Maintaining Ditches that Convey Natural Flow

Fact Sheet F3

Does the Ditch Convey Natural Flow?

Ditches that convey natural flow can be identified by their flow patterns and historical drainage patterns. If a ditch only flows during storm events or periods of site discharge and/or was specifically build to convey stormwater or discharge water, then it is not typically considered to be a ditch that conveys natural flow. If a ditch is located in an area where there historically was a stream, then it is likely that the ditch still conveys some natural flows.

Considerations for Ditches that Convey Natural Flow

Ditches with natural flow should be identified, mapped, and assigned specialized maintenance procedures. If natural flow is observed or suspected in a ditch, maintenance activities must be put on hold until the appropriate permits are obtained. Maintenance activities may also require special permitting and coordination with local, state, and federal agencies (see Fact Sheet A3 - Permit Requirements for Ditch Maintenance).

For ditches that are (1) known to have natural flow or (2) located in proximity to a waterbody or wetland:

- Confirm if ditch is hydraulically connected to a stream. Ditches that are within ¼ mile of a stream may also require special permitting and procedures.
- Prior to beginning maintenance activities, confirm that the site and maintenance activity are properly permitted. A copy of the appropriate permit must be present on site during the maintenance activity.
- Ensure that field crews are aware of specialized procedures (see Working in Fish-Bearing Waters and General Maintenance Procedures on pages 2-3 of this fact sheet).
- Use reflective markers (“fish sticks”) to identify stream or wetland buffers where mowing activities should be limited.
- Limit maintenance to areas near ditch outlets to control overgrowth and allow access for inspection and repair, when possible.
- Determine if proposed BMPs for erosion and sediment control are appropriate (e.g., check dams should not be used in locations that could reduce actual or potential areas where fish can seek refuge during high flows).
- If fish are suspected or known to be present, postpone all work until further direction is given by a crew lead or project manager.
Scheduling Maintenance Activities

Perform maintenance activities during low flow or no flow periods if possible, and only during the period defined by the Hydraulic Project Approval (HPA) or federal permit (if applicable).

Working in Fish-Bearing Waters

Before beginning maintenance activities, isolate the maintenance work area using fish block nets and upstream and downstream containment dams.

Place all in-water materials within the isolated area.

If fish are present, herd fish and remove using electroshocking. Fish removal can only be performed by a qualified and permitted consultant or crew member.

Any flow diversion intake structures should be equipped with a screening apparatus to prevent fish (and debris) from entering the system.

Reflective Markers (“Fish Sticks”) for letting crews know when they are working close to a stream

Photo source: Kitsap County

Ditch with Natural Flow
General Maintenance Procedures

The following general maintenance procedures may apply to maintenance activities in and near ditches that convey natural flow.

Prior to Work
Source Control

- Prevent oil and other pollutants from migrating offsite and entering water bodies.

Begin Work
Isolate and Divert Flow Around the Work Area

- Prevent mobilization of sediment.

During Work
Minimize Disturbance

- Reduce risk of site disturbance and soil compaction.

End of Work
Carefully Reintroduce Flow

- Reduce risk of site disturbance and soil compaction.

Objective

Maintenance Procedures

- Perform equipment maintenance/service
  - Remove buildup of oils and grease on equipment prior to transporting them to the site.

- Flag work area to minimize disturbance to riparian vegetation
- Isolate maintenance work area with upstream and downstream containment dams.
- For non-fish bearing waters and low-flow scenarios, use a vactor truck.
- For fish-bearing waters and/or higher flow scenarios, use a pump and bypass system.
  - Install an intake screening apparatus to prevent fish and/or debris from entering the hose.
  - Provide secondary containment for potential fuel spills from pump system.
- If a pump and bypass system is not feasible, isolate half the channel at one time, allowing flow to pass through the other half.
- Monitor the area downstream of the maintenance activity for turbidity. If high turbidity is observed, stop work and address the source.

- Keep excavation or other heavy equipment on the roadway and off the ditch bank.
- Utilize low-impact equipment if feasible (see Equipment and Materials on page 4 of this fact sheet).
- Protect side slopes from erosion.
- Leave vegetation in place where sediment buildup does not impede flow or filtration.
- If maintenance equipment must be serviced in the field, use drip pans and non-toxic solvents when possible. Clean surfaces following any discharge or spill.

- Remove built-up sediment from containment dams.
- Slowly reintroduce water to the work area. Ensure sufficient energy dissipation when reintroducing flow to minimize turbidity. Consider allowing flow to build-up and spill gradually over the upstream containment dam or remove top layer of upstream dam.
- Once area has stabilized, slowly remove any in-water containment or other materials used during maintenance activities.
- If vegetation disturbance (e.g., trampled or uprooted plants, exposed soil) has occurred, consult a habitat restoration expert (additional permitting may be required).
- Remove and recycle or dispose of any waste materials.
- Clean equipment and tools offsite where pollutants can be contained.
Considerations for Corrective Maintenance

**Ditch Cleaning and Minor Reshaping/Regrading**

These types of corrective maintenance activities are not typically implemented in ditches that convey natural flow; however, ditch cleaning may be considered when sediment accumulation near the inlet and/or outlet is impeding flow or causing erosion. Ditch reshaping/grading may be necessary if ditch storage capacity is limited by accumulated sediments; maintenance would require excavation of sediment to restore the ditch slope or grade line.

When using a vactor truck, keep backwash out of the work area by maintaining suction until the vactor line has cleared. If subsurface water enters the work area, use an additional vactor truck or pump and sediment tank to manage flow without causing turbidity downstream.

**Ditch Stabilization**

Ditch stabilization may be required when erosion damage has occurred, or if high flows have caused ditch bottom erosion or scour. Corrective maintenance activities may include installing additional vegetative cover or riprap on steep side slopes or installing check dams to slow flow.

**Equipment and Materials**

Additional equipment not used for routine ditch maintenance activities may be necessary to complete maintenance activities when natural flow is present.

<table>
<thead>
<tr>
<th>Maintenance Activity</th>
<th>Common Equipment and Materials</th>
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<tbody>
<tr>
<td>Work Area Isolation</td>
<td>- Containment dams (e.g., water bladders, sand bags)</td>
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<td>- Fish exclusion nets (9.5 mm of stretched mesh, only for work in fish-bearing waters)</td>
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<td>- Pump and bypass setup* (if ditch flow is significant)</td>
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<td>- Spill kit, including containment for the pump</td>
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<td>Ditch Cleaning and Minor Reshaping/Regrading</td>
<td>- Hand tools (e.g., rakes, hoes, shovels)</td>
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<td>- Backhoe or excavator with ditching bucket or DitchMaster</td>
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<td>- Front end loader</td>
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<td>- Grader</td>
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<td>- Belt loader</td>
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<td></td>
<td>- Vactor truck</td>
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<tr>
<td>Ditch Stabilization</td>
<td>- Riprap</td>
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<td></td>
<td>- Check dams (note restrictions for fish presence)</td>
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<tr>
<td>Minor and Major Replanting/Reseeding</td>
<td>- Riprap</td>
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<td>- Check dams (note restrictions for fish presence)</td>
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</table>

*Includes pump, backup pump, hoses, pump intake screen to keep fish and debris out of pump, and energy dissipation for outflow back into drainage system

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