Channel Clearance & Drift Removal

ODOT Bridge Maintenance Training

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Presentation Outline

- Understanding the issues
- Safety concerns
- Environmental considerations
- When to respond
- How to achieve results

The Issue

Small bridges & culverts

Large Structures

Minor drift

Large jams

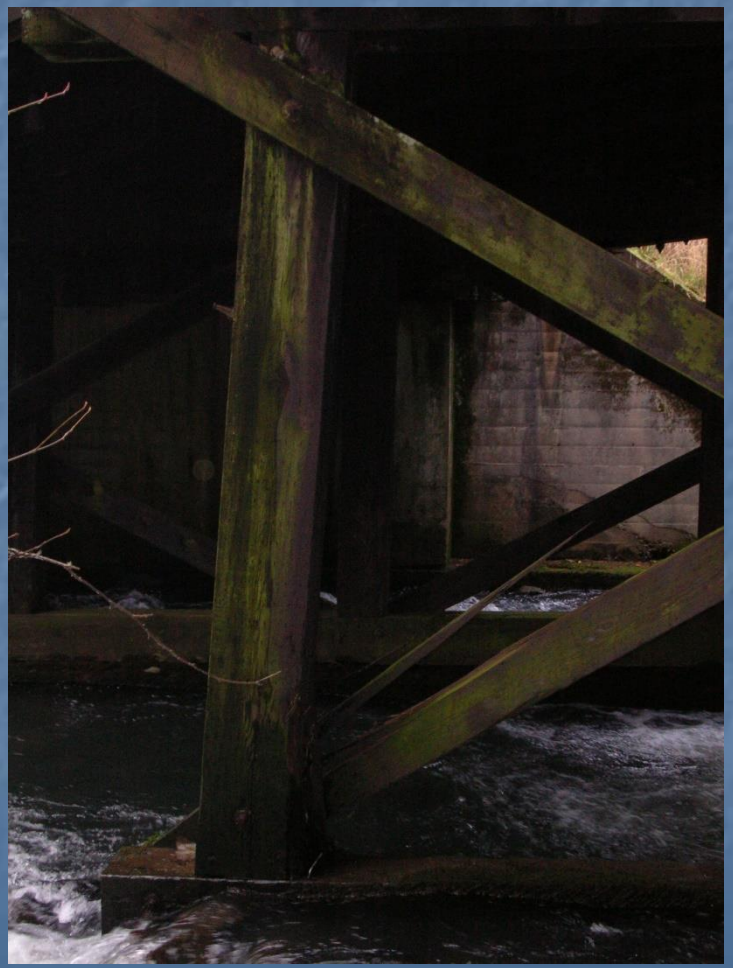
Silted channels

Commonalities:

- Channel blockage: resulting in reduced hydraulic capacity and the potential for overtopping/undermining
- Increased velocities causing the potential for unwanted scour
- Impact damage to inlets and structural components
- Additional side load forces to structure

Girder Damage

Piling/Column Damage



Debris in Culvert

Debris Can Cause Problems

Safety

Safety Considerations

- Personal Protective Equipment (PPE)
- Accessibility
- Traffic control measures (work zones)
- Site specific hazards & utilities
- River conditions (volume/velocity)
- Day/Night work conditions
- Proper staff, tools and equipment
- Structure condition assessment

Environmental

Environmental

- Permits may be required:
  - If the project takes place in a wetland or a waterway within the ordinary high water line
  - If the combined calculated volume of removal/fill exceeds 50 cu yards of material
  - If the work required is non exempt and falls outside of the applicable in-water work window
- To be safe, consult your environmental group during the planning stage to decide if a permit is required.

Environmental

Debris blocking flow at bridge should be removed

Debris that do not pose a threat should be left in place

Environmental

- Woody debris help:
  - Increase channel roughness helping to reduce bank erosion (limiting sediments and turbidity)
  - Slows floodwaters reducing potential for downstream flood damage
  - Provides habitat, safety from predators, and food for fish and wildlife
- In general, if it does not pose a threat to infrastructure or safety, it is recommended to leave large woody debris in the waterways

Environmental

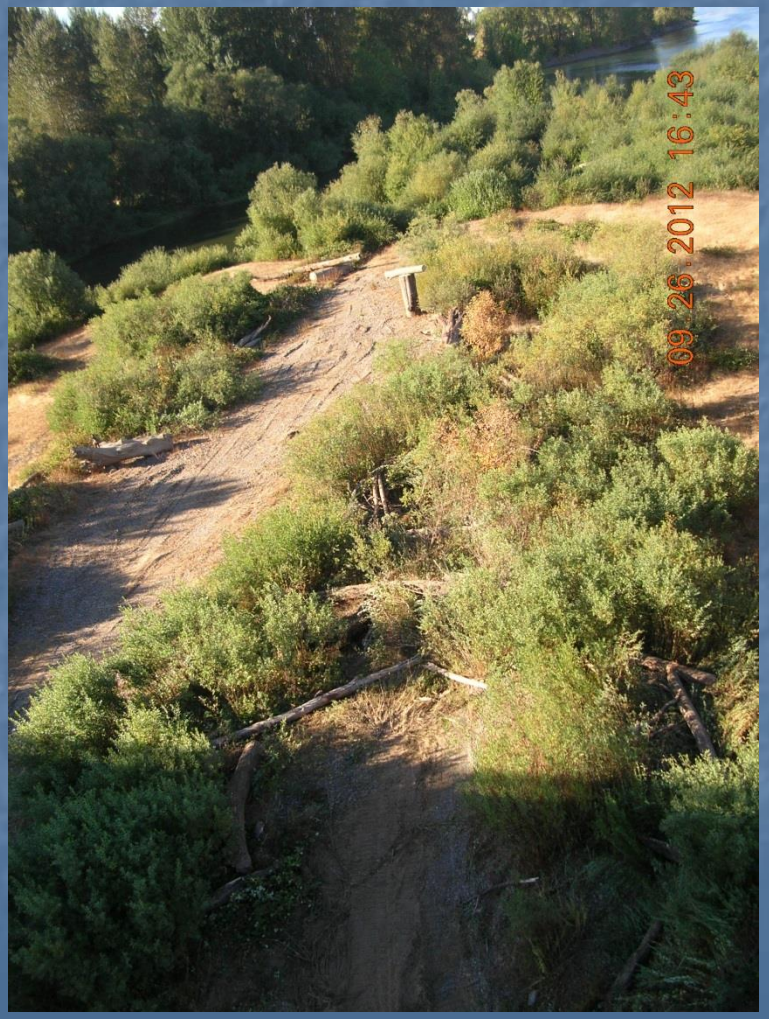
Returning debris to downstream waterway

Environmental

Returning debris to downstream waterway

Environmental

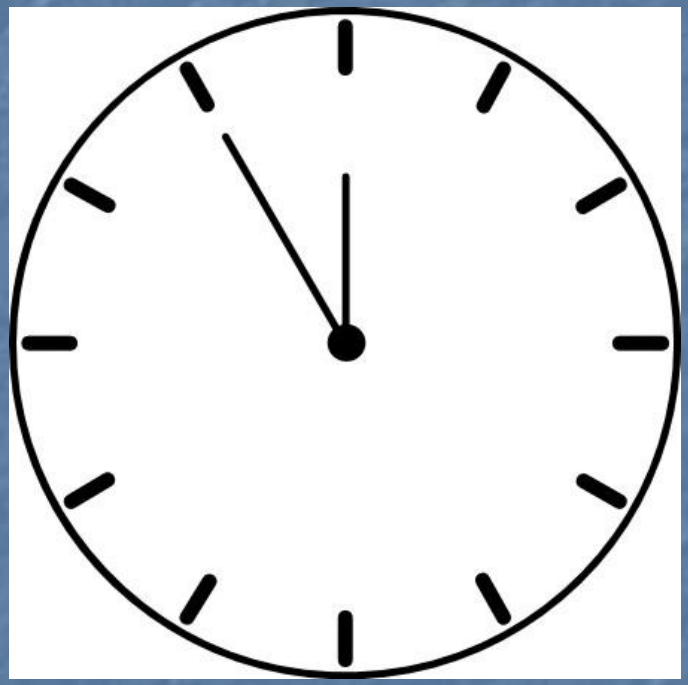
Disbursement on downstream rock bar



Environmental

As a last resort, remove it and build a bonfire

When do we respond ?



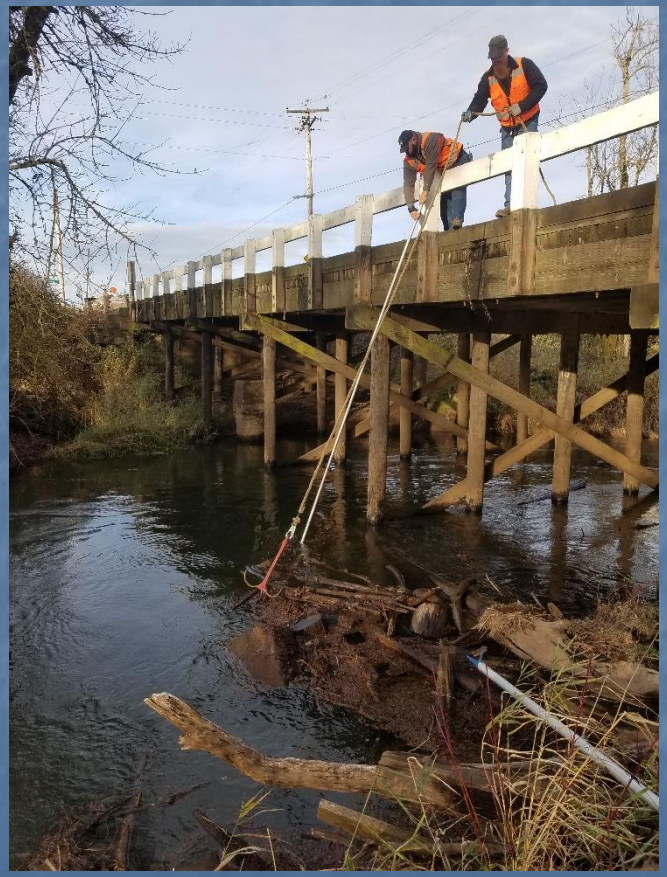
- Decisions are based on:
  - Type and size of debris
  - Size of the structure
  - Projected flow & river levels
  - Structure threat assessment
  - Safety of removal
  - Environmental permits and/or restrictions

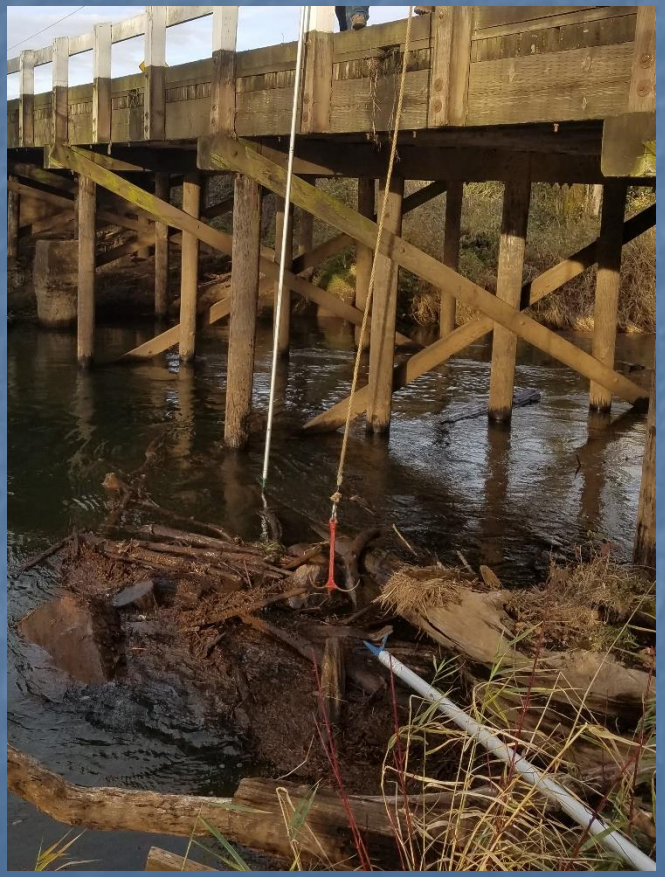
The Response

In Water Hand Removal

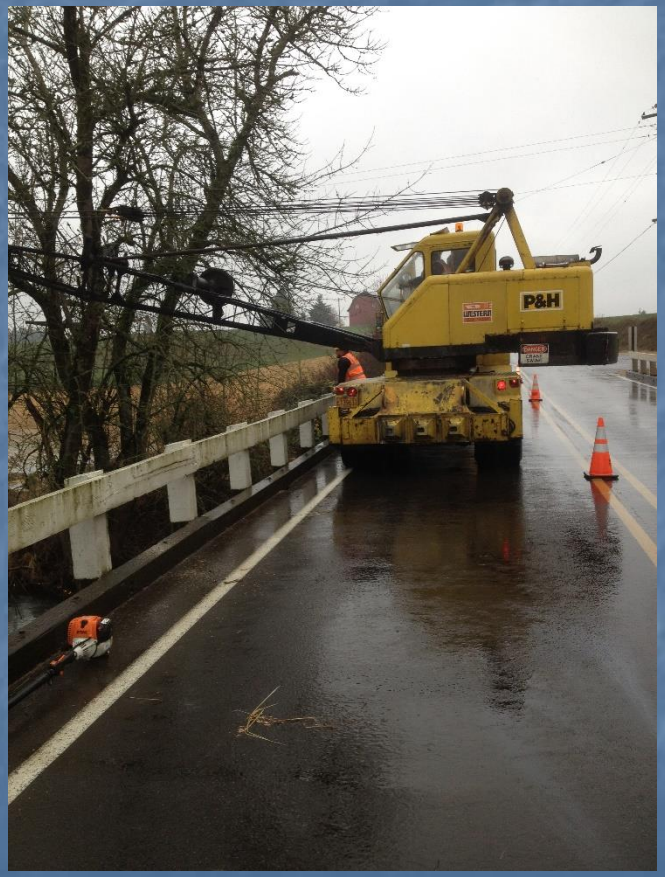
- Depending on the depth and flow of the waterway, chest waders can be an option to cut & pull apart smaller accumulations

Hand Removal From Bridge

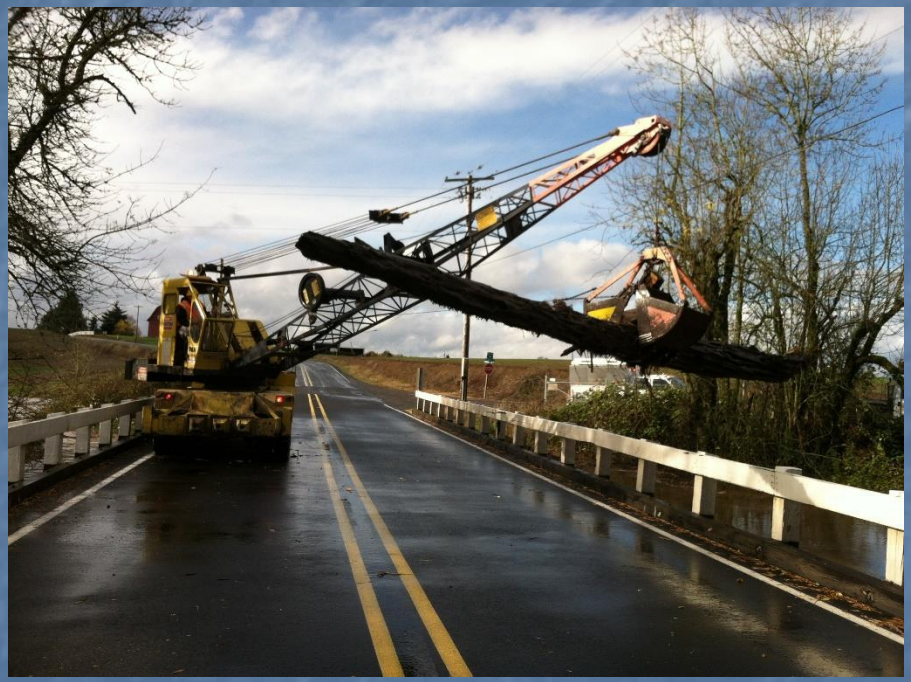




Crane Removal



Crane Removal



Low Water Clearing

Before & After

Before & After

Before & After

Debris & Siltation

- Reduce capacity of the culvert
- Alter flow through the culvert
- May lead to scour at inlet
- May cause scour at outlet
- May cause undermining
- May cause culvert to overtop

Removal of Debris & Silt

- Method is dependent on:
  - Type of debris, sediment and vegetation
  - Size of culvert
  - Permits and environmental restrictions

Silt Removal Methods

- Vacuum truck
- Water jet
- Fire hose flushing
- Bucket line or drag box
- Small skid steer loader

Preventative Maintenance

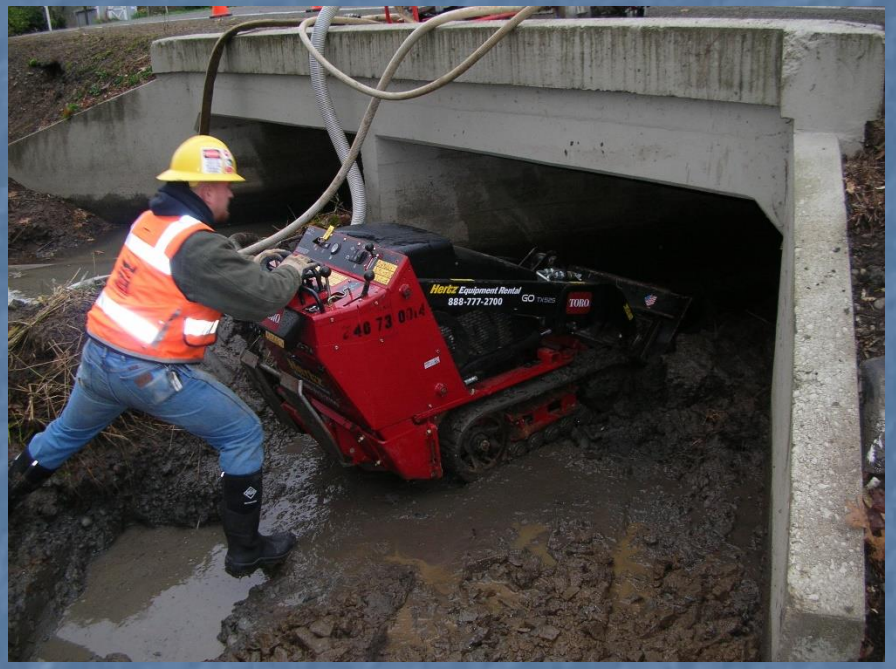
Bucket line

Preventive Maintenance

Drag box

Preventive Maintenance

Small skid steer / Mini excavator



Preventive Maintenance

Small skid steer / Mini excavator

Before & After

Preventative Maintenance

Utilization of natural flow to clean out deposits

Preventative Maintenance

Utilization of natural flow to clean out deposits

Preventative Maintenance

Utilization of natural flow to clean out deposits

Preventative Maintenance

Beaver Dams

Preventative Maintenance

Beaver Dams

- Hand Removal
- Machine removal
- In place options
- Trapper options / Relocation
  Check with local environmental group for regulations/restrictions

Preventative Maintenance

Beaver Dams - Hand Removal

Preventative Maintenance

Beaver Dams - Hand/Machine Removal

Preventative Maintenance

Beaver Dams - Machine Removal

Preventative Maintenance

Beaver Dams - In place Options

Preventative Maintenance

Beaver Dams - In place Options

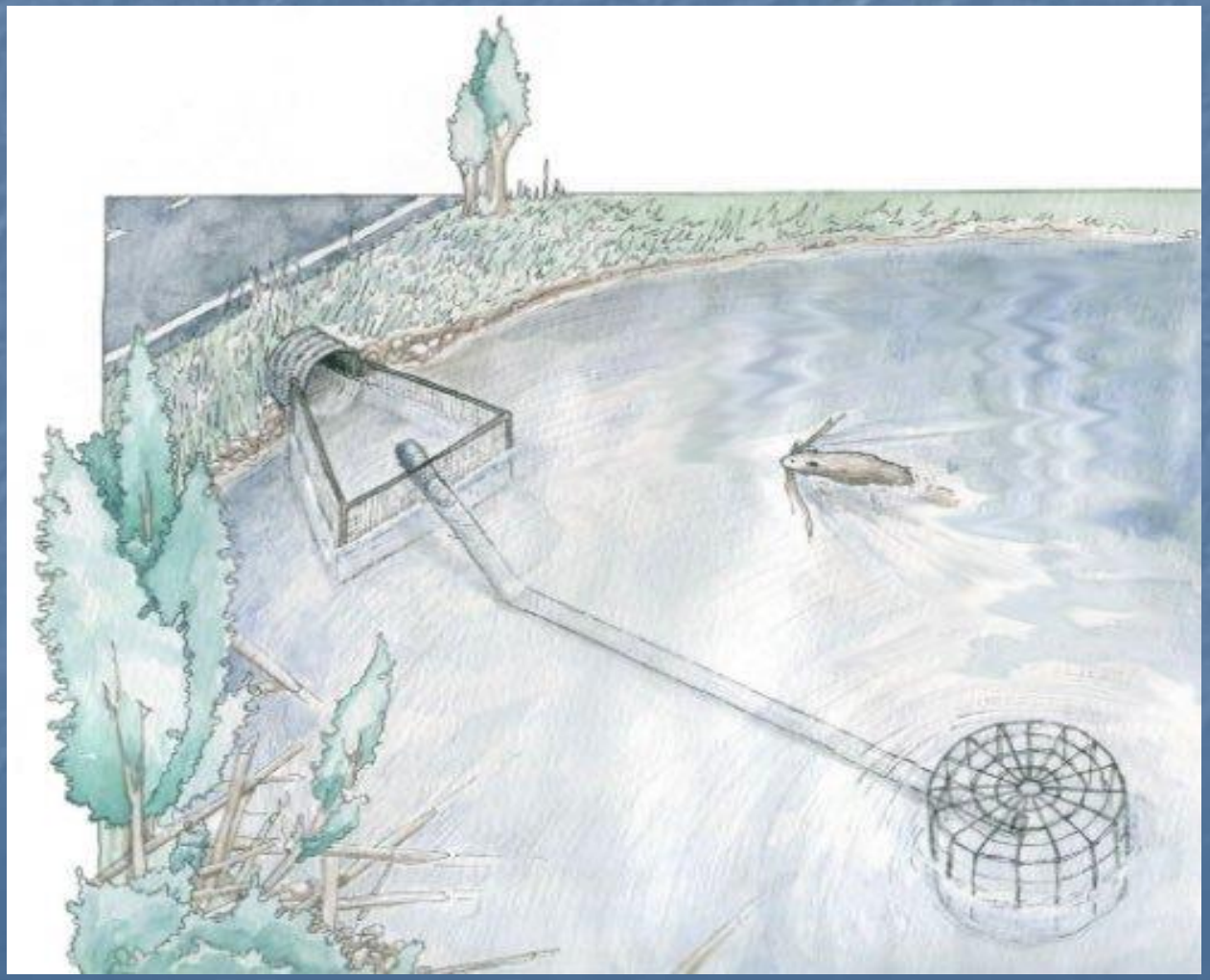
Preventative Maintenance

Beaver Dams

Preventative Maintenance

Beaver Dams - In place Options

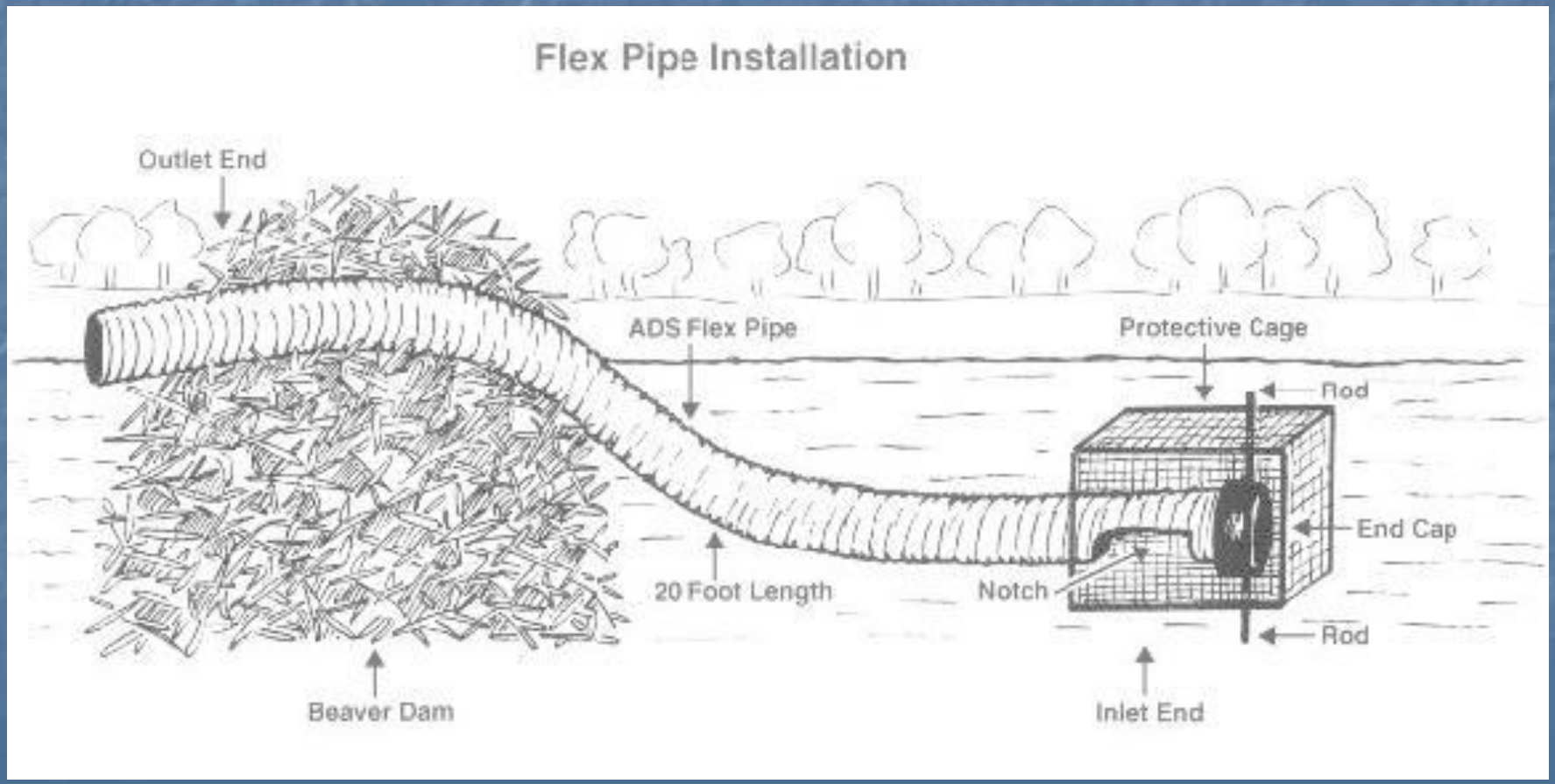
Beaver Deceiver



Preventative Maintenance

Beaver Dams - In place Options

Beaver Deceiver



Preventative Maintenance

Beaver Dams - In place Options

Beaver Deceiver

Preventative Maintenance

Beaver Dams - In place Options

Beaver Deceiver

Questions

Thank you!