Developing a Modern-Day Tidal Crossing Assessment Protocol

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The Nature Conservancy
New Hampshire
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### What’s Similar?

#### CROSSING TYPE & CONDITION (field evaluation)

<table>
<thead>
<tr>
<th>Crossing Type:</th>
<th>Structure Materials:</th>
<th>Structure Dimensions (feet):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round Culvert</td>
<td>Concrete</td>
<td>Dimension A:</td>
</tr>
<tr>
<td>Elliptical Culvert</td>
<td>Plastic-Corrugated</td>
<td>Dimension B:</td>
</tr>
<tr>
<td>Box Culvert</td>
<td>Plastic-Smooth</td>
<td>Dimension C:</td>
</tr>
<tr>
<td>Embedded Round Culvert</td>
<td>Steel-Corrugated</td>
<td>Dimension D:</td>
</tr>
<tr>
<td>Open Bottom-Arch</td>
<td>Steel-Smooth</td>
<td></td>
</tr>
<tr>
<td>Bridge with Abutments</td>
<td>Aluminum-Corrugated</td>
<td></td>
</tr>
<tr>
<td>Bridge w/ S. slopes and Abutmen</td>
<td>Wood</td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

**Note any Obstructions at Structure Openings:**

<table>
<thead>
<tr>
<th>Low Tide Perch:</th>
<th>High Tide Perch:</th>
<th>Scour at Outlet:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream:</td>
<td>Downstream:</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>None</td>
<td>None</td>
<td>Low</td>
</tr>
<tr>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>High</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Angle of Stream Flow Approaching Structure:**

- **Upstream**
  - Sharp Bend (~45°)
  - Mild Bend (5-45°)
  - Naturally Straight
  - Channelized Straight

- **Downstream**
  - Sharp Bend (~45°)
  - Mild Bend (5-45°)
  - Naturally Straight
  - Channelized Straight

**Crossing Condition:**

- None
- New
- Old
- Eroding
- Collapsing
- Rusting

**Crossing Corrosion Severity:**

- None
- Low
- Medium
- High
- N/A

**Crossing Deformation:**

- None
- Low
- Medium
- High

**Spalling Severity:**

- None
- Low
- Medium
- High
- N/A

**Joint Separation:**

- None
- Partial
- > 1" - 1.5" or soil infiltration
- > 2" - 3" or soil infiltration
- N/A

**Headwall Materials:**

- Metal
- Concrete
- Masonry
- Gabion
- Dry Fit Stone
- Plastic
- Other

**Headwall Condition:**

- Excellent
- Good
- Fair
- Poor

**Scour Around Structure (circle all applicable):**

- None
- Culvert
- Footing
- Wing Walls
- Abutment

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**Sketch of Structure**

- Downstream view
- Upstream view

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**Image:**

Photograph of a bridge with a person standing on it, looking down into a river.
### What's Different?

**LONGITUDINAL PROFILE AND HIGH WATER INDICATORS (field evaluation)**

Elevation data will be referenced to the road centerline, when possible, for best results of tying to LiDAR elevations.

<table>
<thead>
<tr>
<th></th>
<th>Height at Road Centerline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specify if different reference point is used:</strong></td>
<td></td>
</tr>
<tr>
<td>Road Surface*</td>
<td></td>
</tr>
<tr>
<td>Calling of</td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td></td>
</tr>
<tr>
<td>HWI Stain</td>
<td></td>
</tr>
<tr>
<td>HWI Wrack</td>
<td></td>
</tr>
<tr>
<td>High Water Elevations</td>
<td>Shot 1</td>
</tr>
<tr>
<td>Upstream:</td>
<td></td>
</tr>
<tr>
<td>Downstream:</td>
<td></td>
</tr>
</tbody>
</table>

**Longitudinal Profile Stations**

```
US HC
US Pool
US RS
US RR
CL
DS RS
DS RR
DS Invert
DS
DS Pool
DS HC
```

US = Upstream
DS = Downstream
RR = Road Ramp
RS = Road Surface

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**Notes**

- Elevation data will be referenced to the road centerline, when possible, for best results of tying to LiDAR elevations.
- Specify if different reference point is used:
  - Road Surface*
  - Calling of Structure
  - HWI Stain
  - HWI Wrack
- High Water Elevations:
  - Shot 1
  - Shot 2
  - Shot 3
  - Shot 4

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**Diagram**

- Longitudinal profile stations are marked with specific labels for upstream (US) and downstream (DS) regions.
- Elevation points are indicated at various locations along the profile, including the high water level (US HC), pool area (US Pool), and various station markers (US RS, CL, DS RS, etc.).

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**Images**

- Photographs of fieldwork activities, including the use of equipment for elevation measurement and visual inspection of the profile.

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*Note:* This page is part of a draft document and may contain preliminary or incomplete information.
Longitudinal Profile:
Inundation & Flood Risk, Tidal Range & Restriction

Spherex Ave. Longitudinal Profile

- Streambed Profile
- Road Profile
- High Water Indicator
- High Tide
- Low Tide

Flow
Desktop Analysis:
Salt Marsh Migration Potential

Legend
Salt Marsh Migration Potential
Year 2050, 1.7’ SLR
- Yellow: Salt Marsh Expansion
- Red: Transitional Salt Marsh
- Green: Existing Upstream Salt Marsh
- Light Green: Route 1A Crossing Watershed
Desktop Analysis:
Flood & Inundation Risk to Public & Private Property

Legend
Projected Tidal Inundation
2050 1.7' SLR with 1% Annual Flood
- Mean Higher High Water (MHHW)
- Existing Upstream Salt Marsh
- Route 1A Crossing Watershed
Thanks!