

Assessing risks to inform AIS management

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What is risk assessment and why is it important?

- Which AIS should be prioritized for management?
- Where should management focus?
- **What is the risk of _____?**

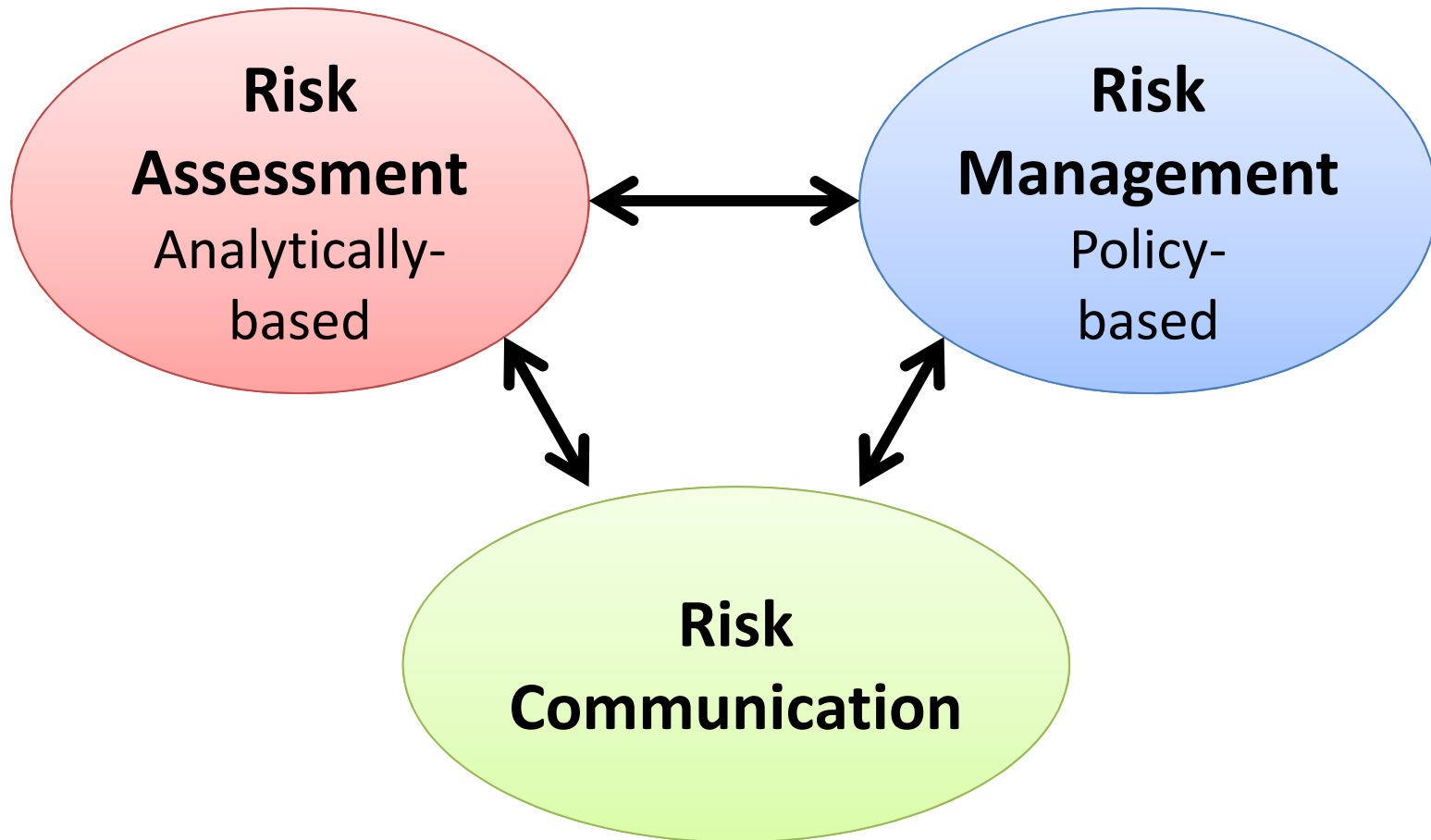


Risk assessment is central to decision making concerning AIS

Outline

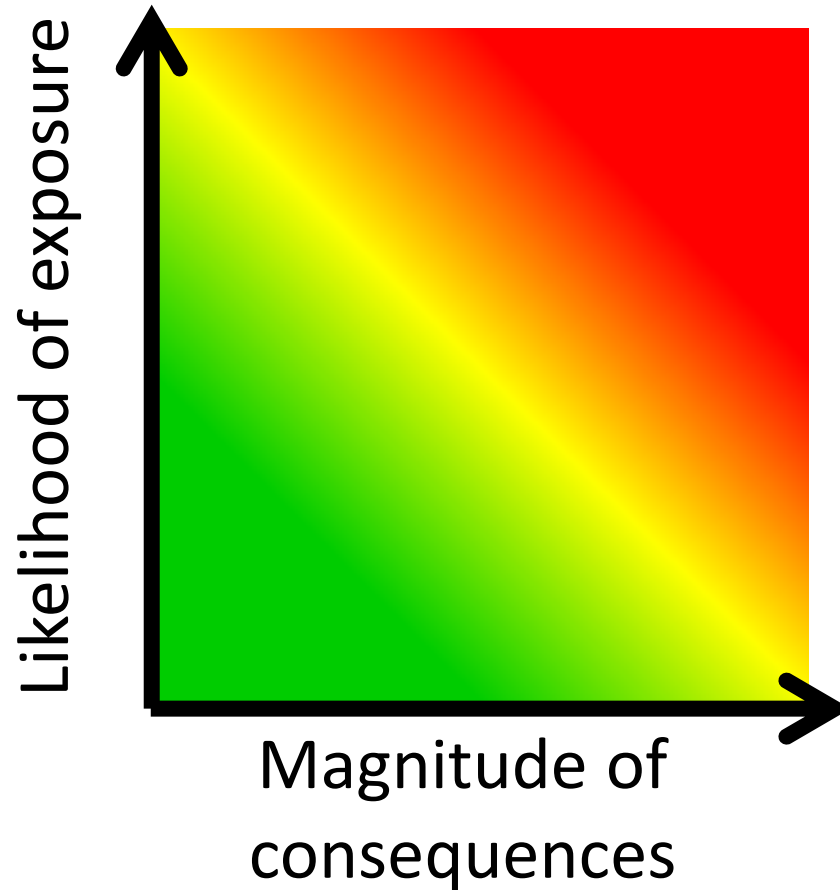
- Introduction to risk assessment
 - How it informs AIS decision making
- Invasive Asian carp example
- Bait harvest example
- Questions and discussion

Risk analysis



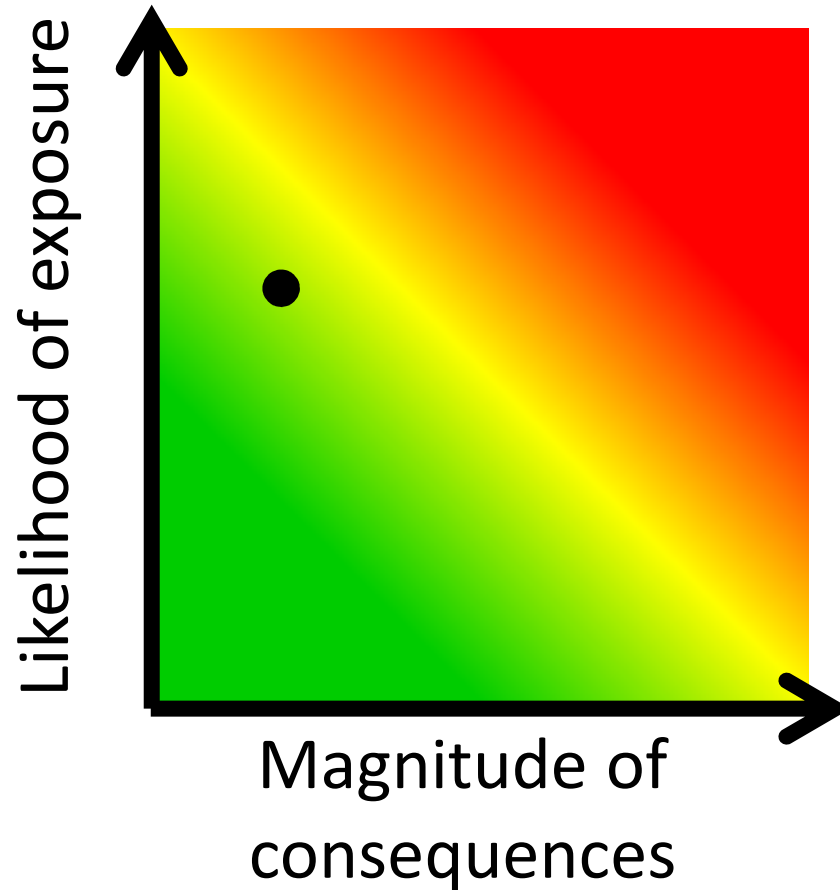
Simple definition of risk

$$\text{Risk} = \text{Exposure} \times \text{Consequence}$$



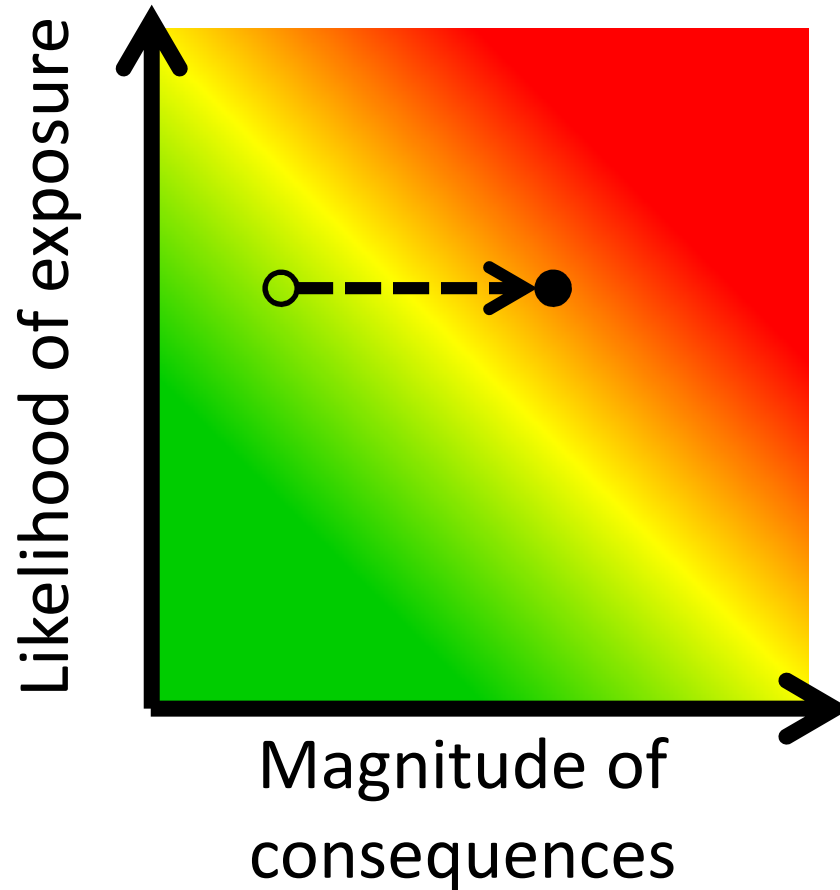
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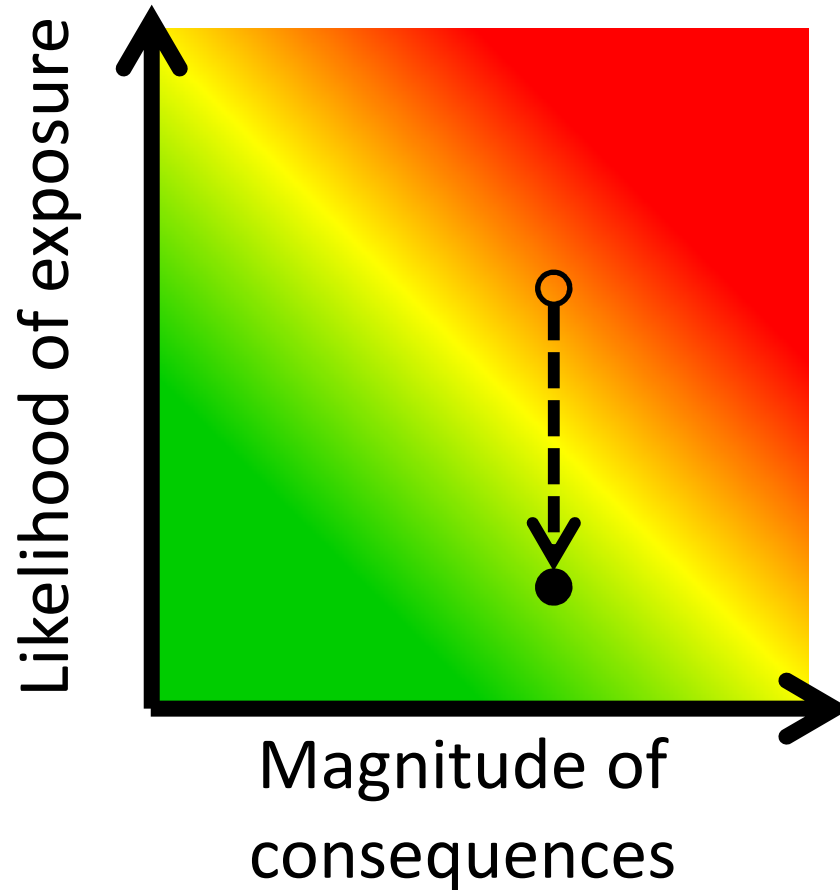
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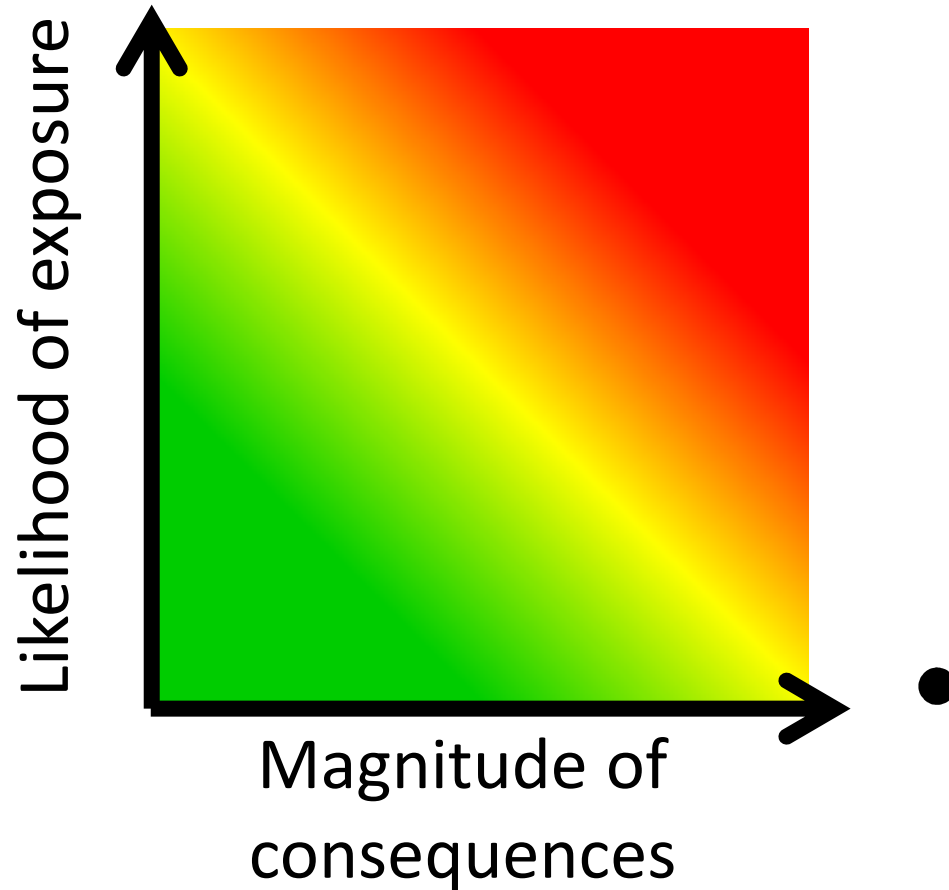
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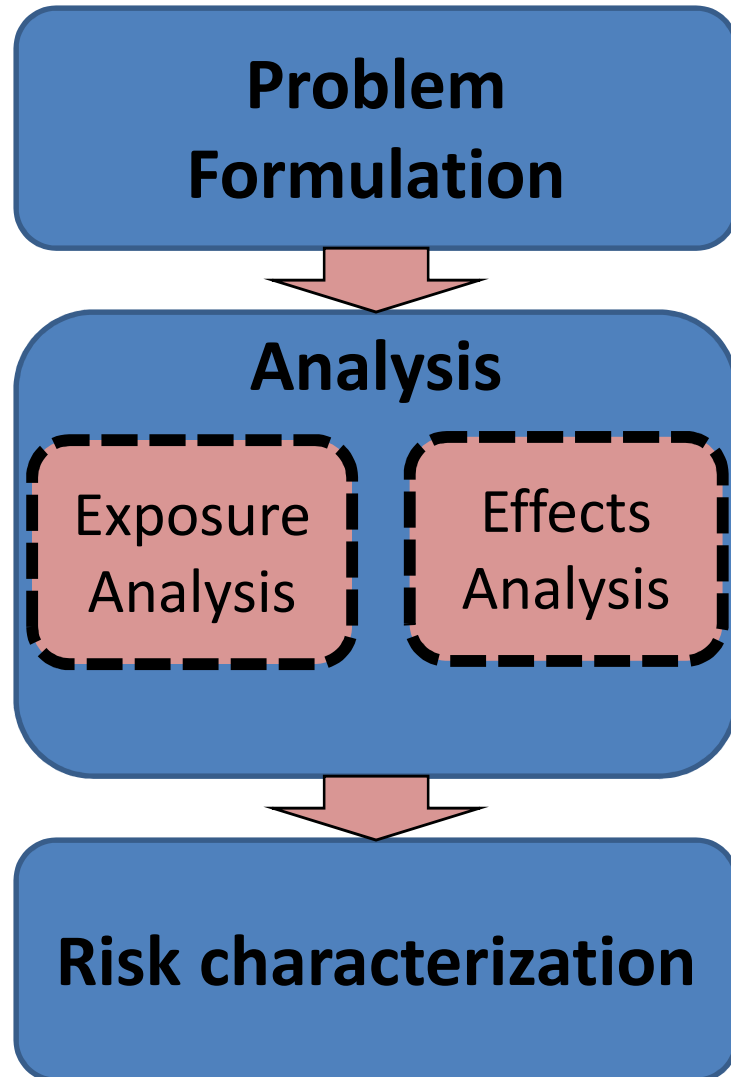


Simple definition of risk

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Ecological Risk Assessment (ERA) for AIS



What is the context?

What could cause harm? (stressor = AIS)
What is valued in the uninvaded system?
(e.g., species or recreational use)
How could they interact? (risk pathways)

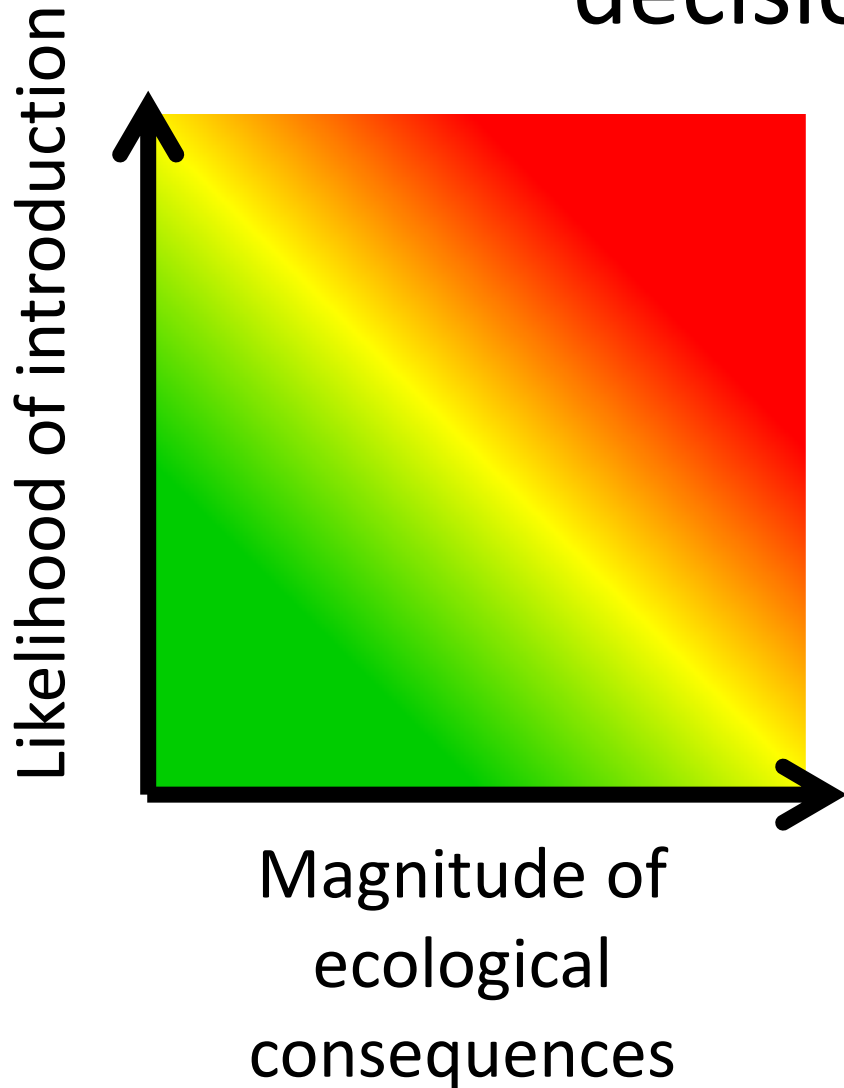
Exposure Analysis: Likelihood of introduction, establishment, or spread of AIS

Effects Analysis: Probability and severity of consequences

Risk characterization

Characterize risk and summarize findings for decision making

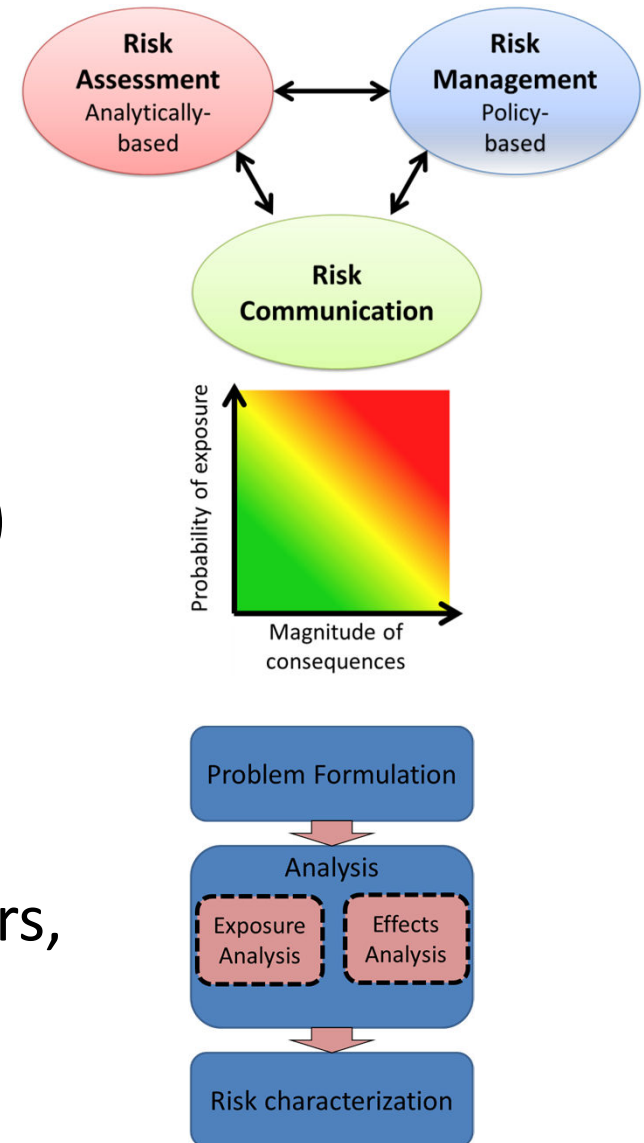
How is ERA used to inform AIS decision making?



- Risk is a product of:
Exposure & Effect
- Identifies points for management
 - Pathways for introduction
 - Susceptible environments
- Prompts discussion about what change is undesirable
- Helps determine research needs

Risk assessment best practices

- Right participation
 - What is valued?
 - What are risk pathways?
 - Are the results trusted?
- Correct scope (spatial & temporal)
- Properly deal with uncertainty
- Right scale of ERA
 - Formal risk assessment by agency
 - Less formal brainstorming of stressors, valued entities, risk pathways



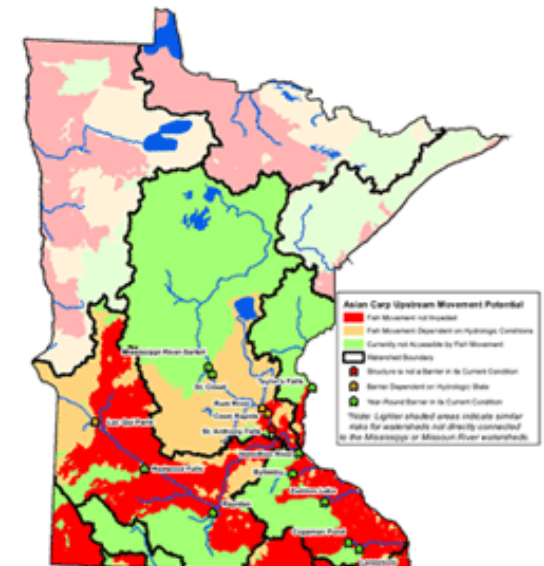
Invasive Asian carp

- Asian carp = Bighead, silver, black, grass
- Bighead and silver escaped to wild in 1970s
 - Imported to southern US for aquaculture
- Bighead and silver carp disrupt ecosystems by consuming plankton & macroinvertebrates
- Silver carp jump up to 10 feet when startled
- 2014 MN findings in Mississippi river
 - Cottage Grove (silver & bighead),
Lake Pepin (bighead), Hastings (silver),
mouth of St. Croix (bighead)



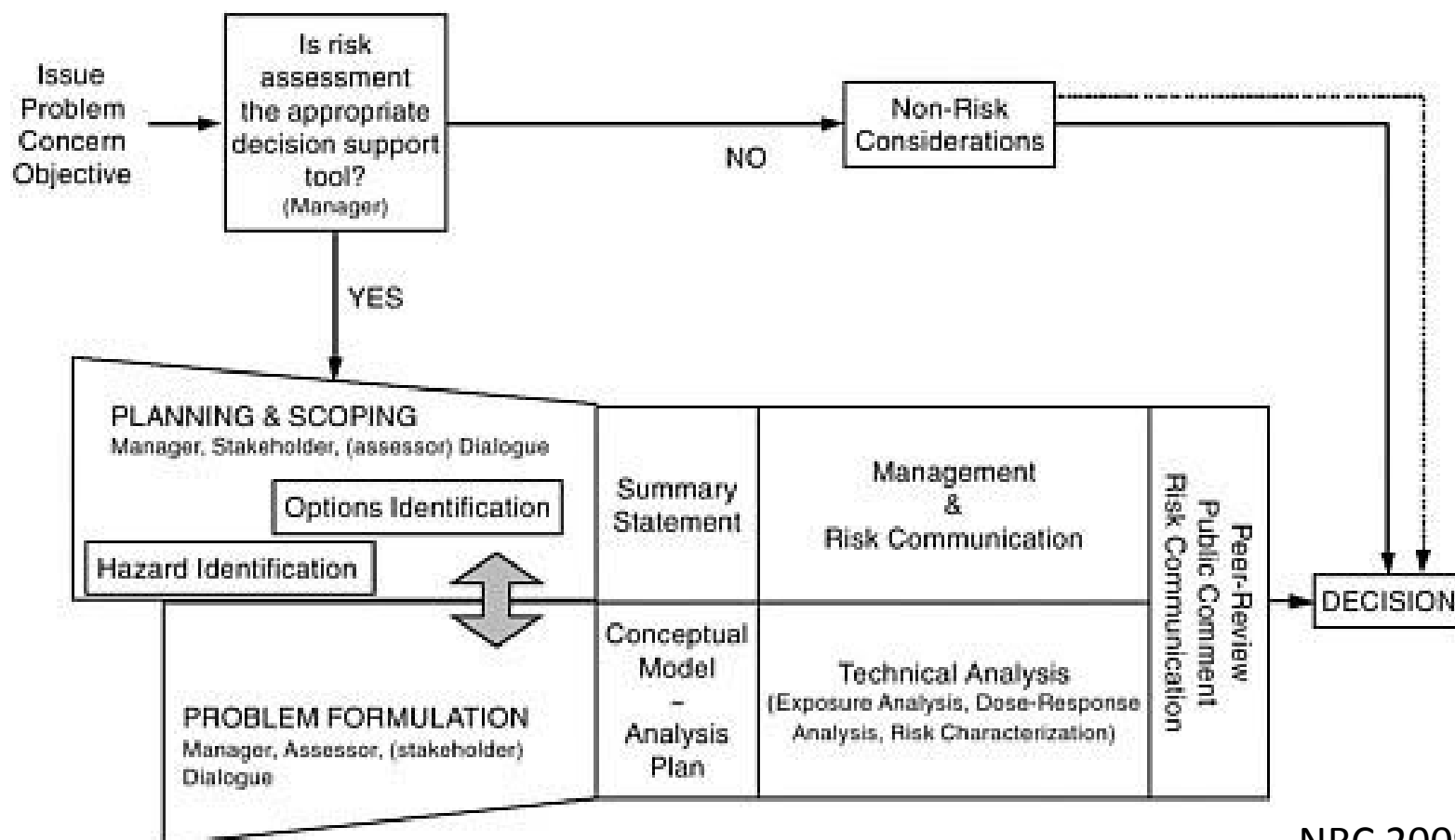
ERA and invasive Asian carp

- Existing work has largely focused on potential spread (exposure) and not consequences (effects)
 - What are potential adverse effects given establishment?
 - What waterways, species, and areas of the state are of most concern?
 - What management should be pursued?
- Create robust list of potential adverse effects to analyze
 - Conduct focus groups with managers and stakeholders



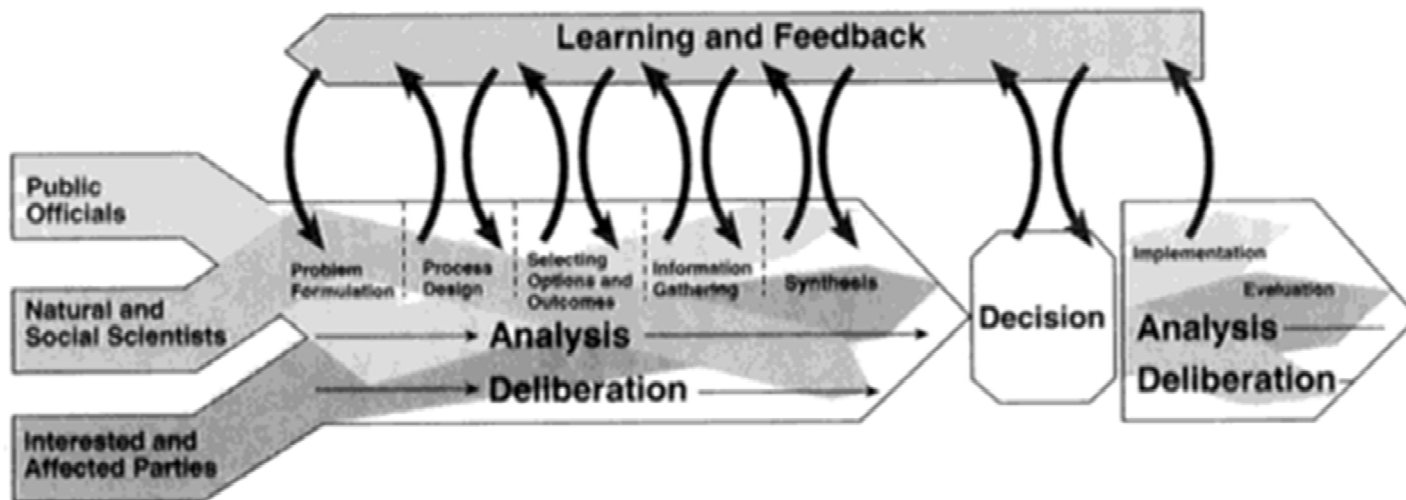
Risk assessment

- A structured process for supporting decision making



Risk assessment characteristics

- Participatory – stakeholders, deliberative
- Evidence-based – analytic



NRC 1996

Risk assessment characteristics

- Participatory – stakeholders, deliberative
- Evidence-based – analytic
- Policy informative – relevant
- Generates new information – priorities, gaps
- Never-ending – iterative (but with endpoints)

Example: bait harvest

- AIS movement during bait harvest in infested waters
- Can we refine policies governing this activity?
 - Without increasing AIS risk or difficulty of enforcement
 - While simplifying operations and applying statewide

Bait harvest in infested waters

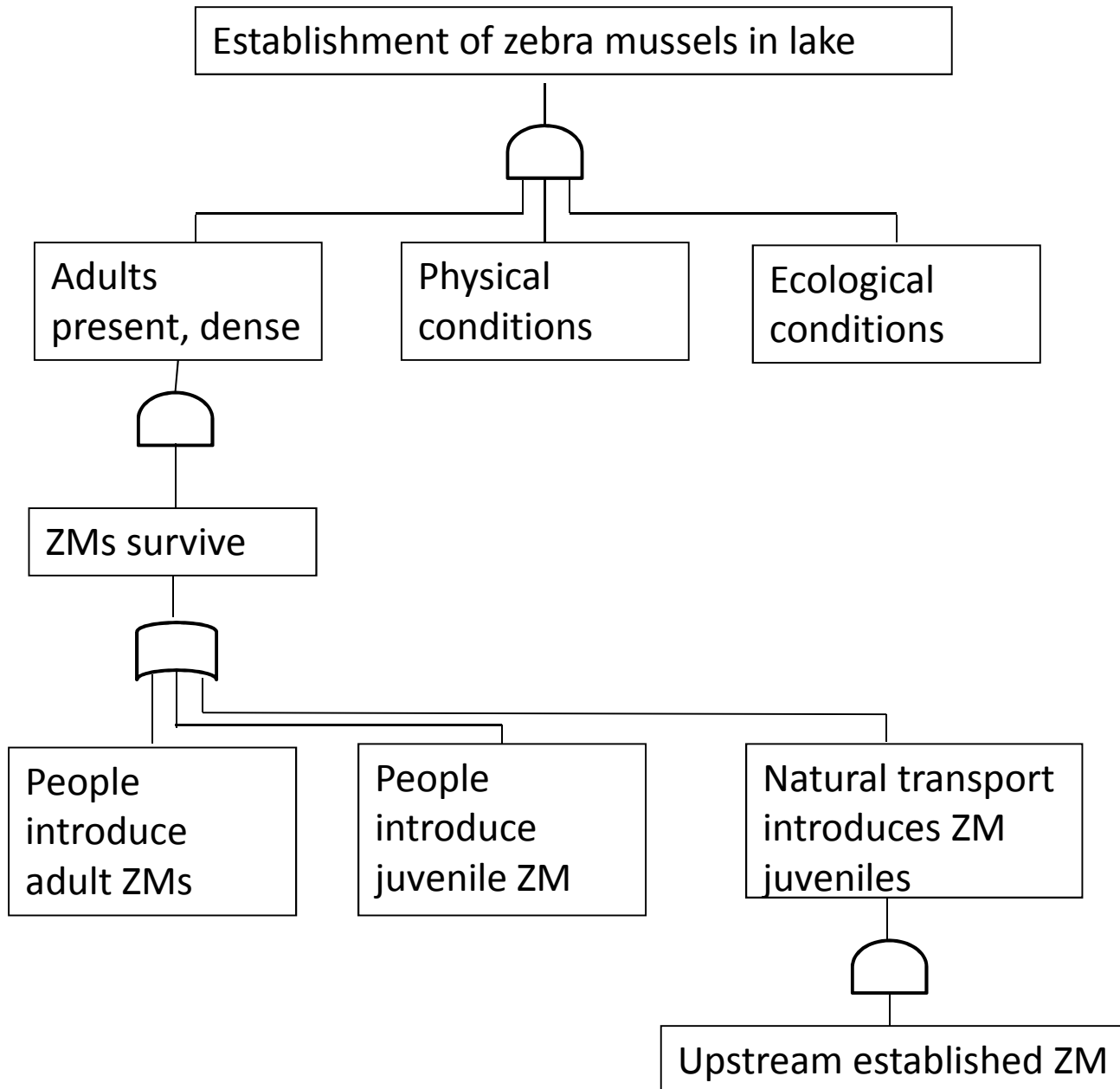
- Convene stakeholders
- Model bait harvest processes
 - identify activities with risk of AIS transfer, and how to mitigate

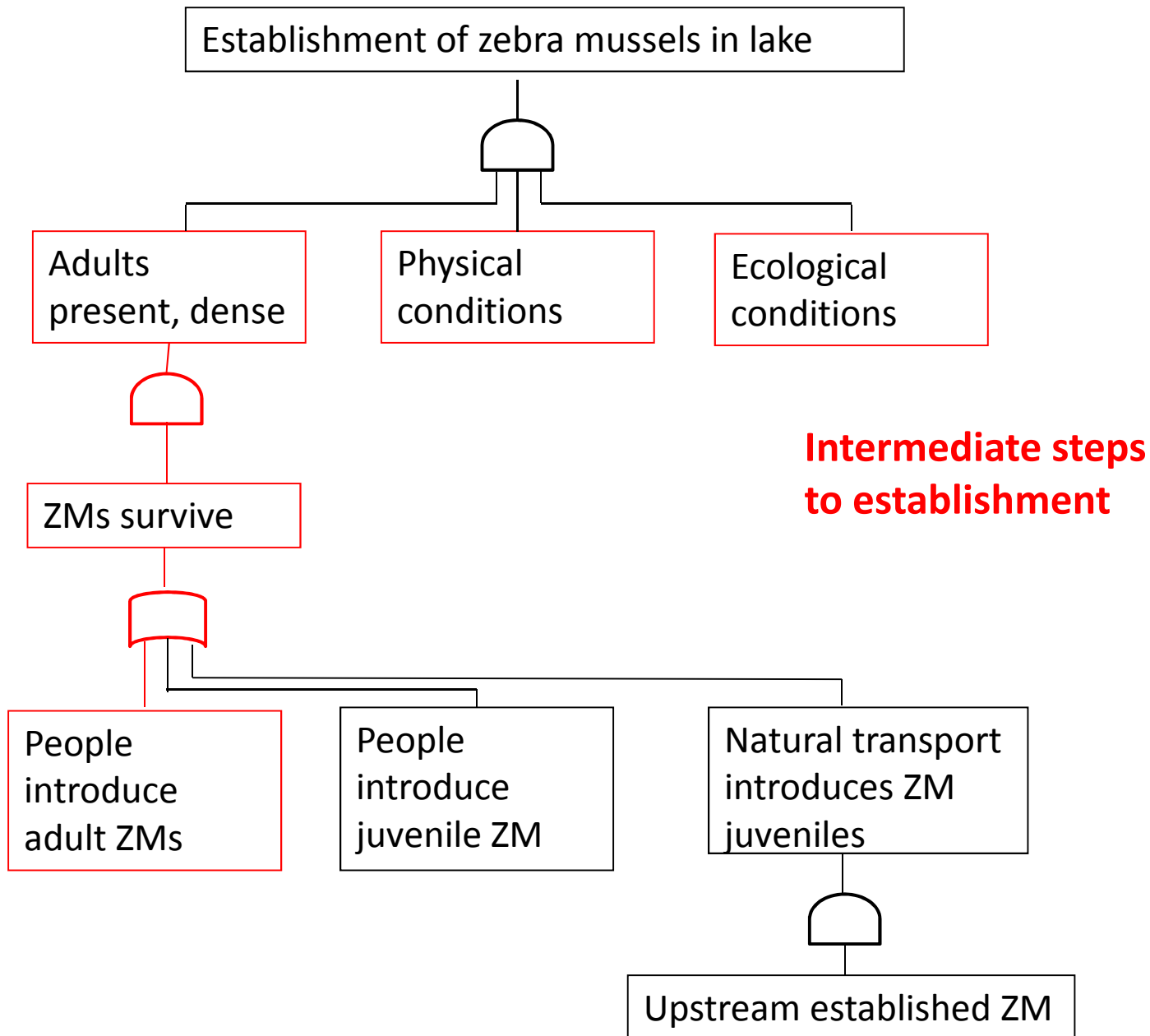
Example: communications plan

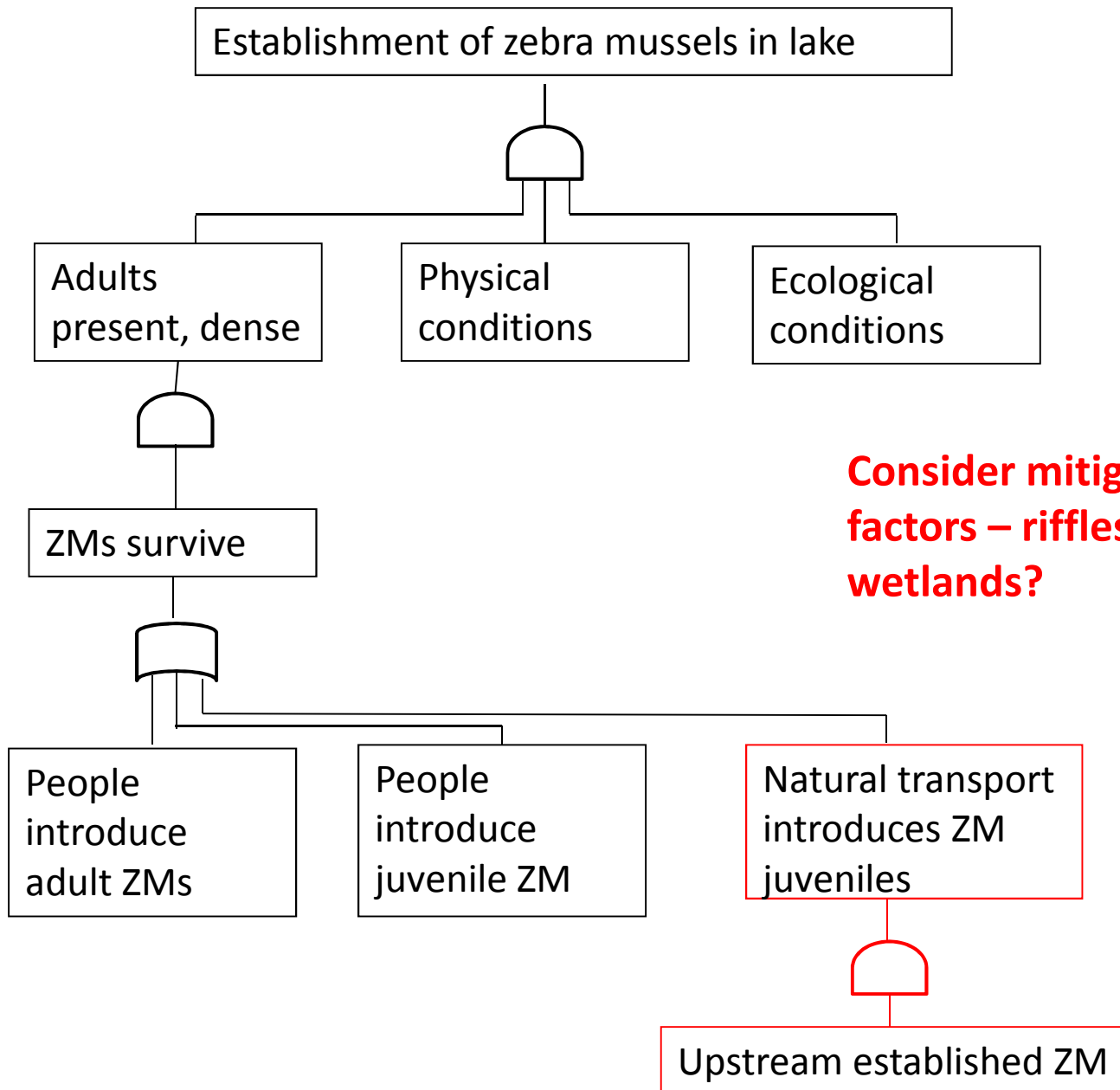
- How can I design an effective outreach campaign to help prevent the spread of aquatic invasive species?

Risk assessment to inform outreach

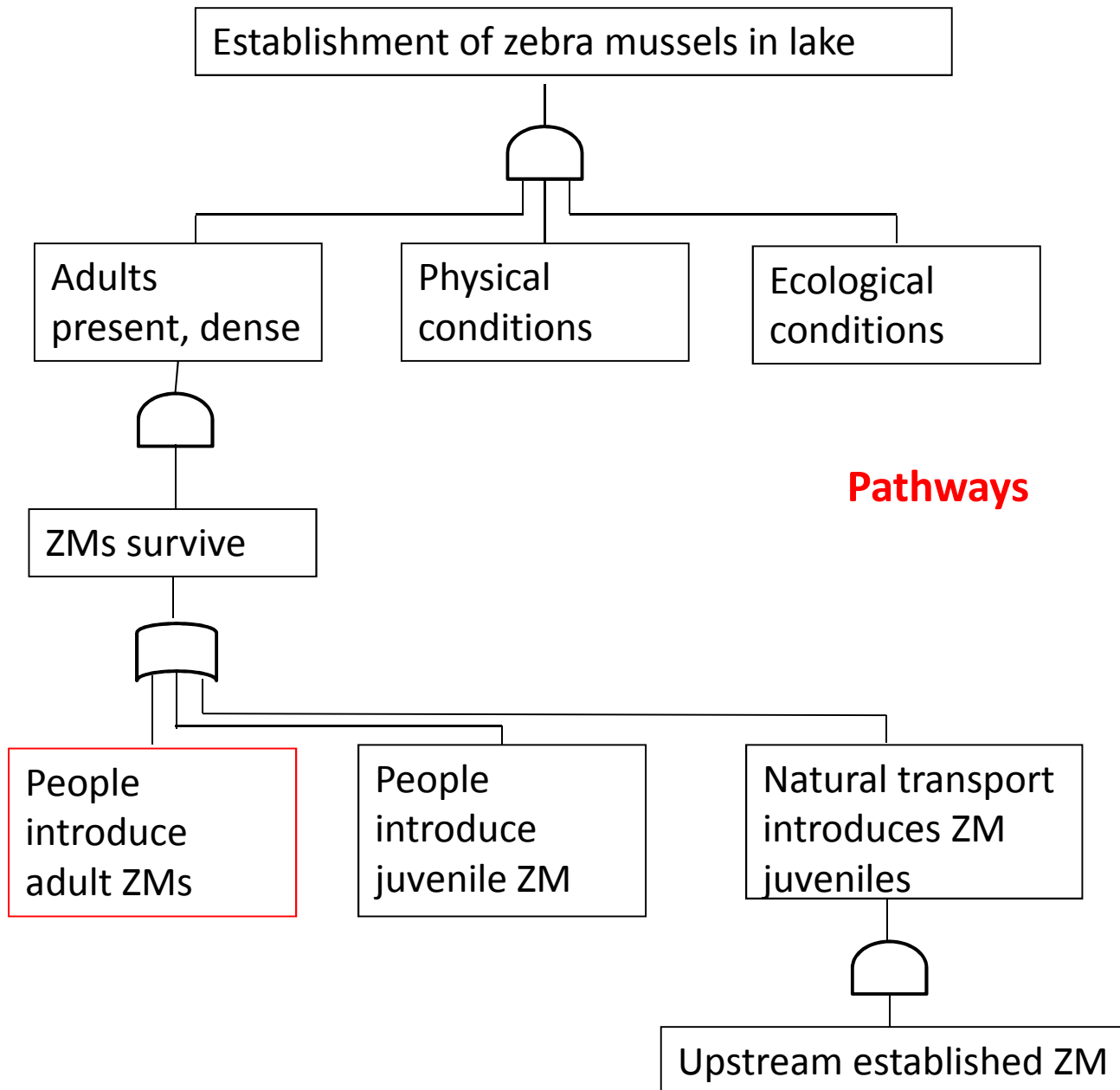
- How could risk assessment inform a communications plan?
 - Convene stakeholders
 - Brainstorm and prioritize AIS hazards
 - Develop models for exposure for high-priority hazards





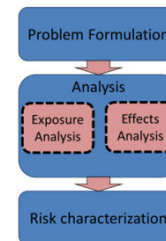
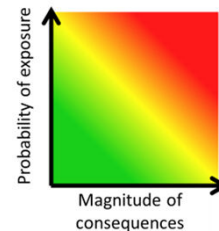


Consider mitigating factors – riffles, wetlands?



Conclusions

- ERA is a useful tool at a variety of scales
 - Identify potential risk pathways
 - Identify most consequential potential adverse effects
- Key points to keep in mind
 - Participation, scope, uncertainty, scale



Questions?

Acknowledgements



**Minnesota Aquatic Invasive Species
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