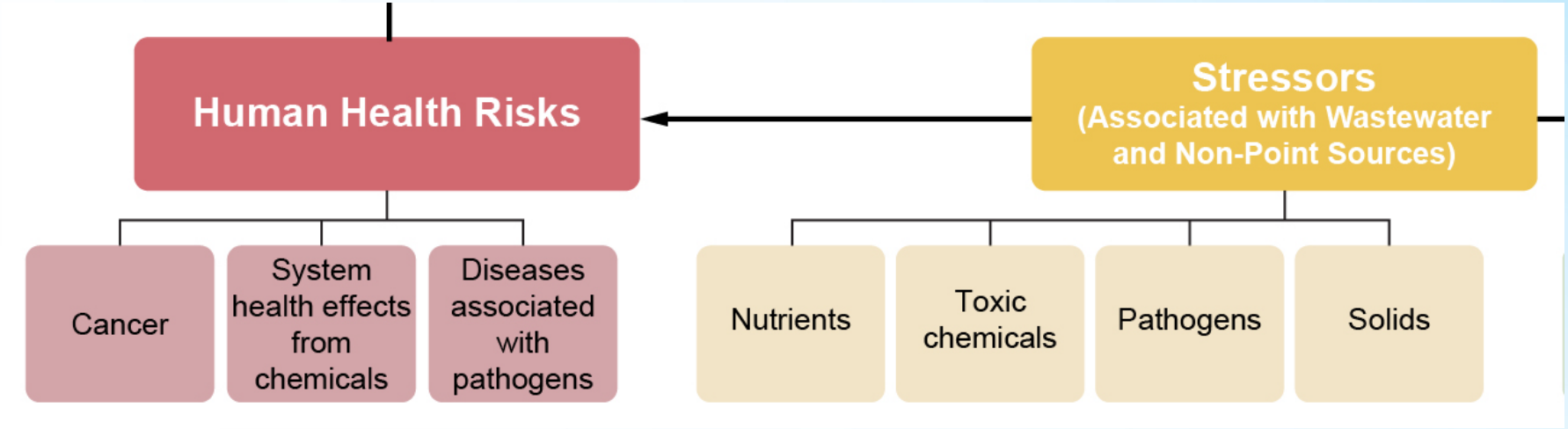
Identify the project related stressors



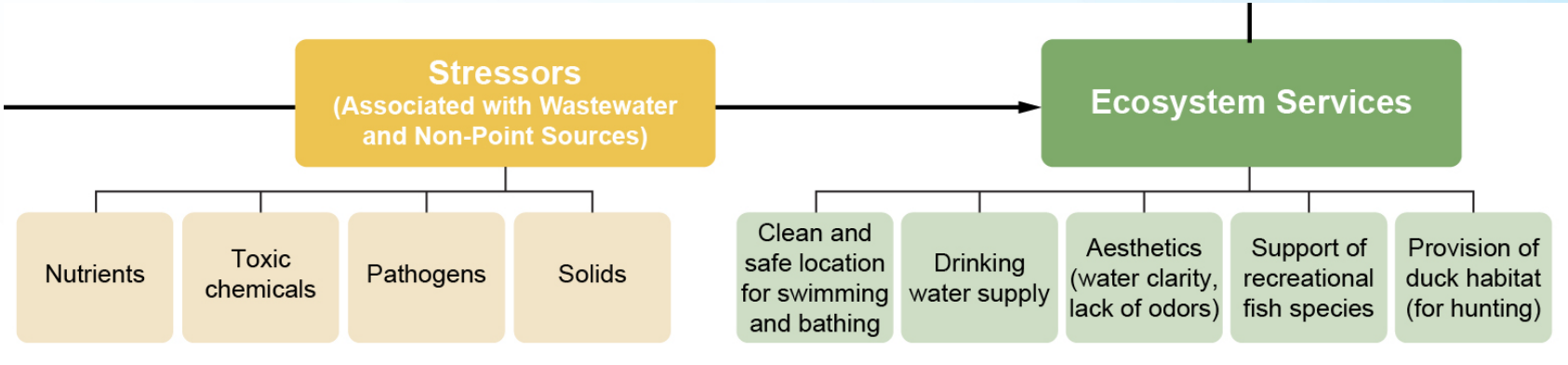
Understand the nature of the communities and stakeholders



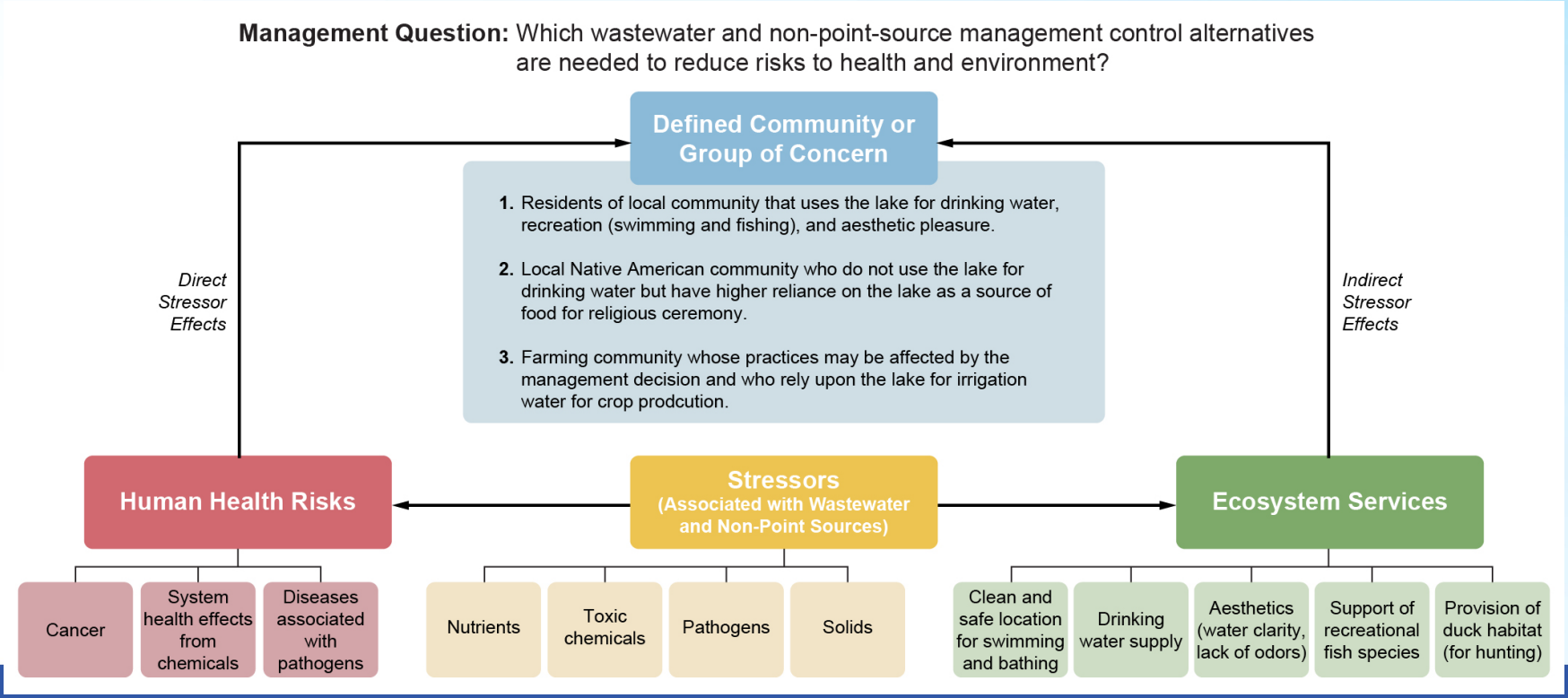
Relate stressors to community-specific human health risks



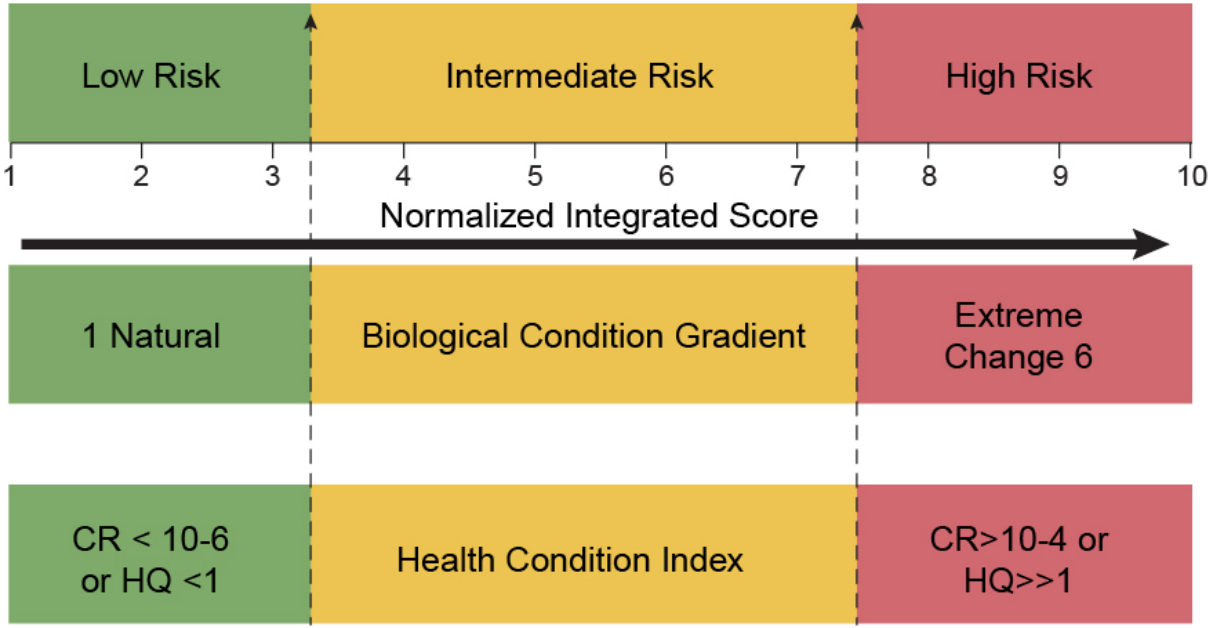
Relate stressors to impacts/risks to ecosystem services



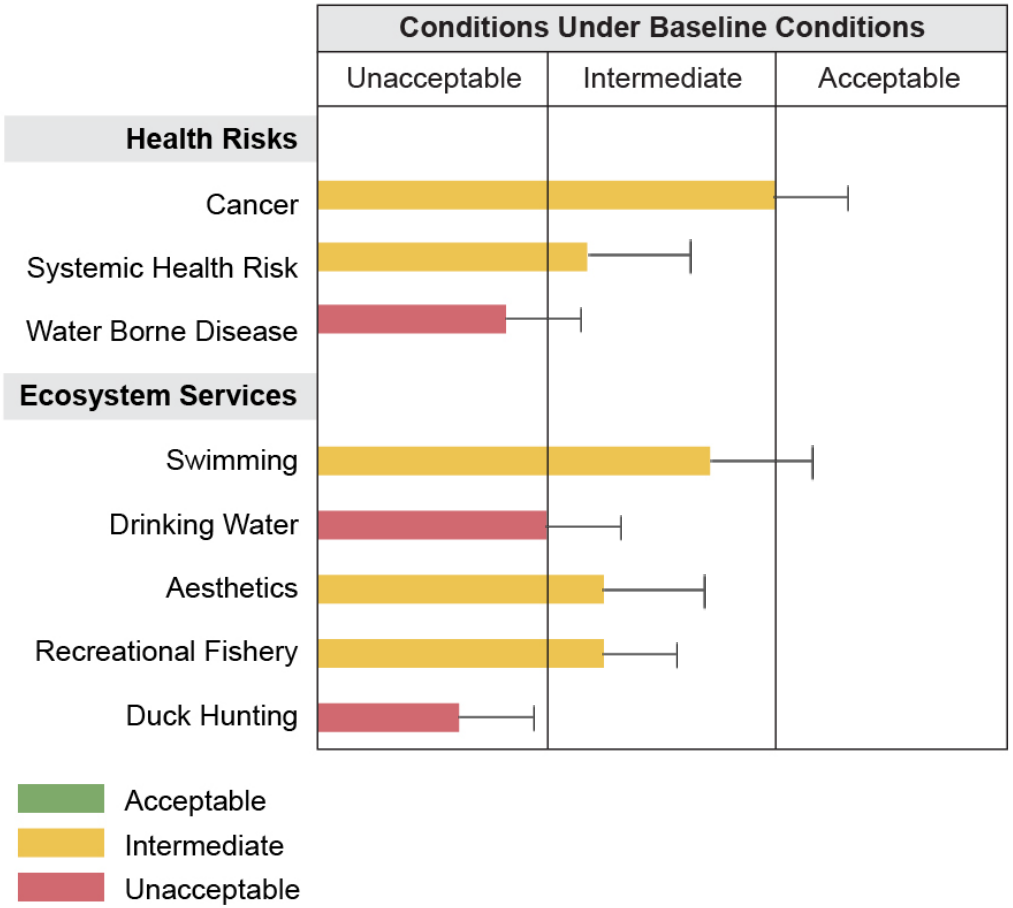
One Health Perspective: integrate human health and ecosystem services for defined communities



Utilizing relative risk/impact scaling normalized for each type of impact

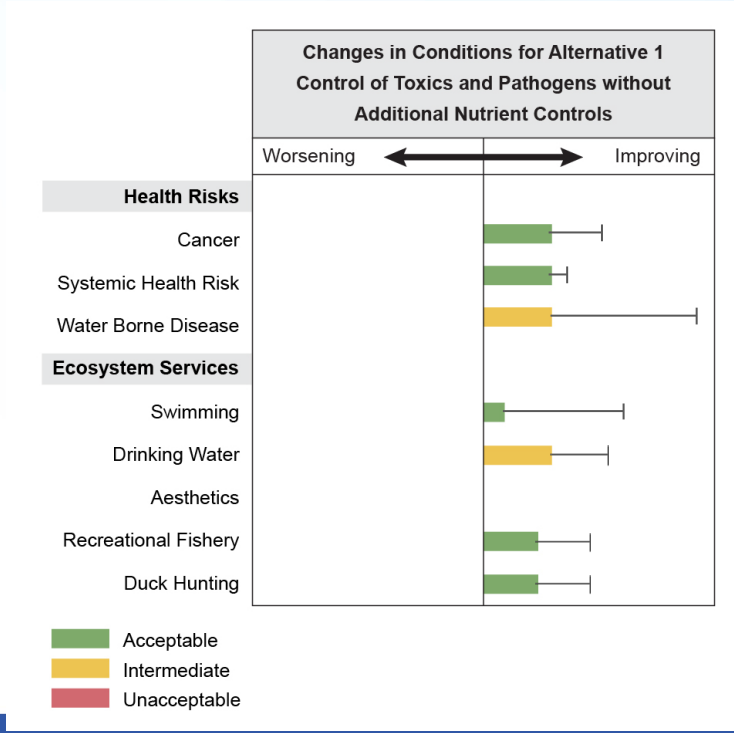


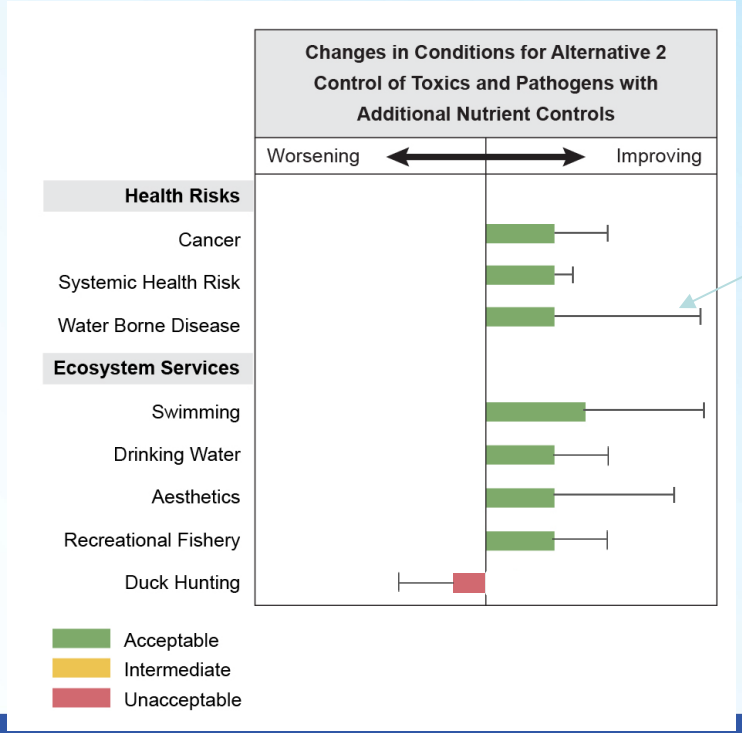
- Stressors considered collectively
- Facilitates comparisons of the magnitudes of impacts at baseline and changes from baseline (i.e., increasing or decreasing stressors and associated impacts).
- Facilitates communication



Baseline health and ecosystem impacts / risks

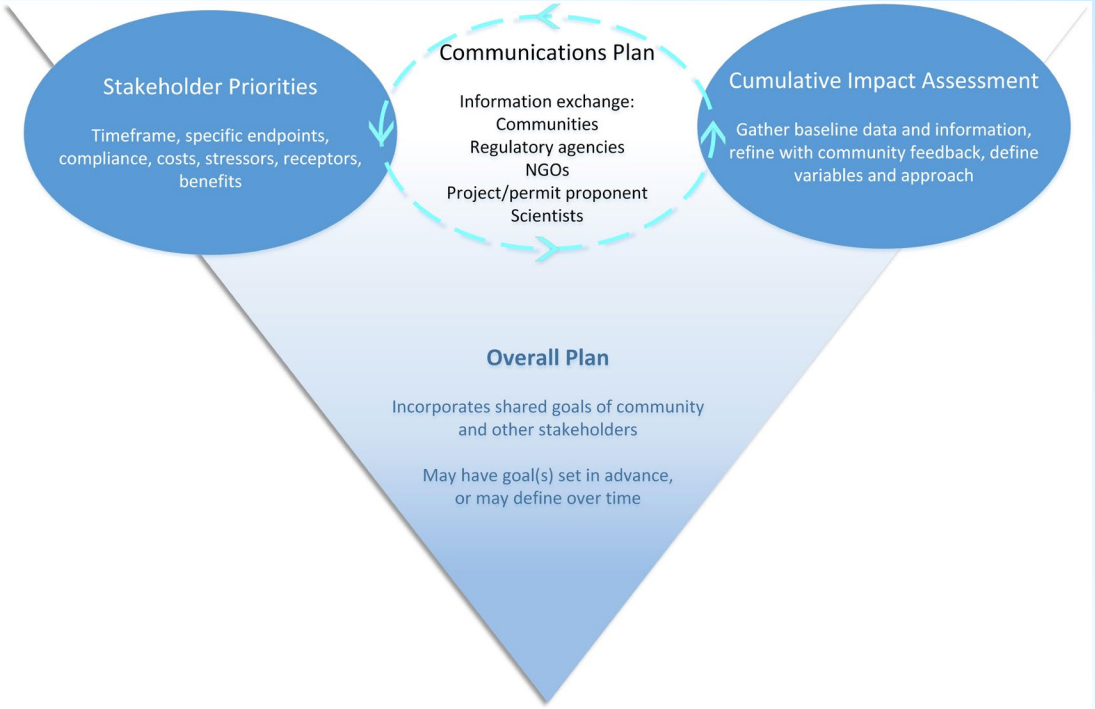
Changes in relative risks/impacts for two wastewater treatment alternatives



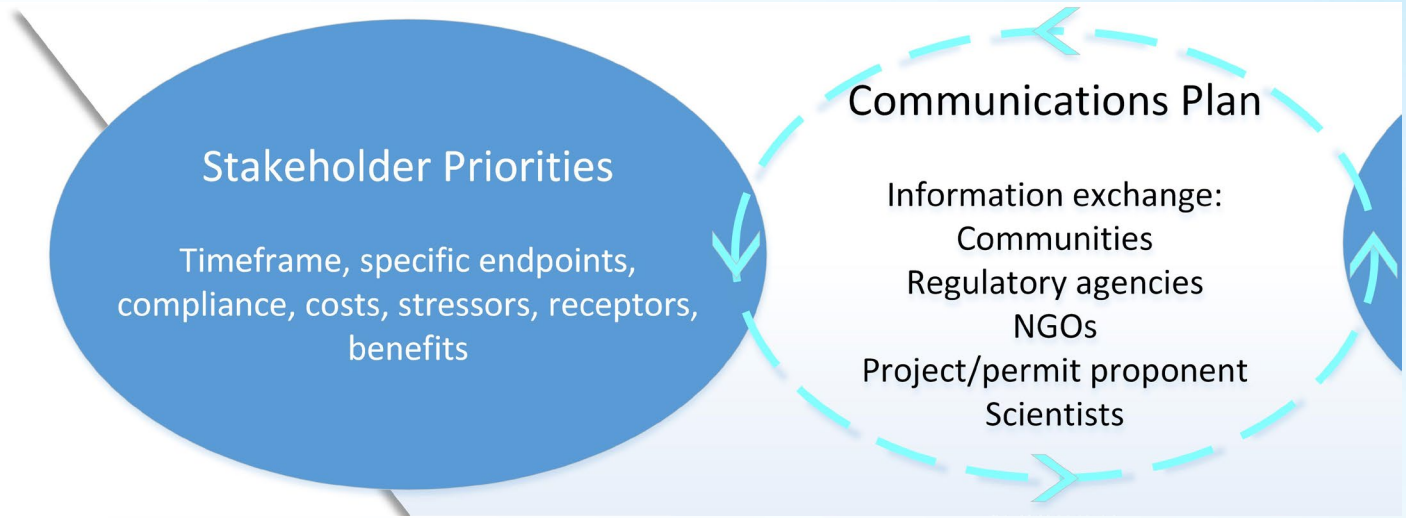


What is driving this uncertainty? Opportunities for addressing early on in project design?

Returning to the framework



Decisions affecting EJ communities (and others) require effective stakeholder engagement, communication, and careful listening to achieve a shared understanding



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