Chapter 7. Risk considerations
Leif Embertson - April 19, 2016
What is risk?

A function of;

- Probability
- Consequence

\[ Risk = P(h) \times \sum(C) \]

Where:

\[ P(h) = \text{Probability of a specific event or combination of events occurring.} \]

\[ \sum(C) = \text{Summation of the consequences of event occurring, typically presented as a monetary cost.} \]
What are the potential consequences?

- Flooding
- Erosion
- Infrastructure
- Recreational
- Private property
- Habitat

What happens to habitat if we do nothing?
What are the hazards?

Only a small fraction of LW is an issue

- **A.** All wood in stream reach.
- **B.** Portion of wood causing high-risk recreational hazards in stream reach.
- **C.** Portion of wood that is both ecologically most functional and causes high-risk recreational hazards.
- **D.** Portion of ecologically most functional pieces of wood in stream reach.

The social engineering...

- Rivers are inherently dangerous
- Perception of “healthy” or “normal” often skewed
- How to address uncertainty in a dynamic system?
What level of assessment?

- Qualitative vs Quantitative
Recreational use and private property

Considerations can be divided into;

- Reach attributes
- Local/structure characteristics
Risk assessment model

- More Consideration
  - High Relative Risk
  - High Relative Safety
  - Low Recreational Safety
  - High Recreational Risk

- Less Consideration
  - Low Relative Risk
  - Low Relative Safety
  - Moderate Recreational Safety
  - Moderate Recreational Risk

<table>
<thead>
<tr>
<th>STRUCTURE CHARACTERISTICS</th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>Active channel?</td>
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<td>Outside of bend?</td>
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<td>Strainer potential</td>
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<td>Egress potential</td>
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<td>Sight distance</td>
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<td>Depth velocity product</td>
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How to improve safety?

Risk can be mitigated through

- Public education/outreach
- Public notification
- Signage
- Land conservation
- Monitoring and/or adaptive management
Final thoughts on risk...

Rare events do happen ...but shouldn’t necessarily impact the final outcome.