Jun 26th, 11:40 AM - 12:00 PM

Concurrent Sessions C: Integrating Recreation and River Safety with Fish Passage - Eco-Hydraulic Evaluation of Whitewater Parks as Fish Passage Barriers

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Eco-Hydraulic Evaluation of Whitewater Parks as Fish Passage Barriers

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What is a Whitewater Park?
Are they good for fish?

1. Impaired Passage?
2. Degraded Habitat?
3. Recreational boater and tuber presence?
4. Overharvest from anglers?
Are they good for fish?

1. Impaired Passage?

2. Degraded Habitat?

3. Recreational boater and tuber presence?

4. Overharvest from anglers?
So what’s the problem?
So what’s the problem?

Swimming Barrier?
Swimming Barrier?

Depth Barrier?

So what’s the problem?
So what’s the problem?
So what’s the problem?

Swimming Barrier?

Jump Barrier?

Depth Barrier?

Turbulent Effects?
Goals and Objectives

1. Assess complete barrier presence.
2. Assess partial barrier presence.
3. Evaluate overall hydraulic conditions.
4. Determine presence of burst swimming barrier.
5. Develop guidance for management.
Methods

Site Selection

Track Fish Movement

Evaluate Hydraulic Conditions

Data Analysis

Management Guidance
Study Location
Fish Tracking
Objective 3: Hydraulic Assessment of WWPs

FLOW3D

Terrestrial LiDAR

Survey-grade GPS
Data Analysis

• Evaluation of raw movement data

• Logistic regression analysis

• Comparison of hydraulic model results

• Evaluation of burst swimming barrier
1. Are WWPs Complete Barriers?

Figure 3.4: Frequency of fishes that successfully moved upstream from the initial release location vs. fishes that did not move upstream for all species and all MRT ($n = 1639$).

Figure 3.5: Frequency of fishes that successfully moved upstream at each location vs. fishes that did not move upstream for all species and all MRT ($n = 2648$).
2. Are WWPs Partial Barriers?
3. Hydraulic Conditions

Figure 4.1: (A) Modeling results for WWP3 indicates reverse flow around the high-velocity WWP1.

<table>
<thead>
<tr>
<th>Structure</th>
<th>30 cfs</th>
<th>150 cfs</th>
</tr>
</thead>
<tbody>
<tr>
<td>WWP1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WWP2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WWP3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It seems like a summary table of observational differences among structures would be effective—maybe save for journal ms.
4. Burst Swimming Barrier Assessment
1. Not complete barriers

2. Data suggests a partial barrier

3. Significant burst swimming effect not observed

4. Alternate causes of impairment include: depth, turbulence, and fish behavior
Guidance for Management

• Small adjustments in design elements appear to effect passage success

• Possible for WWPs to meet recreation and fish passage goals

• Implications of partial barriers are unknown

• Site selection

• WWPs with similar design characteristics and hydrology appear to function within range of salmonid burst swimming ability
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Questions?

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