

Weed Awareness for Reclamation – Info Sheet

Preventing introduction and spread of weeds on reclamation sites

Alberta Environment and Parks
Alberta Agriculture and Forestry

June 2019

Alberta

Caveat

- *Weed Awareness for Reclamation*
 - is not comprehensive,
 - is for information purposes only, and
 - will be updated periodically.
 - In the event of discrepancies between this document and existing policies and legislation, the latter shall take precedence.
- For information on weeds and reclamation, refer to:
 - *Weed Control Act*
 - Weed Control Regulation
 - 2010 Reclamation Criteria for Wellsites and Associated Facilities

Outline

- *Weed Control Act*
- Planning and Awareness
- Weed Surveys
- Weed Seeds
- Preventative Measures
- Amendments
- Maintenance
- References

Participants to Date

- Alberta Environment and Parks
- Alberta Agriculture and Forestry
- Alberta Transportation
- Agriculture Service Boards
- Oil and gas industry
- Special Areas Boards

Why are weeds a concern?

- Weeds are one of the most common stakeholder complaints for operating industrial sites and those being reclaimed
- Economic impact of weed control
 - Cost of weed control
 - Impacts of **not** controlling weeds



Canada Thistle

Weed concerns in reclamation



Scentless
Chamomile

- Refusal of reclamation certificates
- Weeds invading natural landscapes
- Weeds interfering with end land uses
- Loss of integrity of native ecosystems
- Loss of productivity
- Negative impacts on biodiversity
- Potential impacts for wildfire risks

Weed Control Act

What is a Weed?

- There are regulated and non-regulated weeds
- A regulated weed is a plant designated by the *Weed Control Act* as a **prohibited noxious** or **noxious weed**, which includes all parts of the plant, including its seeds



Province of Alberta

WEED CONTROL ACT

Statutes of Alberta, 2008
Chapter W-5.1

Current as of October 1, 2011

Office Consolidation

© Published by Alberta Queen's Printer

Alberta Queen's Printer
7th Floor, Park Plaza
10611 - 98 Avenue
Edmonton, AB T5K 2P7
Phone: 780-427-4952
Fax: 780-452-0668

E-mail: ap@gov.ab.ca
Shop on-line at www.ap.alberta.ca

Weed Control Act: Part 1

- Weed control is a legal requirement.
- A person must **destroy a prohibited noxious weed** that is growing on land the person owns or occupies:
 - growing parts must be killed,
 - reproductive mechanisms must be rendered non-viable.
- A person must **control a noxious weed** that is growing on land the person owns or occupies.
 - control the growth or spread, or destroy.



Spotted
Knapweed

Weed Control Act: Sections 4 and 5

- A person shall not use or move any thing that, if used or moved, might spread a noxious weed or prohibited noxious weed.
- A person shall not deposit or permit to be deposited noxious weed seeds or prohibited noxious weed seeds where they might spread.

Operator Liability

- Operators or lease holders are the **occupants** as defined in the *Weed Control Act*.
- Occupants are liable for weed issues.



What is a Problem Plant?

- Problem plants might not be designated under the *Weed Control Act*.
- They might be plants that have negative impacts in a location
 - Introduced forages like crested wheatgrass, smooth brome and timothy may be desirable in one area but problem invaders in some natural landscapes or on reclaimed sites.
- Whether a plant becomes a problem depends on the plant's habits and the climate and soils in the area.

Planning and Awareness

Weed Awareness Saves Time and Money

- **Prevent weeds from being introduced**
 - more cost effective than trying to control them after they are established.
- Every year industry spends millions of dollars on weed control.
- Simple precautions can be taken up front during planning, construction, and reclamation activities
 - saves time and money.

Case Study Example: Downy Brome

- A pipeline company purchased straw for crimping on well sites in southern Alberta.
- Downy brome (a noxious weed) was contained in the straw.
- The cost to the company was \$33,000/ha to minimize new seed production and \$1100/ha in ongoing maintenance.

Planning to Avoid Weeds



Yellow Toadflax

- Companies should communicate with:
 - The landowner and/or occupant
 - The weed inspector, agricultural fieldman, and reclamation inspector for the area

Pre-Site Assessment Interview

- Questions to ask
 - What is the weed history on the site *and* surrounding area?
 - What weeds have been managed in last three years?
 - Are there any weeds of concern on neighbouring fields?
 - What weeds are of concern in the area?

Questions to Ask During Planning Phase

- What is the current land use?
- Are special crops being grown?
 - e.g.: certified, organic?
- Sensitive landscapes
 - Native stands, wetlands
- Are herbicides allowed?



Native Prairie

Questions for Landowners and Occupants

- Who are my contacts if problems arise?
- How will equipment be cleaned?
- Does the company have an active weed control program?
- Will you notify me if there is a change in location/route?
- Will I get a copy of the seed analysis reports?
- How will the lease holder control weeds?
 - Will the lease holder provide a report or any notification?

Communication with Agricultural Fieldmen and Public Land Managers

- What weeds have been documented in the area?
- What new weeds are a concern?
- What control methods have worked well?
- Has the landowner effectively controlled weeds?
- What problems have other companies had?

Assistance for Landowners and Occupants



- Farmers' Advocate Office
- Surface rights groups
- Agricultural fieldmen
- Alberta Agriculture and Forestry
- Alberta Environment and Parks
 - reclamation inspectors
 - public lands/rangeland inspectors.

Weed Surveys

Pre-Activity Weed Survey

- Prior to commencing an activity
 - the operator should conduct an on-site inspection for all listed weeds; the landowner/occupant should sign the survey form
 - The survey should include those weeds of concern in particular municipalities.
- Copies of the pre-activity weed survey should go to:
 - the landowner/occupant and the municipality
 - if the activity is on public lands, the Public Lands program with Alberta Environment and Parks.

Pre-Activity Weed Survey: Why do it?

- Important documentation when conflicts arise
 - e.g. what was brought in vs. what was already there.
- A benchmark for companies conducting activity.
- Important step in identifying sources of weeds
 - e.g. what might companies be bringing to the next site?

Weed Survey: Why do it?

- Off-site concerns become evident.
- Updates during the life of operations can save money and time
 - especially on long term projects where third party impacts are likely.



Blueweed

Weed Survey Methodology



Leafy spurge

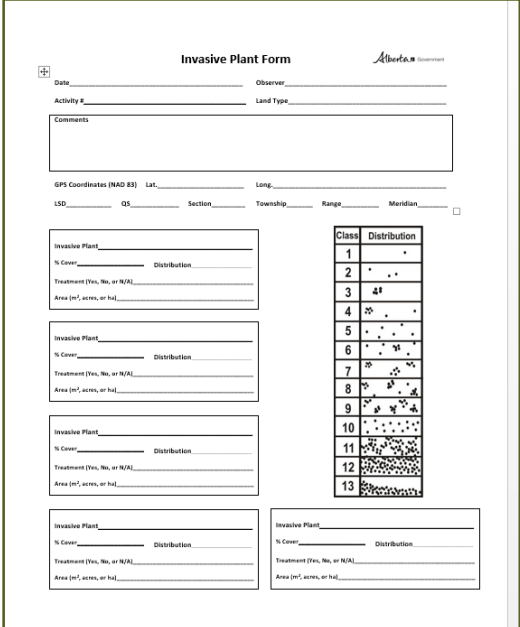
- Survey for any weeds listed as prohibited noxious or noxious in Alberta's *Weed Control Act*
 - Check with the municipality for additional weeds
- Also obtain a list of local problem species from the municipal district or county being surveyed
 - talk to the agricultural fieldman

Weed Survey Methodology: Effectiveness

- Use qualified personnel to do the survey
 - hire an appropriate environmental contractor if necessary.
- Use the Alberta Agriculture and Forestry **Weed Seedling Guide** and/or the **Identification Guide for Alberta Invasive Plants** to recognize early stages
 - Surveys may be easier when plants are in bloom and are easily recognized
 - Control methods are usually easier and more effective at early stages.
- Report findings in a timely manner to agriculture fieldman or municipal district/ county weed inspector.

Weed Survey Info Sheet

- Record weed information with a survey sheet or app
 - Track site locations and land use type(s)
 - Track weed locations
- Keep a history
 - Weed types found and extent of infestation
 - Control methods used
- Report regulated weeds
 - Weed inspector and/ or agricultural fieldman



The image shows a survey form titled "Invasive Plant Form" with the Alberta logo. The form includes fields for Date, Observer, Activity #, and Land Type. There is a large text box for Comments. Below this are fields for GPS Coordinates (NAD 83) including Lat, Long, LSD, OS, Section, Township, Range, and Meridian. The form features four sets of input fields for recording weed data, each with fields for Invasive Plant, % Cover, Distribution, Treatment (Yes, No, or N/A), and Area (m², acres, or ha). To the right of these input fields is a vertical table with 13 rows, labeled "Class" and "Distribution". Each row contains a class number (1-13) and a corresponding distribution pattern of symbols (dots, squares, triangles, etc.) representing the weed's spread.

Class	Distribution
1	.
2	• •
3	▲
4	• • •
5	• • • •
6	• • • • •
7	• • • • • •
8	• • • • • • •
9	• • • • • • • •
10	• • • • • • • • •
11	• • • • • • • • • •
12	• • • • • • • • • • •
13	• • • • • • • • • • • •

Weed Surveys: What to Record

- What weeds are present?
 - Location(s) of weeds and extent of infestation.
- Growth stage(s) and species.
- Control action(s) taken
 - type and timing
 - if herbicide is used
 - record type, amount and weather conditions.



Young Scentless
Chamomile
(pre-flowering)

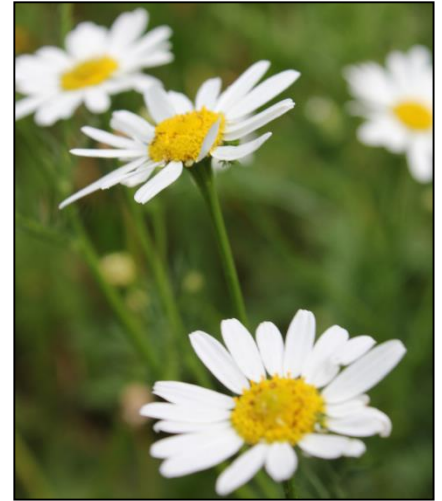
Weed Seeds

Weed Seeds in the Seed You Buy

- “Canada No. 1” or “certified seed”.
 - *only* guarantees the *variety* (genetic) purity,
 - but NOT that the seed is weed free!!!
- Common seed *can* be cleaner than certified seed.
- The *only* way to ensure that weeds/problem plants are not present:
 - get a “Report of Seed Analysis”
 - keep it on file (due diligence)

Example: Scentless Chamomile in Canada No. 1 Alfalfa

- *Canadian Seeds Act* allows 5 Scentless Chamomile (a noxious weed) seeds per 25 grams of seed (Canada No. 1).
- Seeding at 10 lb./acre (11.2 kg/ha)
 - Yields 900 Scentless Chamomile seeds/acre, or 2240 seeds/ha.
- Checking the seed analysis report can prevent this from happening.



Report of Seed Analysis

- Ask for a “Report of Seed Analysis” for each seed lot:
 - review them **before** you buy
 - refuse unsuitable seed lots
 - prevent problems before they can occur!
- The person purchasing seed needs to know what to look for
 - use qualified personnel.

Report of Seed Analysis: Issues

- It is not always possible to buy a completely weed-free seed lot
 - but, you can purchase one that does not contain weeds or plants of concern.
- Watch out for “other” potential problem plants:
 - agronomic species, and
 - weeds of concern.
- Reject or refuse a seed lot for planting if it will create issues.

Report of Seed Analysis: Things to look for

- Numerical info:
 - Lot number, or seed sealing number
 - Crop certificate number
 - Seed testing certificate number
- Crop info:
 - Crop Kind
 - Crop Variety
- Germination: percentage of seeds that grow
 - Hard Seeds: pertains to legume seeds, but still included in germination.

Report of Seed Analysis: Things to verify

- Pure Living Seed (PLS), or Pure Live Seed
 - Seed that is pure and viable
 - TZ : “tetrazolium test”, to determine percentage of viable seed.
- Signature and stamp
 - from accredited seed analyst.
- Place and Date of analysis.

Example: A Preventable Problem

- 22 kilometers of seismic line were seeded in the M.D. of Greenview
- A “Forestry Mix” was used
 - Scentless Chamomile was an impurity
- One landowner seeded 0.8 km with a different mix
 - That 0.8 km stretch of land stayed clean
 - everyone else is still picking and spraying Scentless Chamomile.

Lesson: Ask for a “Report of Seed Analysis” *before* purchasing seed!



Preventative Measures



Clean Equipment and Materials

- All equipment and materials must be properly pressure cleaned when moving to a new area
 - check with municipalities about weeds of concern
- Pay attention to less accessible parts or areas
 - e.g., tracks, belly pans, lugs, between tandem wheels
- Document the area where cleaning occurred
 - any weeds that come up can be easily controlled
 - record the location

Wash Station



- Many types exist:
 - Portable, temporary, permanent, jobsite
 - Sprayers, bays, drive-thru, industrial.

Storage Areas

- Make sure equipment and materials are from clean storage areas
 - items like pipes, boulders, fill material, tanks
 - talk to suppliers and contractors



Soil Movement

- Proper soil conservation eliminates need to haul topsoil
 - keep soils as close to the original location as possible
- Do not import topsoil with weeds
 - Note: fence line and ditch soils should be carefully inspected for weeds before use



Canada thistle problem following storage of weedy soil on cultivated land.

Mats – Rig Mats, Swamp Mats

- Use clean mats
- Wash mats before moving to new locations
- Ensure mats are free of soil, weed seeds, and propagules
- Prevent weeds from entering sites



Amendments

Using Amendments

- If suitable topsoil is unavailable, the soil quality on the site can be improved by using appropriate weed-free amendments and cropping practices
 - e.g. certified weed-free compost and green manure
- Choose and use amendments carefully
 - Get recommendations from an Agrologist
- Ensure amendments do not encourage weeds
 - Do not import amendments with weeds
 - Some amendments could favour weed growth

Annual Crops vs. Crimping



- Planting an annual crop (using clean seed) is a safer choice than crimping straw for weed and erosion control
- Use material from the same landowner if possible or get them to recommend a source

Straw Crimping

- Check fields where the straw is coming from
 - on large projects contract the straw production with a reputable grower
- Straw can sometimes be obtained from a certified annual seed crop grower
- On public land, get sources approved with appropriate regulatory personnel



Maintenance



Soil Stockpiles

- All stockpiles with maintenance needs should have side slopes no steeper than 4:1
- Revegetate with species that provide erosion control and are competitive with weeds



Staging Areas

- Remove small mounds of gravel, soil or debris that can impede maintenance such as mowing or spraying
- Level or back blade areas before moving equipment away from the location



Leafy spurge infestation

Regular Inspections and Control

- Make sure inspection personnel have the authority to deal with weeds immediately
 - Appropriate control measures to be used by qualified personnel
 - E.g. herbicides can only be applied by certified applicators
- Inspect operational areas twice during the growing season (spring and late summer)
 - Check for noxious weeds and other unwanted vegetation
- Weed control must be done in a timely manner

Issues with Residual Herbicides

- Do not apply residual herbicides more than once every three years
- These products accumulate in the soil
 - Can prevent the growth of desirable vegetation
 - Often contaminating soil for many years
 - Covering contaminated soil with clean soil will not help
 - Contaminated soil may require disposal or treatment
- If shallow-rooted weeds germinate after a residual herbicide has been used, use a non-residual herbicide to control them

Special Precautions for Native Vegetation Stands

- The use of non-selective herbicides can damage desirable species
 - E.g. native wildflowers and plants
- Picking, mowing, or spot spraying (with selective herbicides)
 - Preferred control methods in areas revegetated with native species
 - Usage and timing depends on weed types and native species type
- Care must be taken not to mow stands too low (<15 cm) to avoid damage to native plants

Natural Recovery – No Seed Areas



Wild white geranium

- Only use this approach where weed invasion potential is low
- Annual weeds (e.g. stinkweed) usually disappear in a few years and can be mowed if very competitive

References



References

- Crop Protection (“Blue Book”, annual publication, AAF), Alberta Agriculture and Forestry, AGDEX 606-1.
- Identification Guide for Alberta Invasive Plants. 2015. Wheatland County, 95pp.
- Native Plant Working Group. 2000. Native Plant Revegetation Guidelines for Alberta. H. Sinton-Gerling (ed.), Alberta Agriculture Food and Rural Development and Alberta Environment. Edmonton, Alberta.
- Practical Crop Protection (“Green Book”), Alberta Agriculture, AGDEX 606-3.
- Problem Introduced Forages on Prairie and Parkland Reclamation Sites. Conservation and Reclamation Information Letter 01-6. Alberta Environment.

References, cont.

- Weeds of North America, France Royer and Richard Dickinson. Edmonton: University of Chicago Press; 2014.
- Weeds of the Prairies, Alberta Agriculture, AGDEX 640-4.
- Weeds of the West, Tom D. Whitson. Newark, CA: Western Society of Weed Science in cooperation with the Western United States Land Grant Universities Cooperative Extension Services (and the University of Wyoming), 1996.
- Weed Seedling Guide, Alberta Agriculture, AGDEX 640-9.

END

