

Table 1. Routine Ditch Maintenance Strategies.

Strategy	Description	Condition	Ditch Surface Type	Water Flow	Common Equipment and Material Needs	Considerations	References
Ditch Vegetation Management Strategies							
Mowing	Cutting vegetation to a reasonable height to allow for proper water flow and aesthetics	Tall vegetation is impeding flow of water through the ditch or causing line of sight issues	✓ Vegetated	✓ No flow	<ul style="list-style-type: none"> Mower Specialized mower for steep slopes Brooms, scoops, shovels, and/or handheld blowers <p>Additional Equipment and Materials for Natural Flow</p> <ul style="list-style-type: none"> Reflective markers (“fish sticks”) 	<p>Considerations Prior to Implementation</p> <ul style="list-style-type: none"> Set the mowing height at the highest acceptable level. For standard turf grass, mowing only the top 1/3 of the grass blade height is recommended. Where vegetation growth is excessive, additional mowing may be necessary. Avoid operating in wet areas or rough terrain to minimize scalping and rutting. Strategize mowing direction to minimize spreading of cut material onto adjacent paved surfaces. If vegetation is providing flow control or treatment, too much removal or trimming could reduce these functions. If possible, retain vegetation on the south or west sides of the ditch to provide shading of the ditch and reduce water temperature. If there is an opportunity to re-seed, low growing grass seed mix is recommended to reduce mowing frequency and cost. <p>Steep Slope Considerations</p> <ul style="list-style-type: none"> Use a specialized mower when steep slopes (≥ 15 percent) are present. <p>Disposal Considerations</p> <ul style="list-style-type: none"> Turf grass may be mulch mowed and left in place; however, large quantities of turf grass clippings may lead to outlet clogging and nutrient loading in downstream water bodies. 	<p>Refer to Invasive Species and Noxious Weed Removal (Table 1, page 3) for additional recommendations regarding mowing.</p> <p>Refer to Fact Sheet F3 – Maintaining Ditches that Convey Natural Flow for natural flow considerations.</p> <p>Refer to local codes and regulations for additional requirements.</p>
Brush Cutting (or Brushing)	Trimming woody vegetation to remove overgrown and/or excessive vegetation to allow for proper water flow and to restore sight distance	<ul style="list-style-type: none"> Overgrown/excessive vegetation impeding flow or storage of water and sediments Safety or structural integrity of the roadway is jeopardized 	✓ Vegetated	✓ No flow	<ul style="list-style-type: none"> Brush cutters Power saws Axes and/or machetes Pruning shears, loppers, and/or clippers Brooms, scoops, shovels, and/or rakes Truck cover (for securing load during transport) 	<p>Considerations Prior to Implementation</p> <ul style="list-style-type: none"> If vegetation is providing flow control or treatment, too much removal or trimming could reduce these functions. If possible, retain vegetation on the south or west sides of the ditch to provide shading of the ditch and reduce water temperature. <p>Disposal Considerations</p> <ul style="list-style-type: none"> Remove cut branches/other vegetative debris after brushing to reduce outlet clogging and spreading invasive species. Compost or stockpile vegetative matter in a clean green stockpile at your maintenance facility, if possible. 	<p>Refer to local codes and regulations for additional requirements.</p>

Table 1 (continued). Routine Ditch Maintenance Strategies.

Strategy	Description	Condition	Ditch Surface Type	Water Flow	Common Equipment and Material Needs	Considerations	References
Ditch Vegetation Management Strategies (continued)							
Minor Reseeding/ Replanting	Adding seed and/or plants to stabilize exposed soils. Applies to conditions affecting a small section of a ditch that can be addressed as part of routine maintenance.	<ul style="list-style-type: none"> Sparse vegetation/ eroded patches on ditch bottom Poor grass growth 	<ul style="list-style-type: none"> ✓ Vegetated ✓ Bare Soil 	<ul style="list-style-type: none"> ✓ No flow 	<ul style="list-style-type: none"> Seed mix Hydroseeder Post-seeding erosion control BMPs (e.g., straw mulch, biodegradable nets and blankets, coir mats) 	<p>Considerations Prior to Implementation</p> <ul style="list-style-type: none"> Ensure that erosion control BMPs are installed properly to avoid blockages. Low growing grass seed mix is recommended to reduce mowing frequency and cost. Confirm that there are no weed seeds or invasive plant seeds in the seed mixes. Seed and/or plant during the following optimum windows: <ul style="list-style-type: none"> Late spring (April 1 through June 30) Early fall (September 1 through October 1) Establishment of vegetation may not be feasible in coarse grained or mineral soils. 	<p>When major reseeding/ replanting is necessary to correct poor conditions, refer to Major Replanting/ Reseeding (Table 2, page 9).</p> <p>Refer to Fact Sheet F3 – Maintaining Ditches that Convey Natural Flow for natural flow considerations.</p> <p>Refer to local codes and regulations for additional requirements.</p>
Weed Control	Control of weeds through biological, physical, mechanical, chemical, or cultural methods	Weeds present in ditch	<ul style="list-style-type: none"> ✓ Vegetated ✓ Bare Soil ✓ Rock 	<ul style="list-style-type: none"> ✓ No flow ✓ Standing water ✓ Low flow 	<ul style="list-style-type: none"> Required permits (keep documentation on-site during work) Weeding tools Weed burner Brooms, scoops, shovels, and/or rakes 	<p>Considerations Prior to Implementation</p> <ul style="list-style-type: none"> Verify that required permits have been obtained prior to beginning work. Review preferred implementation strategies documented in an Integrated Pest Management (IPM) plan. Ensure that herbicide applications are performed by licensed, qualified staff. Use physical and/or mechanical methods of vegetation removal rather than applying herbicides, where practical. <p>Disposal Considerations</p> <ul style="list-style-type: none"> Compost or stockpile vegetative matter in a clean green stockpile at your maintenance facility, if possible, and only if invasive species and noxious weeds are not present. 	<p>Refer to Invasive Species and Noxious Weed Removal (Table 1, page 3) for disposal considerations when invasive species and noxious weeds are present.</p> <p>Refer to Fact Sheet F3 – Maintaining Ditches that Convey Natural Flow for natural flow considerations.</p> <p>Refer to Fact Sheet A3 – Permit Requirements for Ditch Maintenance for permitting considerations.</p> <p>Refer to your local IPM plan, local codes and regulations for additional requirements.</p>

Table 1 (continued). Routine Ditch Maintenance Strategies.

Strategy	Description	Condition	Ditch Surface Type	Water Flow	Common Equipment and Material Needs	Considerations	References
Ditch Vegetation Management Strategies (continued)							
Invasive Species and Noxious Weed Removal	Control of invasive species and noxious weeds through biological, physical, mechanical, chemical, or cultural methods	<ul style="list-style-type: none"> Invasive species present Noxious weeds present 	<ul style="list-style-type: none"> ✓ Vegetated ✓ Bare Soil ✓ Rock 	<ul style="list-style-type: none"> ✓ No flow ✓ Standing water ✓ Low flow 	<ul style="list-style-type: none"> Required permits (keep documentation on-site during work) Weeding tools Weed wrench Targeted herbicide applicator (woody painter/herbicide wand) Garbage bags (to prevent seed development and dispersal) Protective clothing and eye protection (for toxic, noxious weeds) 	<p>Considerations Prior to and During Implementation</p> <ul style="list-style-type: none"> Verify that required permits have been obtained prior to beginning work. Invasive species may need to be removed by hand. Pull plants when soils are moist and before seeds are produced. Identify invasive species that can and should be controlled or reduced by mowing. Ensure that herbicide applications are performed by licensed, qualified staff. Prior to mowing, implement the following for small populations of invasive plants: <ul style="list-style-type: none"> Use herbicides early in the summer. Physically remove flower or seed heads (cut and bag). Physically remove rootstock (mechanically excavate). Implement the following for large, mature invasive plants: <ul style="list-style-type: none"> Control large purple loosestrife plant populations with biocontrol beetles (<i>Hylobius</i> sp. or <i>Galruccella</i> sp.) prior to mowing. Mow plants prior to seed maturation, allow the plants to regrow to a height of 2 to 4 feet and then treat with foliar herbicide. If mowing occurs after seed maturation, hand clean the upper parts of the mowing equipment with a brush or broom prior to moving to a new location. <p>Disposal Considerations</p> <ul style="list-style-type: none"> Ensure proper disposal per the Washington State Noxious Weed Control Board. Bag cut flowers and seed heads. 	<p>Refer to Fact Sheet F3 – Maintaining Ditches that Convey Natural Flow for natural flow considerations.</p> <p>Refer to Fact Sheet A3 – Permit Requirements for Ditch Maintenance for permitting considerations.</p> <p>Refer to the Washington State Noxious Weed Control Board for weed identification, removal, and disposal considerations: www.nwcb.wa.gov</p> <p>Refer to your local IPM plan, local codes and regulations for additional requirements.</p>
Other Maintenance Strategies							
Inlet/Outlet Cleaning	Clean accumulated sediment from inlets and outlets	Accumulated sediment or blockage impeding flow (≥ 50% blockage) at inlet/outlet pipe	<ul style="list-style-type: none"> ✓ Vegetated ✓ Bare Soil ✓ Rock ✓ Paved ✓ Metal 	<ul style="list-style-type: none"> ✓ No flow ✓ Standing water 	<ul style="list-style-type: none"> Rake, hoe, or shovel Wheelbarrow or buckets 	<p>Steep Slope Considerations</p> <ul style="list-style-type: none"> Consider adjusting threshold to ≥ 30% blockage when steep slopes (≥ 15%) are present. <p>Disposal Considerations</p> <ul style="list-style-type: none"> Use or disposal options for the sediment removed from the inlet and/or outlet will depend on the characterization of the waste. 	<p>Refer to Fact Sheet A3 – Permit Requirements for Ditch Maintenance for permitting considerations.</p> <p>Refer to local codes and regulations for additional requirements.</p>

Table 1 (continued). Routine Ditch Maintenance Strategies.

Strategy	Description	Condition	Ditch Surface Type	Water Flow	Common Equipment and Material Needs	Considerations	References
Other Maintenance Strategies (continued)							
Nuisance Animal/ Insect Control	Control of nuisance animals/insects through mechanical, manual, or chemical methods. Examples of nuisance animals and insects include: <ul style="list-style-type: none"> • Beavers: May block ditch capacity with dams • Bees: Could pose a hazard to crews maintaining the ditch • Moles: Contribute to erosion by burrowing holes • Mosquitoes: May result from stagnant flow in ditch; nuisance and public health hazard • Nutria: Contribute to erosion by destroying the banks of ditches 	Nuisance animals/ insects present	<ul style="list-style-type: none"> ✓ Vegetated ✓ Bare Soil ✓ Rock ✓ Paved ✓ Metal 	<ul style="list-style-type: none"> ✓ No flow ✓ Standing water 	<ul style="list-style-type: none"> • Animal guards (e.g., rods, flap gates, and finger-type flap gates) for outlet pipes • Traps (if allowed) 	<p>Considerations Prior to Implementation</p> <p>Preferred implementation strategies should be documented in an Integrated Pest Management (IPM) plan.</p>	<p>Refer to Fact Sheet F3 – Maintaining Ditches that Convey Natural Flow for natural flow considerations.</p> <p>Refer to Fact Sheet A3 – Permit Requirements for Ditch Maintenance for permitting considerations.</p> <p>Refer to your local IPM plan, local codes and regulations for additional requirements.</p>

Table 2. Corrective Ditch Maintenance Strategies.

Strategy	Description	Condition	Ditch Surface Type	Water Flow	Common Equipment and Material Needs	Considerations	References
Ditch Cleaning Strategies							
Hand Ditching	Removing sediment and debris manually using a rake, hoe, or shovel	<ul style="list-style-type: none"> Sediment accumulation near inlet and/or outlet Excess sediment impeding flow or causing erosion 	<ul style="list-style-type: none"> ✓ Vegetated ✓ Bare Soil ✓ Rock ✓ Paved ✓ Metal 	<ul style="list-style-type: none"> ✓ No flow ✓ Low flow 	<ul style="list-style-type: none"> Rake, hoe, or shovel Wheelbarrow or buckets Erosion control BMPs (e.g., wattles, check dams, silt fences) <p>Additional Equipment and Materials for Natural Flow</p> <ul style="list-style-type: none"> Required permits (keep documentation on-site during work) Containment dams (e.g., water bladders, sand bags) Vactor truck (for non -fish bearing waters and low -flow scenarios) Fish exclusion nets (9.5 mm stretched mesh) Pump and bypass setup (if ditch flow is significant) Spill kit, including containment for the pump Erosion control BMPs for pump outfall, channel stabilization, etc. 	<p>Considerations Prior to Implementation</p> <ul style="list-style-type: none"> Verify that required permits have been obtained prior to beginning work. Cleaning should be performed during low flow or no flow periods if possible. Install erosion control BMPs prior to conducting sediment removal. Consider retaining vegetation near ditch outlet(s), also known as “skip ditching.” Reseed and install erosion control BMPs after sediment has been removed if needed. <p>Steep Slope Considerations</p> <ul style="list-style-type: none"> Retain additional vegetation near ditch outlet(s) when steep slopes (≥ 15 percent) are present. <p>Disposal Considerations</p> <ul style="list-style-type: none"> Sweep and collect dirt and debris remaining on the pavement at the completion of work. Separate screenings into soil and vegetative matter (e.g., leaves, grass, needles, branches, etc.) categories: <ul style="list-style-type: none"> Compost or stockpile vegetative matter in a clean green stockpile at your maintenance facility, if possible. Use or disposal options for the soil portion will depend on the characterization of the waste. 	<p>Refer to Minor Reseeding/ Replanting (Table 1, page 2).</p> <p>Refer to Fact Sheet F2 – Ditch Cleaning Strategies for additional information on ditch cleaning.</p> <p>Refer to Fact Sheet F3 – Maintaining Ditches that Convey Natural Flow for natural flow considerations.</p> <p>Refer to Fact Sheet A3 – Permit Requirements for Ditch Maintenance for permitting considerations.</p> <p>Refer to local codes and regulations for additional requirements.</p>

Table 2 (continued). Corrective Ditch Maintenance Strategies.

Strategy	Description	Condition	Ditch Surface Type	Water Flow	Common Equipment and Material Needs	Considerations	References
Ditch Cleaning Strategies (continued)							
Bucket Ditching (Mechanical Excavation)	Removing sediment and debris in deep ditches where hand ditching is impractical	<ul style="list-style-type: none"> Sediment accumulation near inlet and/or outlet Excess sediment impeding flow or causing erosion 	<ul style="list-style-type: none"> ✓ Vegetated ✓ Bare Soil 	<ul style="list-style-type: none"> ✓ No flow ✓ Low flow 	<ul style="list-style-type: none"> Backhoe or excavator with ditching bucket or Ditch Master Erosion control BMPs (e.g., wattles, check dams, silt fences) <p>Additional Equipment and Materials for Natural Flow</p> <ul style="list-style-type: none"> Required permits (keep documentation on-site during work) Containment dams (e.g., water bladders, sand bags) Vactor truck (for non -fish bearing waters and low -flow scenarios) Fish exclusion nets (9.5 mm stretched mesh) Pump and bypass setup (if ditch flow is significant) Spill kit, including containment for the pump Erosion control BMPs for pump outfall, channel stabilization, etc. 	<p>Considerations Prior to Implementation</p> <ul style="list-style-type: none"> Verify that required permits have been obtained prior to beginning work. Cleaning should be performed during low flow or no flow periods if possible. Cleaning should utilize low-impact equipment if feasible. Install erosion control BMPs prior to conducting sediment removal. Consider retaining vegetation near ditch outlet(s), also known as “skip ditching.” Reseed and install erosion control BMPs after sediment has been removed if needed. Keep excavation equipment on the roadway and off the ditch bank. <p>Steep Slope Considerations</p> <ul style="list-style-type: none"> Retain additional vegetation near ditch outlet(s) when steep slopes (≥ 15 percent) are present. <p>Disposal Considerations</p> <ul style="list-style-type: none"> Sweep and collect dirt and debris remaining on the pavement at the completion of work. Separate screenings into soil and vegetative matter (e.g., leaves, grass, needles, branches, etc.) categories: <ul style="list-style-type: none"> Compost or stockpile vegetative matter in a clean green stockpile at your maintenance facility, if possible. Use or disposal options for the soil portion will depend on the characterization of the waste. 	<p>Refer to Minor Reseeding/ Replanting (Table 1, page 2).</p> <p>Refer to Fact Sheet F2 – Ditch Cleaning Strategies for additional information on ditch cleaning.</p> <p>Refer to Fact Sheet F3 – Maintaining Ditches that Convey Natural Flow for natural flow considerations.</p> <p>Refer to Fact Sheet A3 – Permit Requirements for Ditch Maintenance for permitting considerations.</p> <p>Refer to local codes and regulations for additional requirements.</p>

Table 2 (continued). Corrective Ditch Maintenance Strategies.

Strategy	Description	Condition	Ditch Surface Type	Water Flow	Common Equipment and Material Needs	Considerations	References
Ditch Cleaning Strategies (continued)							
Shoulder Ditching (blade ditching or shoulder pulling)	Reshaping and cleaning ditches by removing excess sod from the shoulder	<ul style="list-style-type: none"> Sediment accumulation near inlet and/or outlet Excess sediment impeding flow or causing erosion 	<ul style="list-style-type: none"> ✓ Vegetated ✓ Bare Soil 	<ul style="list-style-type: none"> ✓ No flow ✓ Low flow 	<ul style="list-style-type: none"> Grader Belt loader Erosion control BMPs during maintenance (e.g., wattles, check dams, silt fences) <p>Additional Equipment and Materials for Natural Flow</p> <ul style="list-style-type: none"> Required permits (keep documentation on-site during work) Containment dams (e.g., water bladders, sand bags) Vactor truck (for non -fish bearing waters and low -flow scenarios) Fish exclusion nets (9.5 mm stretched mesh) Pump and bypass setup (if ditch flow is significant) Spill kit, including containment for the pump Erosion control BMPs for pump outfall, channel stabilization, etc. 	<p>Considerations Prior to Implementation</p> <ul style="list-style-type: none"> Verify that required permits have been obtained prior to beginning work. Cleaning should be performed during low flow or no flow periods if possible. Cleaning should utilize low-impact equipment if feasible. Install erosion control BMPs prior to conducting sediment removal. Consider retaining vegetation near ditch outlet(s), also known as “skip ditching.” Reseed and install erosion control BMPs after sediment has been removed if needed. Keep excavation equipment on the roadway and off the ditch bank. <p>Steep Slope Considerations</p> <ul style="list-style-type: none"> Retain additional vegetation near ditch outlet(s) when steep slopes (≥ 15 percent) are present. <p>Disposal Considerations</p> <ul style="list-style-type: none"> Sweep and collect dirt and debris remaining on the pavement at the completion of work. Separate screenings into soil and vegetative matter (e.g., leaves, grass, needles, branches, etc.) categories: <ul style="list-style-type: none"> Compost or stockpile vegetative matter in a clean green stockpile at your maintenance facility, if possible. Use or disposal options for the soil portion will depend on the characterization of the waste. 	<p>Refer to Minor Reseeding/ Replanting (Table 1, page 2).</p> <p>Refer to Fact Sheet F2 – Ditch Cleaning Strategies for additional information on ditch cleaning.</p> <p>Refer to Fact Sheet F3 – Maintaining Ditches that Convey Natural Flow for natural flow considerations.</p> <p>Refer to Fact Sheet A3 – Permit Requirements for Ditch Maintenance for permitting considerations.</p> <p>Refer to local codes and regulations for additional requirements.</p>

Table 2 (continued). Corrective Ditch Maintenance Strategies.

Strategy	Description	Condition	Ditch Surface Type	Water Flow	Common Equipment and Material Needs	Considerations	References
Other Corrective Ditch Maintenance Strategies							
Ditch Stabilization	Control erosion and scour by installing additional vegetative cover or riprap on steep side slopes or installing check dams to slow water flow and to cover bare soils	<ul style="list-style-type: none"> Erosion damage Ditch bottom eroded or scoured during to flow channelization or high flows 	<ul style="list-style-type: none"> ✓ Vegetated ✓ Bare Soil ✓ Rock 	<ul style="list-style-type: none"> ✓ No flow ✓ Low flow 	<ul style="list-style-type: none"> Riprap Check dams Erosion control BMPs during maintenance (e.g., wattles, check dams, silt fences) Seed mix Post-seeding erosion control BMPs (e.g., straw mulch, biodegradable nets and blankets, coir mats) Geotextile fabric <p>Additional Equipment and Materials for Natural Flow</p> <ul style="list-style-type: none"> Required permits (keep documentation on-site during work) Containment dams (e.g., water bladders, sand bags) Vactor truck (for non -fish bearing waters and low -flow scenarios) Fish exclusion nets (9.5 mm stretched mesh) Pump and bypass setup (if ditch flow is significant) Spill kit, including containment for the pump Erosion control BMPs for pump outfall, channel stabilization, etc. 	<p>Considerations Prior to and During Implementation</p> <ul style="list-style-type: none"> Verify that required permits have been obtained prior to beginning work. Anchoring straw mulch is difficult in narrow areas. Vegetation may not be feasible in rocky areas or in ditches that experience high flows. Perform ditch stabilization during low flow or no flow periods if possible. Straw mulch is inexpensive, but can easily be washed or blown away. Do not use hay mulch, which is more likely than straw mulch to contain weed seeds. (Note: Some jurisdictions do not allow straw or hay mulch.) <p>Steep Slope Considerations</p> <ul style="list-style-type: none"> Anchoring straw mulch is difficult when steep slopes (≥ 15 percent) are present. Vegetation may not be feasible when steep slopes (≥ 15 percent) are present. 	<p>Refer to Minor Reseeding/ Replanting (Table 1, page 2).</p> <p>Refer to Fact Sheet F3 – Maintaining Ditches that Convey Natural Flow for natural flow considerations.</p> <p>Refer to Fact Sheet A3 – Permit Requirements for Ditch Maintenance for permitting considerations.</p> <p>Refer to Fact Sheet A5 – Ditch Retrofit Strategies for retrofit options.</p> <p>Refer to local codes and regulations for additional requirements.</p>
Minor Ditch Reshaping/ Regrading	Excavating accumulated sediments to restore original ditch slope and/or grade line	<ul style="list-style-type: none"> Ditch storage capacity is limited by accumulated sediments Standing water remains in the ditch during storms and does not drain freely 	<ul style="list-style-type: none"> ✓ Vegetated ✓ Bare Soil ✓ Rock 	<ul style="list-style-type: none"> ✓ No flow ✓ Low flow 	<ul style="list-style-type: none"> Excavator Erosion control BMPs during maintenance (e.g., wattles, check dams, silt fences) Seed mix Post-seeding erosion control BMPs (e.g., straw mulch, biodegradable nets and blankets, coir mats) <p>Additional Equipment and Materials for Natural Flow</p> <ul style="list-style-type: none"> Required permits (keep documentation on-site during work) Containment dams (e.g., water bladders, sand bags) Vactor truck (for non -fish bearing waters and low -flow scenarios) Fish exclusion nets (9.5 mm stretched mesh) Pump and bypass setup (if ditch flow is significant) Spill kit, including containment for the pump Erosion control BMPs for pump outfall, channel stabilization, etc. 	<p>Considerations Prior to and During Implementation</p> <ul style="list-style-type: none"> Deep ditches may require more significant ditch reshaping or flow control. Perform ditch reshaping/regrading during low flow or no flow periods if possible. Failure to reestablish vegetation or protect side slopes could lead to erosion. Keep excavation equipment on the roadway and off the ditch bank. Reseed ditch line after reshaping, unless water is flowing. <p>Steep Slope Considerations</p> <p>Ditches with steep side slopes (≥ 15 percent) may require more significant ditch reshaping or flow control.</p>	<p>Refer to Fact Sheet F3 – Maintaining Ditches that Convey Natural Flow for natural flow considerations.</p> <p>Refer to Fact Sheet A3 – Permit Requirements for Ditch Maintenance for permitting considerations.</p> <p>Refer to Fact Sheet A5 – Ditch Retrofit Strategies for retrofit options.</p> <p>Refer to local codes and regulations for additional requirements.</p>

Table 2 (continued). Corrective Ditch Maintenance Strategies.

Strategy	Description	Condition	Ditch Surface Type	Water Flow	Common Equipment and Material Needs	Considerations	References
Other Corrective Ditch Maintenance Strategies (continued)							
Major Replanting/ Reseeding	Adding seed and/or plants to stabilize exposed soils. Necessary to correct poor conditions. Does not apply to conditions affecting a small section of a ditch that can be addressed as part of routine maintenance.	<ul style="list-style-type: none"> Sparse vegetation/ eroded patches on ditch bottom Poor grass growth 	<ul style="list-style-type: none"> ✓ Vegetated ✓ Bare Soil 	<ul style="list-style-type: none"> ✓ No flow 	<ul style="list-style-type: none"> Required permits (keep documentation on-site during work) Seed mix Hydroseeder Post-seeding erosion control BMPs (e.g., straw mulch, biodegradable nets and blankets, coir mats) 	<p>Considerations Prior to Implementation</p> <ul style="list-style-type: none"> Verify that required permits have been obtained prior to beginning work. Consider using different seed mixes for different growing environments (e.g., shady slopes, wetter areas) in the same ditch. Low growing grass seed mix is recommended to reduce mowing frequency and cost. Make sure there are no weed seeds or invasive plant seeds in the seed mixes. Seed and/or plant during the following optimum windows: <ul style="list-style-type: none"> Late spring (April 1 through June 30) Early fall (September 1 through October 1) If necessary, consult an engineer or a landscape architect to develop a planting plan. 	<p>When conditions affect a small section of the ditch and can be addressed as part of routine maintenance, refer to Minor Reseeding/ Replanting (Table 1, page 2).</p> <p>Refer to Fact Sheet F3 – Maintaining Ditches that Convey Natural Flow for natural flow considerations.</p> <p>Refer to Fact Sheet A3 – Permit Requirements for Ditch Maintenance for permitting considerations.</p> <p>Refer to Fact Sheet A5 – Ditch Retrofit Strategies for retrofit options.</p> <p>Refer to local codes and regulations for additional requirements.</p>
Trees of Concern	Removing dead or dying trees, dead parts of live trees, or unstable live trees that have the potential to cause property damage, personal injury, or fatalities	<ul style="list-style-type: none"> Dead or dying trees present Dead parts of live trees present Unstable live trees present 	<ul style="list-style-type: none"> ✓ Vegetated ✓ Bare Soil ✓ Rock ✓ Paved ✓ Metal 	<ul style="list-style-type: none"> ✓ No flow ✓ Low flow 	<ul style="list-style-type: none"> Required permits (keep documentation on-site during work) Chainsaw Ladder Rope Ax Wedges Wood chipper Pruning shears, loppers, and/or clippers 	<p>Considerations Prior to Implementation</p> <ul style="list-style-type: none"> Consult with an arborist to verify that the tree should be classified as a tree of concern and to determine an appropriate removal method. Verify that required permits have been obtained prior to beginning work. <p>Disposal Considerations</p> <ul style="list-style-type: none"> Consult with an arborist regarding proper disposal. If the tree is diseased, then it may require special disposal considerations. 	<p>Refer to Fact Sheet A3 – Permit Requirements for Ditch Maintenance for permitting considerations.</p> <p>Refer to local codes and regulations for additional requirements.</p>

Table 2 (continued). Corrective Ditch Maintenance Strategies.

Strategy	Description	Condition	Ditch Surface Type	Water Flow	Common Equipment and Material Needs	Considerations	References
Other Corrective Ditch Maintenance Strategies (continued)							
Minor Inlet/Outlet Repair	Installing or repairing riprap, aprons, and/or rock plunge pools at inlets and outlets	<ul style="list-style-type: none"> Evidence of scour or undercutting at inlets or outlets 	<ul style="list-style-type: none"> ✓ Vegetated ✓ Bare Soil ✓ Rock ✓ Paved ✓ Metal 	<ul style="list-style-type: none"> ✓ No flow ✓ Standing water 	<ul style="list-style-type: none"> Riprap Shovel Erosion control BMPs during maintenance (e.g., wattles, check dams, silt fences) <p>Additional Equipment and Materials for Natural Flow</p> <ul style="list-style-type: none"> Required permits (keep documentation on-site during work) Containment dams (e.g., water bladders, sand bags) Vactor truck (for non -fish bearing waters and low -flow scenarios) Fish exclusion nets (9.5 mm stretched mesh) Pump and bypass setup (if ditch flow is significant) Spill kit, including containment for the pump Erosion control BMPs for pump outfall, channel stabilization, etc. 	<p>Considerations Prior to Implementation</p> <ul style="list-style-type: none"> Verify that required permits have been obtained prior to beginning work. <p>Disposal Considerations</p> <ul style="list-style-type: none"> Use or disposal options for the removal of sediment will depend on the characterization of the waste. 	<p>Refer to Fact Sheet F3 – Maintaining Ditches that Convey Natural Flow for natural flow considerations.</p> <p>Refer to Fact Sheet A3 – Permit Requirements for Ditch Maintenance for permitting considerations.</p> <p>Refer to Fact Sheet A5 – Ditch Retrofit Strategies for Major Inlet/Outlet repair strategies</p> <p>Refer to local codes and regulations for additional requirements.</p>