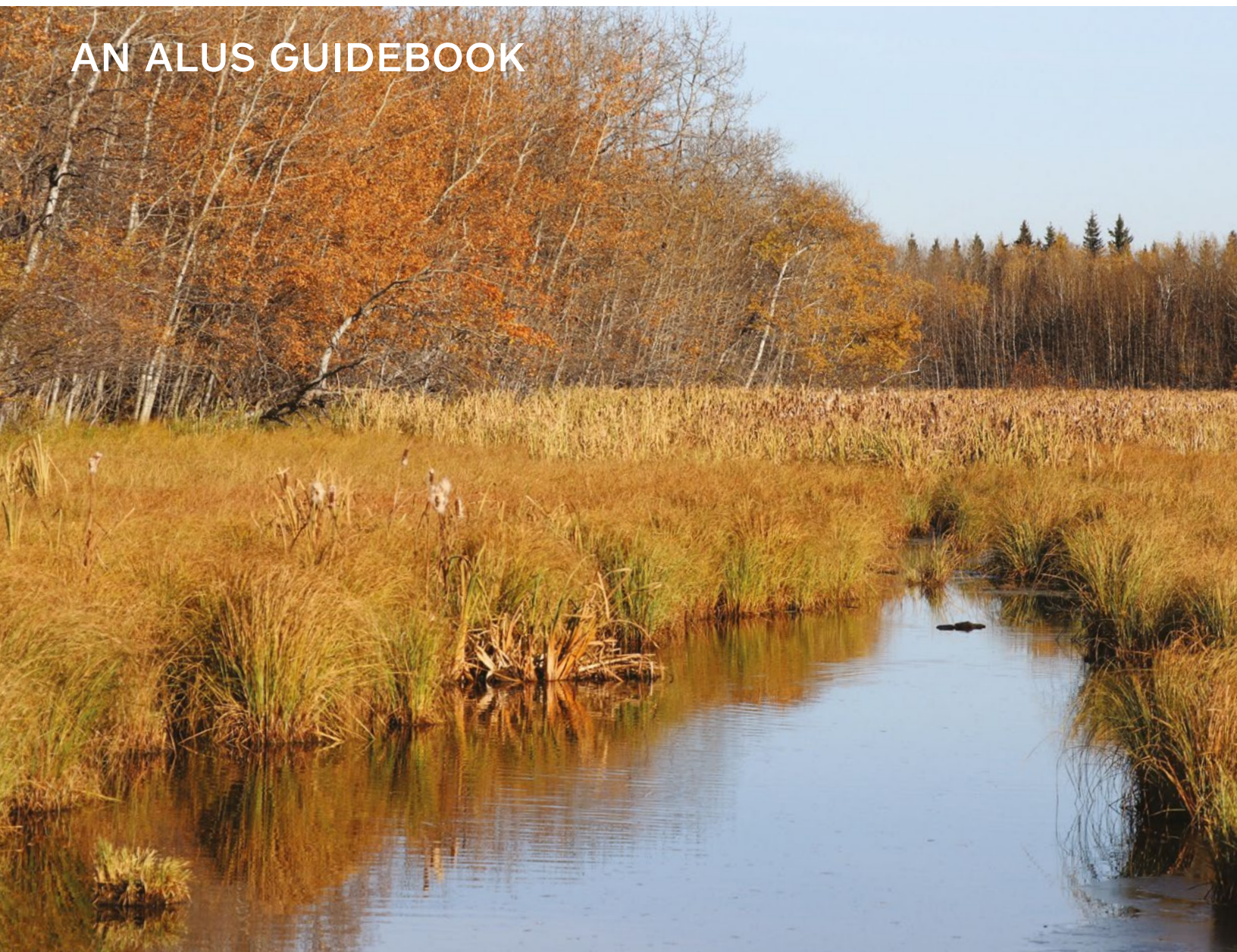




# Success with ALUS Wetland Projects

How to establish and maintain wetland  
projects in ALUS' Western Hub

AN ALUS GUIDEBOOK



# Types of Wetland Projects

Wetlands are expanses of land that are seasonally or permanently covered by shallow water or where the water table is close to or at the soil surface. Wetlands provide a range of benefits for communities, including drought and flood mitigation, water filtration and wildlife habitat. In fact, they are among the most diverse and productive wildlife habitats in the world. Canada has five main types of wetlands: marshes, swamps, bogs, fens and shallow open water. Wetland projects

that can be established and maintained on your property through the ALUS program may include enhancing seasonal or ephemeral wetlands, restoration of previously drained or altered wetlands, constructing dug-out wetlands fed by surface water or groundwater, installing pond-levelling devices for beaver management and many others.

## Enhancing Wetlands



In many locations, especially within the prairie pothole region, ALUS can support enhancing existing seasonal or permanent wetlands, often with very simple management changes. For example, installing a watering system that pumps water from the wetland into a trough placed on less sensitive land helps protect the vegetation around the wetland from excessive trampling. In turn, this protects the banks from soil erosion, improves the quality of the water and improves animal health. Installing riparian fencing to further manage how cattle access the area (or don't) may provide even greater benefits. Crop farmers can enhance the function of their wetlands by setting their crops back to create a buffer between cultivated land and wetlands. The buffer area helps prevent the flow of nutrients from the crop area into the wetland, as the intervening native plants capture nutrients from groundwater before it flows into the wetland. Reducing nutrients that feed into wetlands prevents algal blooms and improves water quality. The ALUS program supports a variety of management changes for the purposes of enhancing wetland function and delivering benefits to the landowner.

## Constructing Dug-Out Wetlands



In certain situations, ALUS can support the creation of a wetland, commonly called a **dug-out**, where water retention would be valuable on the landscape. A reservoir is created, usually via excavation, which fills with water either from exposed groundwater or by capturing surface water from the surrounding watershed. The location of these wetlands is best determined during spring runoff by assessing where water flows and lies on your property. Surface water dug-outs are most successful where there is a watershed large enough to fill the wetland, along with clay soils to prevent the water from draining away. Exposed groundwater dug-outs are suitable for areas with a high water table and do not require clay soils. Government approvals and engineering may be required for dug-outs or created wetlands. Technical experts help ensure that the dug-out design will provide maximum ecological benefit. For example, more gradually sloped sides are encouraged both for bank stability and wildlife access.

## Ecosystem Services Produced by ALUS Wetland Projects

**CLEANER WATER:** ALUS wetland projects help improve water quality, both locally and for communities downstream. By acting as filters and settling areas for runoff water, wetlands allow nutrients, sediment and particulates to be removed before entering shared waterways.

**FLOOD AND DROUGHT REGULATION:** ALUS wetlands help store water on the landscape, preventing it from

flowing rapidly away. This helps reduce flooding downstream and helps retain moisture locally during periods of drought.

**MORE BIODIVERSITY:** ALUS wetland projects support numerous bird, insect, plant and mammal species and slowly release water to ensure continued habitat for aquatic and semi-aquatic species during dry periods.

## Restoring Wetlands



In the past, a large proportion of Alberta's wetlands have been drained in efforts to increase land available for agricultural production. But with improved agricultural efficiencies and the support of ALUS, it is often advantageous for producers to restore seasonal or permanent wetlands. Restored wetlands can help the productivity of worked land and showcase the benefits that wetlands provide to society. In most cases, wetland restoration involves essentially plugging the hole where water was encouraged to drain. Usually this can be done with earthen plugs known as **ditch plugs**. Restoring wetlands can help to restore a lot of the important functions that wetlands provide: water retention, water quality, biodiversity and wildlife habitat, just to name a few.

## Pond-Levelling Devices



Beavers are an important part of Alberta's natural ecosystems, yet their activities can create conditions that are hard to farm around. While beavers can provide a blessing in drought years due to their natural desire to store water on the landscape, that blessing can be a scourge when the ponded water starts overtaking valuable crop land. Traditional beaver management approaches, involving trapping beavers and dynamiting dams, offer only temporary solutions and can be quite frustrating for land managers. ALUS can support a more reciprocal approach that allows agriculture and beavers to coexist. Installing a **pond-leveller pipe** can help manage the water level to a degree that it's acceptable to both the producer and the environment. The beavers can create their habitat, which supports them and many other species, while also holding enough water on the landscape to safeguard against drought. Meanwhile, the pond is managed to a level that it does not encroach on adjacent agricultural land. A harmonious solution!

# What to Expect while Establishing a Wetland Project

When you establish a wetland project through the ALUS program, you can expect the process to take several years. The waterbody portion of the project is generally in place within one year, but the surrounding wetland and buffer vegetation may take several years to establish. By year three, a properly established wetland

project becomes a beautiful landscape of both aquatic and terrestrial habitat. Here is a preview of what to expect for the first few years of your ALUS wetland project, in terms of objectives and maintenance tasks each year. Remember that your ALUS Program Coordinator is available to assist as needed.

## YEAR ZERO

### What to Expect

- You may not notice much change immediately. There may be bare soil or pugging and hummocking from livestock. In some cases, there may be a period where invasive weeds are prevalent as the site recovers. Monitoring is important and weed control may be needed.
- Site preparation is usually minimal for wetland enhancement projects.
- Wetland restoration or creation projects may require more extensive site preparation, planning and design, or formal approvals.

### Objectives

- Ensure all necessary permits are in place.
- Establish the project by installing relevant infrastructure (e.g. fencing or pond-leveller), making relevant management changes or by constructing the dug-out.
- Eliminate unwanted invasive vegetation.
- For constructed wetlands, plant spoil piles (excavated earth) with native species as soon as possible to establish a buffer zone.

### Maintenance Tasks

- Monitor for invasive species.
- Monitor for signs of soil erosion or sediment build-up in the wetland.



## YEAR ONE

### What to Expect

- The wetland project will hold water (seasonally only for ephemeral wetlands).
- Native vegetation will start to grow in the riparian buffer surrounding the wetland. There may also be annual weeds present, which should be monitored and controlled.
- Increased wildlife, such as birds, insects, reptiles and amphibians, may start using the site.
- Some project types will see a dramatic improvement from Year Zero to Year One, while others may take longer to recover. In some cases, the goal of the project may not be recovery but maintenance of a well-established wetland. Year-over-year results may be less visually dramatic, but the changes are ecologically significant.

### Objectives

- Ensure the integrity of the wetland bank by visually inspecting for holes, cracks and signs of soil loss.
- Establish vegetation along all erosion-prone areas, such as the side slopes and control structures. Consult your local ALUS Program Coordinator to select the best species mix for your site.

### Maintenance Tasks

- Inspect wetland banks for signs of damage, erosion, or slumping and report these to your ALUS Program Coordinator.
- Monitor the wetland for invasive species. For tips, see the [Eliminating Unwanted Plants](#) section of this Guide.



## YEAR TWO

### What to Expect

- Native vegetation such as cattails are likely emerging from the seedbank.
- A variety of native birds, insects and mammals are using the wetland as habitat.

### Objectives

- Continue monitoring for invasive species.
- Continue monitoring for damage to wetland banks.

### Maintenance Tasks

- Perform general maintenance in the wetland buffer zone, which may include removing non-native plants. This may also include maintenance of project infrastructure, such as alternative watering systems, fencing, etc.
- Continue to inspect wetland banks and monitor for invasive species on a regular basis.
- Otherwise, simply enjoy your wetland!



## YEAR THREE

### What to Expect

- By year three, most properly established wetland projects are a beautiful landscape of both aquatic and terrestrial habitat.

### Objectives

- Your wetland will be a hub of activity, sustaining a wide variety of birds and wildlife and producing valuable ecosystem functions that benefit your community.

### Maintenance Tasks

- ALUS wetland projects are generally low maintenance once established, but some management techniques are recommended. See the [Wetland Project Maintenance](#) section in this Guidebook.



# Wetland Projects

There are several options for preparing your wetland project site. Wetlands are vulnerable to invasive species; non-native vegetation should be controlled as described below. Eradicating invasive species prior to establishing the project will help ensure a successful and functioning wetland, as controlling invasive species becomes harder once a wetland is established.

There are two components to a wetland project:

**The Waterbody:** Planning for the waterbody component of a constructed wetland varies depending on the type of wetland being established. Your wetland's size, slope, location, impact on common waterbodies or other property, and other factors may determine what kinds of permits you require, whether you need an engineer or biologist's certification, and other

factors. Your ALUS Program Coordinator may be able to help you contact the local regulatory authorities to ensure appropriate permits are in place.

**The Wetland Buffer:** Every wetland project should have a vegetative buffer surrounding it to ensure the wetland functions properly for wildlife habitat and water filtration. For dug-out wetlands, the buffer zone is generally created by distributing the excavated earth around the wetland in spoil piles and then planting native vegetation. The type of vegetation will vary depending on preferences and site conditions. The size of the buffer depends on the characteristics of the site. The ALUS Guidebook Series has more information on how to prepare your buffer area appropriately.

## Overview of Site-Preparation Options



Currently, there are no chemical controls in Canada that can be used to spray in or around water. Once a wetland is established, controlling invasive species becomes harder. Eradicating invasive species prior to wetland development will help ensure a successful and functioning project.

### Chemical Spray Application (for dry sites only)

It is important to eliminate unwanted vegetation while preparing a site for a future wetland project. However, chemical control sprays are NOT permitted for use in, or in close proximity to, waterbodies in Canada. Chemical control sprays may be used on dry sites only. To determine the recommended rate of herbicide to kill unwanted vegetation, contact your local municipal Agriculture Fieldman or Crop Advisor.

For sites with some native species you do not want to remove, perform a spot treatment on undesirable plants

using a backpack sprayer. Repeat this process for as many applications as needed.

### Mowing (For Wet Sites)

For wet sites, mowing is the recommended technique for eliminating unwanted vegetation.

Mow the existing vegetation on your site using a flail mower at the highest setting to cut off the weeds' seed-heads while leaving tall stems for as much soil coverage as possible. This practice can also be conducted in the winter months.

Mow prior to weed seed-set to help reduce the seed bank.

Mow in the early fall if you are targeting woody stems.

Repeated mowing is effective at weakening the root system over time in areas where there are large amounts of invasive plants or woody stems.

### Excavation Equipment

It is important to discuss equipment needs with the contractor preparing your wetland project site. Areas that are quick to inundate with water require excavation equipment, while seasonal wetland construction can usually be completed with a bobcat.

Ensure the contractor can access the site with the needed equipment. If tree limbs or fences are in the way, removal may be necessary.

Creation of dug-out wetlands requires excavation equipment.

## Wetland Enhancement Strategies

The ecological function of a permanent or ephemeral wetland can be improved in a number of relatively

### Willow Staking



Some species of plants and shrubs, such as most willows, will reproduce from cuttings. Merely harvest from a successful willow stand during the winter dormant season. Keep the cuttings moist during transit, then stake them into your project site. Cuttings should be long enough to reach the water table when planted. For a more thorough explanation, read Agroforestry & Woodlot Extension Society's Manual for Riparian Forest Buffer Establishment in Alberta.

simple and practical ways. Note that we will list several options here, but it is far from an exhaustive list.

### Pond-Levellers



To stabilize and contain the size of a beaver pond, a pond-leveller system is often very effective. Our partners at Cows & Fish have become the local experts in pond-levellers, and we encourage interested farmers and ranchers to discuss their sites' needs with Cows & Fish.

## For Livestock Producers

### Portable or permanent alternative watering systems (AWS)

AWS are basically a pump of some sort that brings water out of your wetland and into a trough for livestock to consume. These systems provide clean water to livestock, reduce hoof rot, increase weight gain and prevent livestock damage to sensitive wetlands and the surrounding riparian areas. Usually solar-powered, AWS systems come in a number of different styles to suit virtually any situation. You can choose from permanent or portable systems, several types of activation, summer systems or all-season systems, etc. These systems may be used in conjunction with riparian fencing.

### Riparian fencing

Riparian fencing is fencing placed around the wetland to protect the sensitive riparian area vegetation, the lush area affected by the water. Fencing is typically used in conjunction with an AWS to ensure that livestock maintain access to water. Careful grazing may occur within a riparian pasture if it is large enough, where the animal units

and length of impact can be managed. Grazing should take place after July 15 to accommodate nesting birds and ideally should occur in the winter while the ground is frozen.

### Pasture pipeline systems

For very large pastures, or pastures with numerous prairie potholes or ephemeral wetlands, a pasture pipeline may make more sense than individual alternative watering systems. Pasture pipelines are laid either above ground or below ground and typically have multiple access points connected to troughs.

## For Crop Producers

### Wetland buffers

Simply leaving a buffer of natural vegetation between your crop and your wetland can allow the wetland function to improve drastically. You may wish to stake the boundary or install fence posts to mark the buffer so as not to accidentally extend the crop.

# Wetland Project Maintenance

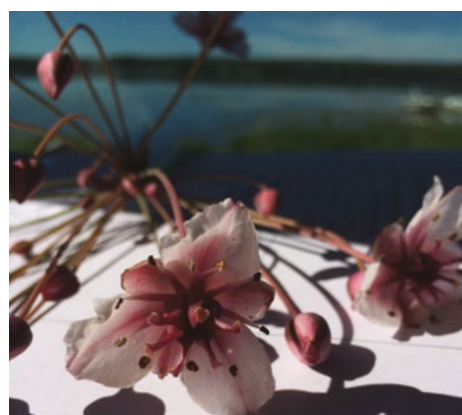
ALUS wetland projects are low maintenance once established but are vulnerable to invasive species and may require occasional infrastructure repairs, so monitoring is an important part of maintaining your project. The following maintenance techniques will help ensure quality wetland function for your land and

the surrounding community for years to come. Please check with your ALUS Program Coordinator to ensure you are using the most appropriate maintenance method and at the right time for your site's unique conditions.

## General Maintenance Techniques

Some regular maintenance is required to maintain the health and function of your ALUS wetland project and to control non-native, invasive species.

### Early Detection, Early Removal

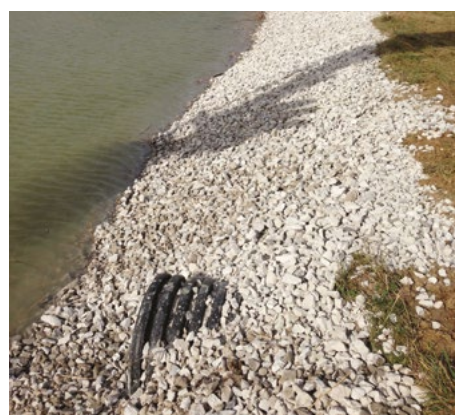


**Why:** Wetlands are vulnerable to aggressive invasive species. Early detection and removal will prevent your wetland from being overtaken by invasive plants. In ALUS' Western Hub, the following invasive species are a particular threat: Canada thistle (*Cirsium arvense*), tall buttercup (*Ranunculus acris*), flowering rush (*Butomus umbellatus*), purple loosestrife (*Lythrum salicaria*) and more.

**When:** As a general guideline, you should inspect your wetland project for the presence of invasive species three times a year: in spring, summer and fall.

**How:** See **Eliminating Unwanted Plants** section in this guide for information on removing invasive species from your wetland.

### Berm Maintenance



**Why:** Inspecting the bank of your wetland is an important part of maintaining your ALUS wetland project. Wetland banks may be susceptible to erosion or damage from animals, such as muskrats. Damaged banks can result in soil erosion or flooding.

**When:** As a general guideline, you should inspect your wetland project four times a year (seasonally).

**How:** Look for evidence of erosion, such as small channels in the soil, areas where vegetation has not established, sloughing of banks, sedimentation at the waterline, etc.

### Infrastructure Maintenance



**Why:** Infrastructure installed to support the project may be subject to damage by animals or weather, theft or manufacturing error. If the infrastructure is damaged, it is unlikely to be protecting your wetland.

**How:** Check fencelines for intactness and tension. It is fairly common for livestock or large ungulates to cause some damage while testing the fence's limitations. Ensure that alternative watering systems are functioning properly and delivering water reliably to your livestock. Check pond-levellers for signs of beaver interference.

## Managing Invasive Species



Controlling invasive species in and around wetland projects is critical to their function. While common annual weeds may be present, it is important to monitor your wetland on an ongoing basis for more aggressive invasive species.

Some species are commonly known to encroach on wetland projects in ALUS' Western Hub. Look out for: Canada thistle (*Cirsium arvense*), orange hawkweed (*Hieracium aurantiacum*), tall buttercup (*Ranunculus acris*), flowering rush (*Butomus umbellatus*), purple loosestrife (*Lythrum salicaria*), leafy spurge (*Euphorbia esula*), scentless chamomile (*Tripleurospermum perforatum*) and common tansy (*Tanacetum vulgare*).

For information on managing invasive species, please refer to the resources from Alberta Agriculture & Forestry and the Alberta Invasive Species Council listed in the **Additional Resources** section of this Guidebook.

## Maintenance Challenges

CHALLENGE	OPTIONS
I see soil erosion or holes in my wetland bank.	Contact your ALUS Program Coordinator as soon as possible.
I have spotted purple loosestrife growing in or around my wetland.	Chemical or manual control depending on site conditions. Contact your ALUS Program Coordinator or municipal Agriculture Fieldman for direction. Refer to <b>Eliminating Unwanted Plants</b> section of this guide.
My wetland is full of cattails.	Cattail is a native plant that supports native wildlife. You can manually thin the cattails by cutting them if you wish.
I do not have the equipment, chemicals or licenses required to do the maintenance and/or site preparation work.	Contact your ALUS Program Coordinator. They can help connect you with individuals and businesses who provide these services.

# Eliminating Unwanted Plants from Wetland Projects

Non-native plants are undesirable species in ALUS wetland projects. Regular monitoring and maintenance are critical. There are several methods commonly used to eliminate these unwanted plants. Mowing and other forms of mechanical maintenance are recommended, due to Canada's restrictions on chemical herbicide use near water.



## Mechanical Controls

**Why:** In wet areas where chemical treatments are prohibited mechanical control is the only option.

**When:** Any time of year.

**How:** Mowing before the weeds set their seeds can gradually decrease the presence of weeds. Spading is a technique where a shovel is used to break the roots and manually remove unwanted plants. You can also trim or cut unwanted plants with various hand tools or trimmers. Over ice mowing in the winter is also an option.

## Chemical Spray Application

**Why:** Chemical sprays can be applied to large buffer sites in poor condition that are overrun with unwanted or invasive weeds. However, the use of pesticides near water is dangerous and is restricted, so check all applicable legislation. Do not use this method on sites with native herbaceous flowering plants (forbs). Only apply chemical controls at a safe distance from water, as per Canadian regulations.

**When:** Spray in early spring while native species are still dormant.

**How:** Contact your municipal Agricultural Fieldman or certified pesticide applicator/dispenser for advice on which herbicides provide the appropriate control option. Protect young trees from the chemical.

## Chemical Spot Treatment

**Why:** Spot treatment can be used to control individual weeds or small areas of invasive plants.

**When:** Spray before the unwanted plant develops its seed-head. Consult fact sheets from the Alberta Invasive Species Council for each type of invasive plant species for detailed information on seed-head descriptions and seed dispersal habits.

**How:** Spray unwanted plants using a backpack sprayer with the appropriate herbicide recommended by the municipal Agriculture Fieldman, Crop Advisor or commercial pesticide dispenser. Be cautious on sites with forbs and be aware of your proximity to the waterbody. When close to water, hand wicking may be more appropriate (see below).

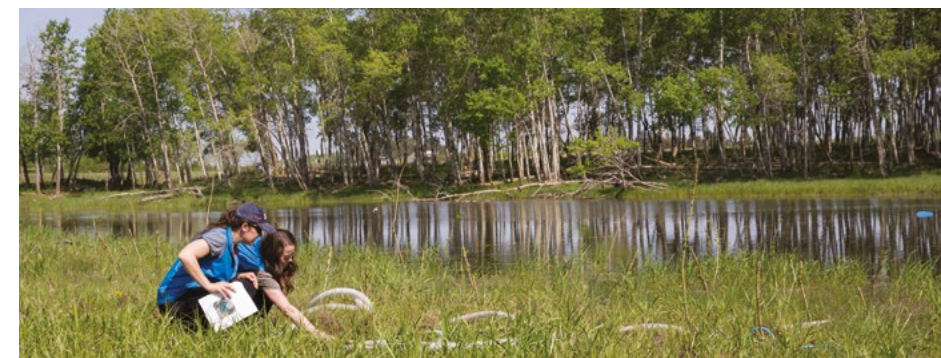
## Daubing or Hand-Wicking

**Why:** This method is used to control aggressive invasive plants growing near a waterbody, such as flowering rush.

**When:** Most effective in late summer and early fall, when the plant is actively moving nutrients towards its roots, but daubing can be done anytime during the growing season, from first plant growth in spring until late fall before the frost.

**How:** Apply the herbicide mixture directly to the stalk of the plant by daubing with an applicator or by running a gloved hand dipped in herbicide along the stalk. See **Additional Resources** for more detailed instructions.

## Additional Resources



ALUS encourages participants to work closely with other knowledgeable agencies in their area. The following groups have created good resources providing information on several topics that, when used in combination with this ALUS guide, will help you establish and maintain a successful wetland project.

### Agriculture and Forestry | Government of Alberta

For information on a variety of topics including invasive species management, ALUS recommends this helpful document: *Invasive Plants in Alberta: Riparian Areas*

**Tel:** 310-0000

**Website:** Alberta.ca

### Wetlands Alberta

A partnership of Alberta Environment and Parks Info Centre, Ducks Unlimited Canada and Alberta North American Waterfowl Management Plan (NAWMP), this organization engages Albertans to conserve and protect wetlands with resources on stewardship, protection and conservation.

**Email:** info@wetlandsalberta.ca

**Website:** wetlandsalberta.ca

### Alberta Invasive Species Council

ALUS recommends the Alberta Invasive Species Council as a source of information about invasive plant species and best management practices.

**Tel:** 587-999-0954

**Website:** abinvasives.ca

### Cows and Fish – Alberta Riparian Habitat Management Society

Another great source of information on the economic, social and environmental value of wetlands.

**Tel:** 403-381-5538

**Website:** cowsandfish.org

### Agroforestry and Woodlot Extension Society

A helpful guide is their *Manual for Riparian Forest Buffer Establishment in Alberta*.

**Tel:** 780-242-9855

**Website:** awes-ab.ca

### About this Guide

This booklet is part of the ALUS Guidebook series, illustrating the types of ALUS projects available to participating farmers and ranchers.

ALUS is a national program helping farmers and ranchers produce cleaner air, cleaner water, more biodiversity and other ecosystem services in their communities. Specifically, ALUS helps farmers and ranchers enhance wetlands, plant shelterbelts, improve riparian buffer zones, create habitat for pollinators and other wildlife, and establish other types of projects to produce ecosystem services. As an Alberta Emerald Award-winner—and guided by a Clean 16 Award-winning team—ALUS Canada is a recognized leader in sustainability that is revolutionizing the way Canadians support the environment.

For more information, please visit ALUS.ca

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The ALUS Canada Guidebook Series is made possible in part by the Government of Canada and the Government of Alberta through the Canadian Agricultural Partnership.

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