



The Verdant Element

Inside this issue:

Zebra and Quagga Mussels	2
Himalayan Balsam	3
Canada Thistle	4
Eurasian Milfoil	4
Growing Forward	5
Giant Hogweed	6
Woolly Burdock	7

HARBORING FUGITIVES?

Now that harvest is done you are able to reflect on what your crops were like. Did you have very clean fields? Were your yields what you expected? We can easily identify what we have growing on our land when things are in full bloom in summer, but do you know what you have in your field when combining? Weeds such as Canada thistle are colonizers and can take up large portions of land and cultivation only exacerbates the problem as new plants can grow from fragmented sections of roots.

Weeds are a fact of life. Every time you disturb the soil, break new land, reclaim old lands, or are generally just out on the landscape we deal with unwanted vegetation. The equipment we use to work the land, along with recreation vehicles, wildlife and livestock, or even our clothing can transport seed from one location to another. Sometimes greenhouses even sell prohibited and noxious weeds as flowers for our gardens and our urban neighbors. When it comes down to control, we all need to be involved in weed identification and eradication.

Invasive plants are not our only issue. A new emerging concern is aquatic invasives; in particular quagga mussels, zebra mussels, Eurasian water-milfoil and yellow flag iris. A large part of Albertan's culture is centered on recreation. We love to boat and go off the beaten path taking with us unwanted species to new places. This summer the Alberta Government set up boat inspection stations and have had 9 cases of mussels cross the border into Alberta (of which all boats were decontaminated and quarantined). Aquatic invasives can also infiltrate into your dugouts, making them unusable.

How do invasives get introduced? Often times invasives are introduced by people who don't recognize their actions as being harmful. In Ontario, goldfish are on the invasives list due to people releasing them into the wild. Goldfish have the ability to survive poor conditions and negatively affect native species and the ecosystem. Eurasian water-milfoil is a popular aquarium plant, as well you can purchase northern snakehead at most pet stores. Both of these species will kill native species and destroy the ecosystem. More care and attention is needed towards what we are purchasing and how we are impacting the environment.

Photo by Dave Britton

Zebra and Quagga Mussels

Zebra and Quagga Mussels originated in the Caspian and Black Sea and were discovered in North America in the late 1980s and have quickly spread across the Midwest states and Ontario. They are fresh water mollusks that were introduced via ships from Europe through ballast water. They are quickly spread laying up to one million eggs per year with their larval offspring being microscopic and free floating. Zebra and Quagga mussels can live up to 30 days out of water. Through boat inspections they can be found in a multitude of locations on boats and trailers, damp storage places on the boats (on life jackets and ropes), ballast water and wading gear. Boats can be decontaminated with hot (60°C), high pressure water. These species have the ability to attach to different substrates whereas native mussels do not have the ability to attach to anything. There is **no control method** so it is impossible to eradicate both zebra and quagga mussels after establishment. Prevention is key in these species.

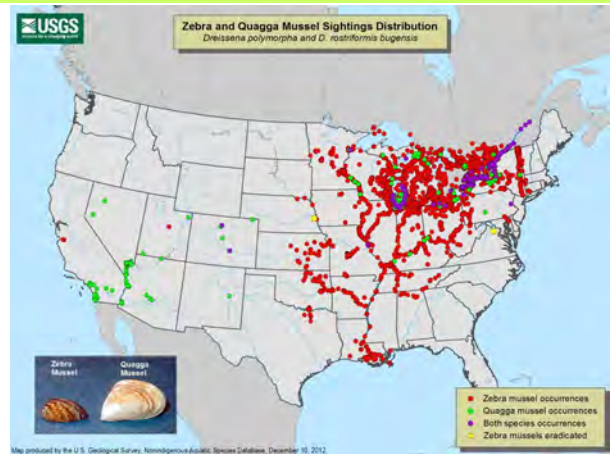
Zebra and Quagga mussels are filter feeders which will affect the entire ecosystem by removing food for fish and plant species. The mussels outcompete native species, accumulate toxins and pollute the water and can lead to increased frequency and duration of toxic algae blooms such as blue-green algae.



Photo courtesy of Kate Wilson, AESRD

They attach to hard substrates such as boats, docks and infrastructure in the water along with softer surfaces such as sand and vegetation, eventually carpeting entire shorelines. They colonize at such a rate that can lead to huge increases in operational costs of water pipelines, intakes, and water treatment systems and boat maintenance.

This summer there were voluntary boat inspection sites at border crossings on weekends that had several confirmed cases of mussels. A large concern is Albertans buying boats in the “snowbird” region of Nevada and Arizona and bringing not only their boat back, but having some mussels along with it. These mussels have recently been added to the fisheries act and Fish and Wildlife officers have the right to confiscate your boat if it has (or suspected to have) mussels on board.



Clean • Drain • Dry

Attention: Boaters and Anglers

Every time you remove your boat from the water, remember to **Clean, Drain and Dry** your watercraft and equipment.

Clean and inspect watercraft, trailer and gear. Remove all plants, animals, and mud.

Drain all water from bait buckets, coolers, bilges, internal compartments, livewells, ballasts, transom and motors.

Dry watercraft and gear completely between trips. Sponge out standing water and allow the wet areas of your boat to air dry.

Inspect and remove plants, animals and mud.

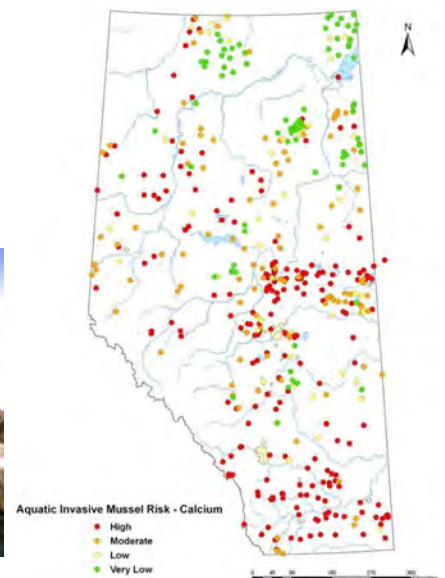
Report any mussels that are attached to your boat.

1-855-336-BOAT (2628)
www.mywildalberta.com

The Alberta Environment and Sustainable Resource Development office is currently developing a prevention and monitoring program. This past



Photos of Zebra Mussel (*Dreissena polymorpha*) by Dave Britton



Alberta Waters Mussel Susceptibility. The environmental factors (calcium and pH) favor mussel survival. Map from Ron Zurawell ESRD 2013]

HIMALAYAN BALSAM

(POOR MAN'S ORCHID, POLICEMAN'S HELMET, INDIAN BALSAM, ORNAMENTAL JEWELWEED, TOUCH-ME-NOT)

Truth be told, when I lived in Denmark I had Himalayan balsam growing in my garden. Ignorance was bliss in my case, it was contained by mowing around it, but little seedlings would pop up all over (due to the plants ability to explode the seed head and send seeds up to 10 meters away). Here in Alberta we have grave concerns about this species entering our wetlands and lakeshores. This



plant is highly adaptive and can grow in dry uplands and gardens and wet riparian areas. This plant is commonly seen in this area in peoples gardens as it has been sold in greenhouses, and can be seen at Jessie lake coming from the storm drain.

Himalayan Balsam is a prohibited noxious weed, which means that you must eradicate them. They have the potential to take over native vegetation, forming a monoculture and destroying wildlife habitat and waterfowl breeding grounds. They can outcompete cattails, rushes and sedges in riparian areas and due to shallow roots allow for erosion and destruction of shorelines.

Himalayan Balsam is an annual, which grows at an impressive rate, achieving heights of 1 to 3 meters. It has a hollow bamboo-like stem with prominent ridges. When under stress, it can grow in a spindly grass-like fashion, flowering close to the ground. The leaves and stem are tinged reddish purple colour, with whorls of three leaves twirling up the stem. Leaves are lance shaped and have prominent veins and serrated edges. The flowers can come in a multitude of shades from white to pink to dark purple. Flowers are heavy with nectar and can attract bees away from native species. Seed capsules can contain up to 16 seeds and explode, shooting seeds up to 10 meters away, and can stay viable for seven years. An average sized plant can produce 700-800 seeds in total.

Control: Hand pulling works best but needs to be done early in the season before seeds form. Disposal by bagging and burning is recommended however for large patches this is ineffective. At Pigeon Lake they have used the "pick, break and drop" method which is pulling out the plant and breaking it apart a few inches above the roots and dropping them on drier lands where they dry out and die. After August, you should bag the tops to prevent seed dispersal. Some herbicides are effective, however sprayed flowering plants can still produce viable seed.

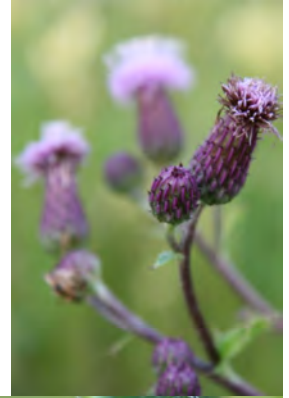


Example of how Himalayan Balsam can outcompete native riparian vegetation.



CANADA THISTLE

Canada thistle is an aggressive perennial with an extensive root system that has been found to go down to depths of 6 meters. It spreads primarily by creeping roots to form colonies that can be found in a variety of habitats. Control: most of the Canada thistle biomass is in the root system so the only effective control is to kill the roots. Cultivation spreads small root pieces around, allowing for the establishment of new plants from those roots. Repeated mowing will eventually deplete root energy reserves, however this will take several years to be effective. There are over 280 registered herbicides for Canada thistle, however one with a residual would



be more effective. The best time to spray is when the plant is in early bud stage (see picture to the right), or in the fall when the plant is moving energy into the root system.

Last year LARA released 1260 Canada thistle Stem Mining Weevils (*Hadropontus litura*) to determine if the weevils can establish native populations for Canada thistle suppression. The weevils are host specific to Canada thistle, and as adults, feed on the leaves of plants and when reproducing, the eggs are laid in the stem and the larvae mine down in the stem to the roots feeding on plant tissue. This summer the weevils were found at the release sites and will continued to be monitored in the next few years. Notable damage to the thistle at the release sites was visible this summer.



EURASIAN MILFOIL

Eurasian Milfoil is easily confused with native milfoil species and other submersed aquatic vegetation. It is currently found in eastern Canada and British Columbia and most of the United States. Eurasian milfoil is a submerged rooted fast growing perennial that can grow to lengths of 2-3 meters. Three to six deeply divided leaves are in whorls around the stem and are feathery in appearance. The flowers of Eurasian milfoil are small and reddish in colour that appear above the waters surface and bloom in late July to early August.

Eurasian Water-Milfoil is one of the most widely distributed invasive species. It can interbreed with native varieties and form an even more aggressive invasive species. The large mats/colonies that it forms blocks out the sunlight from reaching other plants. When the plants start dying in the fall, the decaying matter reduces the oxygen content in the water and can result in fish kills. The thick mats make the water unsuitable for recreation as it prevents people from swimming and fishing. Boat propellers can get entangled as well chop the Eurasian milfoil into tiny fragments. Each of those fragments can re-grow, and be redistributed to other locations to form new colonies.

Physical removal of Eurasian milfoil is the only control option.



Chris Evans, River to River CWMA, Bugwood.org



Photo courtesy of Kate Wilson, AESRD



photo by Ontario Federation of Anglers and Hunters



Growing Forward 2 provides programs and services to achieve a profitable, sustainable, competitive and innovative agriculture, agri-food and agri-products industry that is market-responsive, and that anticipates and adapts to changing circumstances and is a major contributor to the well-being of Canadians.

Growing Forward 2 is now accepting applications for the following programs:

- [Agri Processing Automation and Efficiency - Livestock](#)
- [Agri Processing Product and Market Development - Crop](#)
- [Agri Processing Product and Market Development - Livestock](#)
- [Animal Health Biosecurity Producer](#)
- [Business Management Skills Development](#)
- [Business Opportunity](#)
- [Confined Feeding Operation Stewardship](#)
- [Food Safety Systems Delivery Agent](#)
- [Food Safety Systems Producer](#)
- [Irrigation Efficiency](#)
- [On-Farm Energy Management](#)
- [On-Farm Stewardship](#)
- [On-Farm Water Management](#)
- [Traceability Pilot](#)
- [Traceability Technology Adoption](#)

GROWING FORWARD

Growing Forward Stewardship Programs

Grant funding cost share of 30%-70% of eligible expenses to complete the project (\$50,000.00 funding maximum)

The On-Farm Stewardship Program supports the implementation of beneficial management practices (BMPs) that reduce the risk of agricultural contaminants entering water supplies. The purpose of the On-Farm Stewardship Program is to provide financial support for active producers to implement approved projects which reduce agriculture's impact on water quality.

Below is a list of approved projects under the On-Farm Stewardship Program. Please refer to the following pages for additional information, cost shares and funding maximums for each project.

Activity Code	Project
Category A	
101	Riparian Area Fencing and Management
102	Year-Round/Summer Watering Systems
103	Portable Shelters and Windbreaks
104	Wetland Restoration
Category B	
201	Improved Manure Storage Facilities
202	Livestock Facility Runoff Control
203	Livestock Facility and Permanent Wintering Site Relocation
Category C	
301	Improved Pesticide Management
Category D	
302	Fuel Storage
303	Used Oil Storage
Category E	
100	Innovative Stewardship Solutions

The environment is becoming a more prominent issue. It is a large factor in marketing agriculture and food products in today's global markets. Consumers are demanding more transparency and are demanding high quality and safe products. Reputation of food safety is critical to retain and gain access to domestic and international markets.

Environmental Farm Plans (EFP) provide a tool for producers to self analyze their operation and identify environmental risks, current standards, areas for improvement and also highlight what they are doing well.

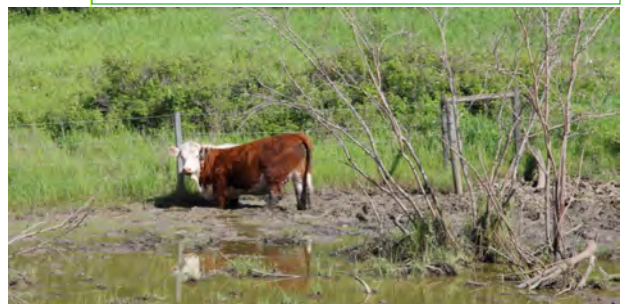
Having a completed EFP allows producers to access different funding opportunities, such as the Growing Forward Stewardship Program. It is also useful in product branding that demonstrates specific environmental standards.

The EFP Process

An EFP can be completed through workshops or one-on-one session(s). The EFP first identifies the soil and farm site characteristics. Following this, the producer completes only the relevant chapters that apply to their operation; such as wintering sites, fertilizer, pesticides, crop management etc. Upon completion the EFP is submitted to a Technical Assistant for review. Once reviewed the EFP will be returned along with a letter of completion.

The EFP is a living document and should be reviewed and updated periodically.

If you wish to complete an EFP or have any questions regarding EFP please contact the LARA office at 780-826-7260



Stuck in the mud? Consider an offsite watering system.

Giant Hogweed is part of the carrot family and can be easily mistaken for several species including cow parsnip and water hemlock. However it grows to an immense size (up to 6 meters tall) with a stout dark reddish hairy stem. Small white flowers form in an umbrella-shaped head. Leaves are deeply divided and can be up to 1.5 meters across.

Do not touch this plant! The clear watery sap contains photosensitizing compounds (furanocoumarins) so if you get it on your skin under UV radiation it will cause severe burning.

Giant Hogweed



They know, they just know where to grow, how to dupe you, and how to camouflage themselves among the perfectly respectable plants, they just know, and therefore, I've concluded weeds must have brains. ~Dianne Benson, *Dirt*, 1994

Resources:

For more information on what weeds are listed in the weed act and needs to be controlled or eradicated visit the Alberta Weed Monitoring Network at:

[http://www1.agric.gov.ab.ca/\\$Department/deptdocs.nsf/All/prm13875](http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/All/prm13875)

Alberta Invasive Plant Council www.invasiveplants.ab.ca

Ontario's Invading Species Awareness Program

www.invadingspecies.com

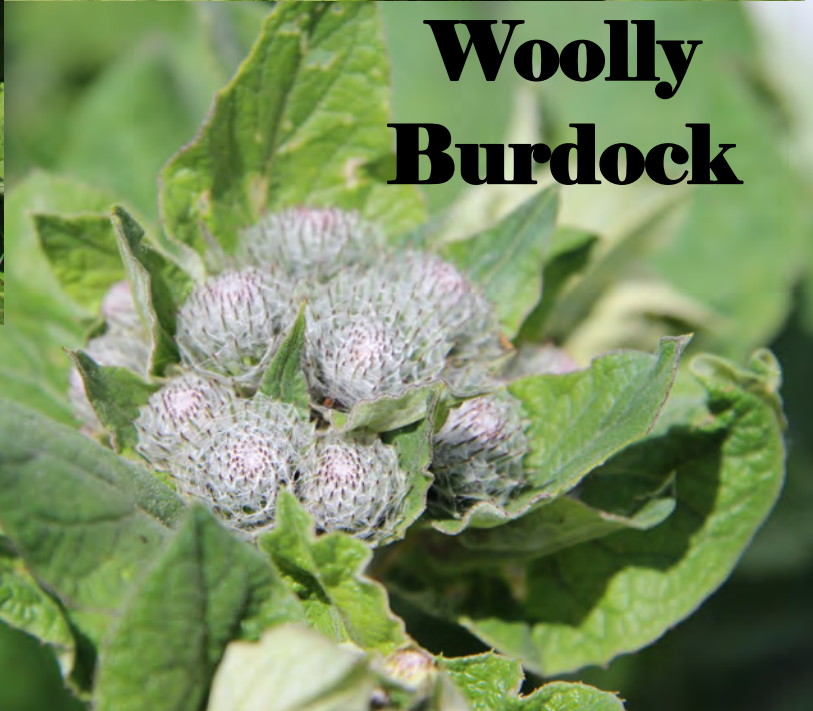
FYI! As of October 2013, there has been a confirmed case of zebra mussels in Lake Winnipeg. <http://news.gov.mb.ca/news/index.html?archive&item=19256>

Like us on Facebook: <https://www.facebook.com/pages/Lakeland-Agricultural-Research-Association/316266591732449>

Sustainable farming encompasses a wide range of practices and principles; combining environmental stewardship with profitability and ensuring that the family farm will be there for generations to come.



Woolly Burdock is a biennial species that can reach heights of 2.5 meters and is considered noxious. It has a large tap-root that can go to depths of 1 meter. Lower leaf stalks can either be hollow or solid and the stem is grooved and rough with many branches. Leaves are heart shaped, are very large (40 cm) and alternating. Clusters of purple globular flowers with the flower head surrounded by whorls of bracts that are densely cobwebby. These bracts are curved allowing them to stick like Velcro to anything that touches them, allowing for seed distribution. This species only reproduces by seed, growing the first year as low-growing rosettes. Herbicide is most effective to control first year growth rather than digging out the large taproots. Woolly burdock matures in the second year of growth and flowers, producing seed. For control it is best to clip the heads and burn them, or mow the plants before it flowers to prevent seed from being produced.



**Woolly
Burdock**



Lakeland Agricultural Research Association

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Bonnyville Alberta
T9N 2H4

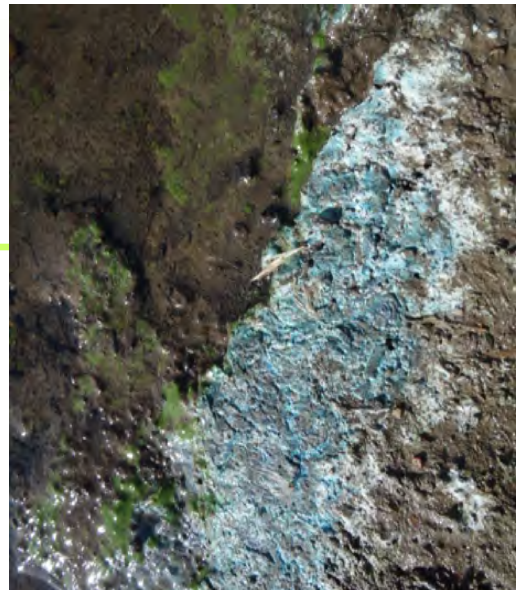
Phone: 780-826-7260
Fax: 780-826-7099
Kellie Nichiporik
E-mail: sustainag.lara@mcsnet.ca

Blue Green Algae



Cyanobacteria or Blue Green Algae is becoming a more common occurrence in both the lakes and dugouts of the area. It is estimated that cyanobacteria have been in existence for over 2 billion years. Blue green algae are primitive bacteria that are capable of photosynthesis. They are a competitive species and can fix their own nitrogen so they are limited by phosphorous in the environment. They are very unique in the fact that they can regulate their buoyancy and move vertically in the water column depending on light requirements and temperature.

Cyanobacteria produce several different forms of toxins some of which are lethal in minutes to ones that bioaccumulate and can cause long term damage to vital organs such as the liver and kidneys. Anatoxins have been known to be lethal within minutes of consumption by affecting the nervous system. The toxins are deactivated by ultra-violet light so do not last long in the environment, but are potent at very weak concentrations. Saxitoxins affects the nervous system and may aggravate pre-existing conditions such as asthma. They also can cause severe contact dermatitis. Microcystins accumulate and can persist in the water for several weeks following the bloom and will cause organ damage to the kidneys and liver. If blue green algae is present in your dugout, if possible find an alternative watering system for your livestock/household or treat the water and do not use for three weeks as the bacteria die and release the toxins.



Working Well Workshop

November 28th, 2013 6:00 PM

Mallaig Unity Hall, Mallaig Alberta



Consider how your life would change if you lost your water supply!

Proper water well siting, construction, maintenance and plugging will help protect your well from biofouling and contamination, save you costly repairs, and ensure your well water yields are sustained over many years.

If you'd like to find out if your groundwater is at risk and learn what you can do to protect your well,

attend this free water well management workshop

To register please contact Kellie at the LARA office

