UPSTREAM EEL PASSAGE

By: Jesse Waldrip
The American Eel is a migratory fish species found in fresh, brackish, and coastal waters from Greenland to northeastern South America.

They spawn in salt water and the juvenile life stages return to freshwater to grow and develop.
Components of an Upstream Eel Passage System

Standard Features

- Ramp
- Substrate
- Attraction Water System
- Holding Tank & Study Facilities
Initial Design Considerations

- Layout of Dam or Other Obstruction
- Engineering Drawings
- Field Dimensions
- Range of River Flow During Passage Season
- Range of Headwater and Tailwater Levels
Initial Design Considerations

Biological Data

• Size Range of Eels at the Site (length frequency data)
• Seasonality of Eel Movement
• River Discharge
• Water Temperature
• Water Quality
• Illumination
• Predation
Initial Design Considerations

Temporary Eel Traps For Data Collection
Initial Design Considerations

- Anecdotal Information About Eel Behavior at the Site
  - Where have eels been seen?
  - Have eels been noted to gather at certain times or under certain flow conditions?
Design Criteria

- Location of Entrance - Critical to Success of Passage
  - Near Point of Known Eel Congregation
  - Near Existing Attraction Flow
  - Avoid Areas of high Turbulence
Design Criteria

- Location of Exit
- Avoid discharge of eels near hydro intakes
Design Criteria

- **Ramp Design**
  - Material - Aluminum, Wood, Concrete
  - Custom vs. Off-The-Shelf
  - 2’-0” Width
  - Angle of Incline 45° or Less
  - Cover
Design Criteria

- Turn Pools
  - Substrate Not Required
  - Recess to Allow Pooling
  - No Criteria For Span Between Pools

EEL “RESTING” ON INCLINE
Design Criteria

- Substrate
  - Types – Milieu, Fish Pass, Enkamat, Akwadrain
- Method of Attachment
- Expansion/Contraction
- Sealing
Design Criteria

- Conveyance Flow
  - Dependant on Substrate Style and Ramp Width (2-10 gpm)
  - Spray Bars and Nozzles
Design Criteria

- Attraction Flow
  - Depends on Hydraulic Conditions at Entrance (up to 250 gpm)
  - Considerations For Sites With Large Fluctuations in Water
Design Criteria

- Water Supply
  - Pump, Gravity, or Siphon
  - Screening
  - Power
Design Criteria

- High Flows and Debris
  - Robust Design of Ramps and Supports
  - Removable
  - Hinged
  - Sacrificial

- Lighting for Night Time Observation
  - Red Lights

- Predation
Design Criteria

• **Vandalism/Theft**
  • Locate in an area where public access is already limited
  • Installation of eel ladder may make existing structures accessible
  • Lockable Covers
  • Fencing

• **Maintenance**
Questions?

Email: Jesse.Waldrip@KleinschmidtUSA.com

Kleinschmidt Web Site: www.KleinschmidtUSA.com