

2017

Volume 8, Issue 1



The Verdant Element

BELIEVE IT OR NOT

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There are the naysayers and the preachers, the ostriches and the rest, but everyone has an opinion on climate change. Truly, the climate has been changing constantly from the dawn of time. Alberta used to be a tropical oasis close to the equator with British Columbia underwater so we would have also been coastal. The planet has been heating and cooling and land masses have shifted, disappeared or formed in new places. Take a look at the Galapagos, where some of the oldest islands are disappearing back into the ocean and new islands are forming. The world is constantly evolving and changing and people cannot dispute that fact. Climate change is real. What can be up for debate is the anthropomorphic effect that we have had on climate change. In the last 100 years there have been leaps and bounds with the green revolution, the industrial revolution and the technology that has come out in the past few decades. Globalization has changed the scale and way we do business. However, all that humankind has achieved has come at a cost. We have removed forests, changed hydrology, caused creatures to become extinct, put in place infrastructure and created chemicals and pollutants that are affecting the natural world. The hole in the ozone for instance was directly human caused and is impacting the global ecosystem. The amount of greenhouse gases being produced is tremendous and is affecting the rate of climate change with a carbon imbalance. Loss of biodiversity is a concern, as we are destroying natural areas, removing habitat and shifting species dynamics and composition with the introduction of invasive species. Our arable lands are being consumed by urbanization, while we are expected to produce more food on less land. Canada is one of the few places in the world where we most likely will be able to increase food production due to changing climate. However, this too may be challenging with more extreme weather events and changes to the amount of precipitation we receive. Sea ice has been declining, and in 2007 the Northwest Passage was ice free.

Continued on page 2

Climate continued from page 1



Both the Arctic and Antarctica are warming at a rate twice that of the rest of the earth. Recently I went to Antarctica and could notably see the effects of climate change. Within the peninsula alone, there is an amazing amount of rock that is showing, that a mere 10 years ago would never be exposed. Polar bears in the arctic are starving to death as a result of lack of sea ice. Snow and ice reflect approximately 90% of solar energy, whereas open water captures about 94%. This in turn is heating up the oceans at an alarming rate. Corals, which provide habitat for approximately 25% of all marine life are extremely sensitive to temperature change. The water chemistry is changing due to the change in temperature. Higher temperatures reduce the amount of oxygen in the water, which in turn is causing the corals to become “bleached”. Places such as the Great Barrier Reef have suffered mass bleaching which is reducing habitat for many species, including many that are endangered such as marine turtles, several species of fish and sea birds. Due to the increase of carbon dioxide in the atmosphere, the ocean is absorbing more carbon dioxide which is causing a decrease in the pH. This decrease in pH is known as ocean acidification and is causing issues with fish reproduction, as well as affecting calcification processes that allow shellfish and corals to form shells and plates. With the shift in climate, loss of biodiversity, greater storm events and changes in landmass, everybody should have a reason to be concerned. Country borders can shift due to changes in sea levels and erosion of lands. The infrastructure, such as pipelines, roads, and buildings are at risk of being damaged or destroyed with extreme weather events, loss of permafrost, or introduction of [invasive] species (zebra and quagga mussels for instance or the pine beetle). The loss of a species is devastating, because personally I don’t want to go and see the last polar bear in a zoo, but also because we as a society should be better stewards of the earth. If not for ourselves, but for future generations.

Photo below: beavers introduced to Patagonia have devastated the natural ecosystem. Photo bottom right: evidence of coral bleaching at the Great Barrier Reef.



Climate change has far reaching impacts which can affect our way of life, our economy, infrastructure, health, environment, and wildlife.

*To report prohibited noxious weeds call the Alberta Pest Surveillance System at :
310-APSS (2777)*



abinvasives.ca
info@abinvasives.ca



Last Updated April 2016

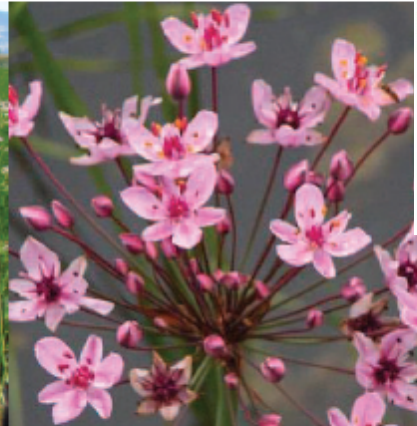
Flowering rush

Butomus umbellatus (Aka grassy rush, water gladiolus)

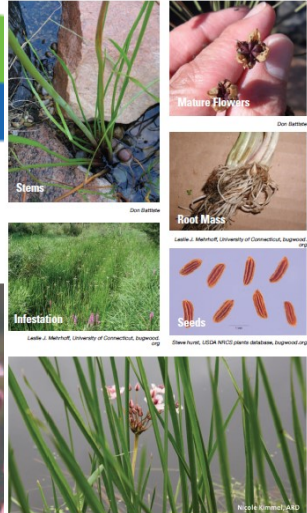
Provincial Designation:
Fisheries Act, Weed Control Act



Alynn Mitchell, Salish Kootenai College



<http://www.weedbase.ca/>



Stems: Don Barber
Mature Flowers: Don Barber
Root Mass: Kellan J. Mitchell, University of Connecticut, Invasive.org
Infestation: Kellan J. Mitchell, University of Connecticut, Invasive.org
Seeds: Steve Hunt, USDA NRCS Pacific Northwest, Invasive.org
Nicola Kimmis/AGD

Overview:

Flowering rush is a cattail-like perennial of freshwater wetlands. It is native to Africa, Asia and Europe¹ and was likely introduced to North America as an ornamental plant. It is the only member of the *Butomaceae* family and is able to reproduce both by seed and vegetatively (rhizomatous roots form bulbils which separate from the parent plant²). Flowering rush infestations can displace native vegetation and result in reduced water quality which may disrupt valuable fish and wildlife habitat. Dense stands in irrigation ditches can reduce water availability and in lakes can interfere with boat propellers and swimming.³ Plants flower summer to fall.¹ Flowers are hermaphroditic (contain both male & female organs) and are pollinated by bees, flies and butterflies.²

Habitat:

Flowering rush can grow on water margins or as a submerged plant with flexible leaves suspended in deeper water (3-6 m).³ It is widely tolerant of soil types (sandy to clay)

and soil acidity, but does require wet soil and full sun.⁴ It is hardy to Zone 2 in Canada.¹

Identification:

Flowering rush can be confused with sedges when not in bloom but is usually a much larger plant.³

Stems: Are erect and triangular near the base. Plants grow to 150 cm.¹

Leaves: Are green and sword-shaped,⁵ originate from base of plant,² and are triangular in cross-section, twisted toward the tip, and feel spongy when compressed.³

Flowers: Are 2-2.5 cm wide with 3 slightly greenish sepals and 3 petals.³ Twenty to fifty pink through white flowers are borne on umbrella shaped clusters³. Anthers are red.⁵ There are 9 stamens ranged in an inner whorl of 3 and outer whorl of 6.³

Prevention:

Simply do not grow it - talk to your local nursery about non-invasive alternatives. Flowering rush can spread by seed or root frag-

ments so care must be taken with attempts to remove existing plants. It has been observed to invade aquatic areas with existing vegetation more slowly³ - maintain existing stands and prevent disturbance.

Control:

Mechanical: Cutting below the water surface can suppress plants but will need to be repeated. Hand digging is feasible with small infestations but care must be taken to remove all parts of the plant - root fragments can drift with water movement and result in new infestations². All plant matter should be removed and disposed of in landfill-bound garbage.

Chemical: Diquat is registered for use on flowering rush in lakes, ponds, irrigation canals and slow moving streams. Herbicide applications near water bodies require specific applicator certification and permits from Alberta Environment. Always check product labels to ensure the herbicide is registered for use on the target plant in Canada by the Pest Management Regulatory Agency. Always read and follow label directions. Consult your local Agricultural Fieldman or Certified Pesticide Dispenser for more information.



REFERENCES
1. Flora of North America. *Butomus umbellatus*. www.efloras.org
2. University of Connecticut. *Flowering Rush*. <http://invasivespecies.org/publications/AgendaWaterResources/EB1201.pdf>
3. Montana State University Extension. *Flowering Rush*. http://www.montana.edu/extension/programs/pests/weeds/invasive_plants
4. USDA Forest Service. *Weed of the Week: Flowering Rush*. www.fs.fed.us/psw/invasive_plants
5. *Invasive and Competing Flora of the Pacific Northwest*. 1991. University of Washington Press. p. 552.

Pest Watch

Riparian Health Assessment

The riparian zone is the interface between the upland and a water course. A healthy riparian area: traps and stores sediment; builds and maintains banks and shorelines; stores water; recharges aquifers; filters and buffers water; creates primary production and much more!

A riparian health assessment is a tool designed to evaluate the site and can provide a foundation to build an action plan and identify priorities.

If you would like a FREE Riparian Health Assessment conducted on your property or more information please call Kellie at 780-826-7260 or email sustainag.lara@mcsnet.ca

Unharvested Crops

Alberta Agriculture and Forestry

[http://www1.agric.gov.ab.ca/\\$Department/deptdocs.nsf/All/com16303](http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/All/com16303)

Spring management options for un-harvested crops

How can you best to capture the highest value from your un-harvested crop that was overwintered, while managing cost and risk, and ensuring soil health for subsequent crops.

Check on your Insurance FIRST

Before you take action with an un-harvested crop, contact your crop insurance provider to ensure that your plans are not contrary to your insurance policies' recommendations or restrictions, and determine what is required in order for them to assess loss and make a claim.

Is the crop worth harvesting?

Those who decide to harvest the crop are often pleasantly surprised at what they get. Yes, yield and grade can be reduced, but the value may be surprising and worth the effort. In some cases the crop may not be as tough as last fall. Take a representative sample of the crop to determine quality.

If rodent or wildlife damage has destroyed or shelled the grain, or if the crop is too flattened to pick up with a combine, then harvesting is not an option.

What are my crop management options?

To decide which management option is most suitable, consider the condition of the crop (standing or swathed) and soil conditions.

Take into consideration what the field conditions were last fall. This will have an impact on spring field access, as the presence of the crop and or swaths will slow soil drying and delaying entry to the field. When considering how best to manage the un-harvested crop, consider when field access is possible, the economics of the management option, current cropping plans, risk of equipment damage, and conservation of soil, soil moisture and the long term health of the soil.

The solution must leave the field surface in good condition for subsequent equipment operations and for crop establishment.

There are several different management options that can include harvesting, baling, grazing, mowing, chopping, residue stacking, tillage and harrowing, each with their own pros and cons as well costs will vary.

If any un-harvested areas are involved in land-use or conservation programs, check with the program facilitators first, to determine if there are any residue management practices that may not be allowed while participating in their program.

What downgrading factors may have worsened in a crop left overwinter?

Sooty molds caused by naturally-occurring fungi will become more prevalent on dead plant material of any kind, including unharvested crops. These molds/mildews can be a downgrading factor. Additionally, freeze damage, rodent excreta, and sprouting are also downgrading factors that can be more common in spring-seeded crops that overwinter.

What if the overwintered crop delays the timing of my normal seeding operations?

When overwintered crops threaten to delay normal seeding operations, it may be wise to be ready to seed an early-maturing crop, or a silage crop, to ensure that late-seeded fields have a chance to reach maturity.

Will crop diseases be worse in a crop that has overwintered?

A crop that goes long past maturity without being harvested may have lots of fungal growth on it. The growth of most fungi only occurs when temperatures are above freezing and lots of moisture is available, so this is not an issue during the cold winter months. Fungal growth is a natural occurrence on crop residues every year, and is not a cause for great alarm. In some cases, the fungi may be plant pathogens, but they will not cause any elevated risk of disease when good crop rotation and disease management principles are followed.

It is important to note that some fungi may produce mycotoxins (poisonous compounds). As a result, it is wise to get overwintered, or moldy crops tested for their levels of mycotoxins before feeding them to animals.

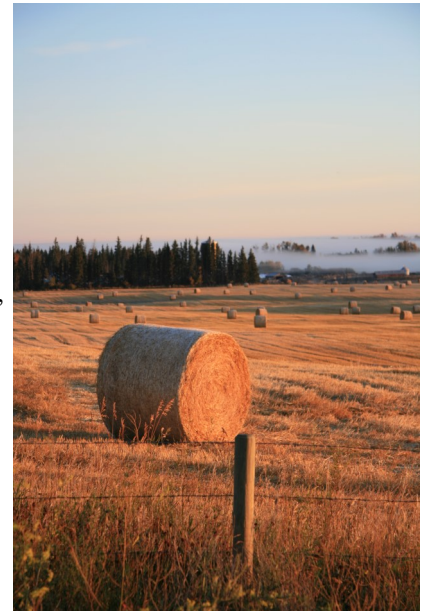
Can I seed directly into the un-harvested crop?

It may be possible to seed into an un-swathed crop. Although some equipment can seed through standing crop residue, the crop material will affect crop establishment and equipment performance; resulting in hair pinning, poor seed to soil contact and emergence issues. If the area of un-harvested crop is small, this approach may work but as the number of acres increases it would become more difficult.

The down side of seeding directly into the un-harvested crop will be volunteer plants and weeds from the last year's crop, so crop selection will be key.

Burning: what to consider:

One of the last options to consider is burning the crop. However, sometimes this is the only option available. Check with your county or



municipal district, most will require permits before burning your crop. If you are in the [Forest Protection Area of Alberta](#), you need to get a [fire permit](#) from the Government of Alberta. There may also be fire bans or restrictions in place, especially early in the spring. Please check [albertafirebans.ca](#) for any restrictions and remember to contact your crop insurance agency.

Burning un-harvested crop will not provide any value to you from the crop and may negatively impact the soil. Smoke generated from burning can have air quality as well as visibility impacts that can result in health issues and even traffic accidents. The impacts of burning can be far reaching depending on weather conditions.

Should I burn my crop to prevent diseases and mycotoxins from spreading?

Burning may destroy crop residues but will have little to no effect on crop diseases. The mycotoxin risk will be removed only because there will be nothing left to feed animals. As a result, burning crops is not recommended to prevent diseases or destroy mycotoxins.

Should I burn my crop to remove the crop residue?

Research has shown that burning crop residues has more negative effects than positive. Burning reduces soil organic matter, carbon and nitrogen. Additionally, it can have negative effects on soil erosion, permeability and air quality. Finally, burning disrupts the balance of microorganisms in the soil reducing the biological activity and overall soil health

In cases where mechanical methods to remove the crop are not possible, or insufficient to handle the residue, burning could be used as a last resort to remove crop residues prior to seeding. Make sure to check with your crop insurance provider, and with municipal authorities, for permission to burn.

If you decide to burn: Burning tips

- Do you have your fire permit? Follow the directions on the permit or as directed by the municipality.
- If you plan on burning, make sure you also have sufficient property insurance in the event that your fire gets out of control, or spreads to neighboring land.
- Monitor your burn; don't leave your field while it's burning.
- Burn small areas at a time and avoid lighting the entire field on fire at once.
- Have a plan to deal with any emergencies.
- Have a water truck and other equipment on hand.
- Till the outside rounds of the field to create a fire break.
- You will also have to monitor after your burn.
- Consider baling the un-harvested crop, removing it from the field and later burning the bales away from your field. Burning the bales in a smaller controlled area is easier to monitor and manage than burning swaths in a field. This option will also help preserve the ground cover, residue and organic matter in the field.



Call 310-FARM for more information.

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.

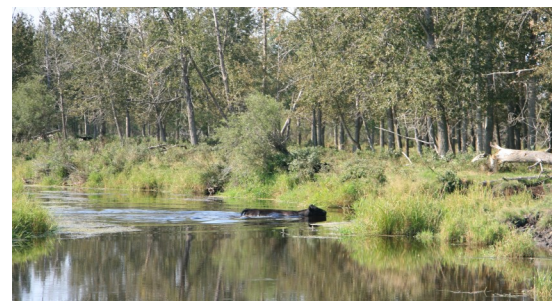
Having a completed EFP allows producers to access different funding opportunities, such as the Growing Forward Stewardship Program. It is also useful in product branding that demonstrates specific environmental standards.

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.

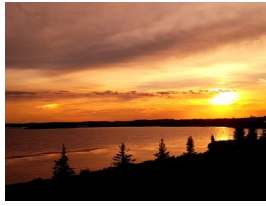
The pros and cons of various mechanical management practices to harvest or manage un-harvested crops.		
	Pros	Cons
Combine	<ul style="list-style-type: none"> Allows for seed or residue collection and/or distribution. Can manage a standing crop, tall stubble or swathed residue. Can be the best way to get the maximum value from the un-harvested crop. Less volunteers in subsequent crop. Readily available. 	<ul style="list-style-type: none"> Difficulty managing crop with high moisture. May have difficulty picking up swaths, cutting a flattened crop or stubble. May be better to swath instead of straight combining to reduce the risk of equipment damage, so an additional operation is required. High operating cost; fuel, operating, depreciation and machine wear and tear. Ground will need to be frozen or dry to avoid soil rutting.
Baling and Bale Silage	<ul style="list-style-type: none"> Most all types of residue; standing or swath can be managed. Once baled, residue can easily be handled or removed from field, used or dealt with later. Silage baler can manage high moisture residue Once collected the material can have many uses and potential revenue. Cheaper operating costs, then combining or chopping Equipment is not as heavy as combine; less impact on wet soil. Less volunteers in subsequent crop. Readily available. 	<ul style="list-style-type: none"> Spoilage is a risk if baled at higher moisture. Difficult to dispose of spoiled bales. Silage bales require extra management and monitoring before and after baling. Bale wrapping (silage) adds to cost. Bale wrappers are not readily available.
Grazing	<ul style="list-style-type: none"> Low cost Livestock are generally available. Reduces time management, the animals do the harvesting. Other direct values such as manure/nutrients and possible revenue from feeding. 	<ul style="list-style-type: none"> Field needs to be fenced and a water source needs to be available. Increases time management, animals need to be managed. Risk to livestock; ingesting contaminated/spoiled, fungus infected feed and forage. Applicability of this option depends on crop type. Animals can cause compaction in wet soils. Volunteer and weeds in subsequent crop. Cereal crops can be deficient in calcium & magnesium which can cause downer cows or milk fever. Be careful when grazing the material, as it is high energy grain with low energy straw, supplement and manage grazing so the animals don't experience grain overload, bloat or acidosis.
Mowing	<ul style="list-style-type: none"> Smaller horsepower tractors can be used. Can cut/chop most residue types. Lower operating cost; fuel, machine wear and depreciation. Readily available 	<ul style="list-style-type: none"> Not effective in high moisture residue. Will not widely distribute residue; multiple passes may be required. Less effective in swathed crop than un-swathed crop Volunteer plants and weeds in subsequent crop
Forage Chopper for Residue Spreading	<ul style="list-style-type: none"> Most all types of crop can be managed. Can manage a high moisture residue if just spreading. Residue can easily be handled and removed from field and dealt with later. Chopped feed/forage crop results in higher palatability and if supplement is added, can be a high value product. Very aggressive; can widely spread and distribute chopped material over field If crop is chopped and removed from field, less volunteers in subsequent crop 	<ul style="list-style-type: none"> High cost if collected product has no value or use, more difficult to dispose of later. Equipment is not readily available. High operating cost; fuel, machine wear and depreciation. Moderately heavy equipment; ground will need to be frozen or dry to avoid soil rutting. If crop is chopped and just spread in the field, issue with volunteer plants and weeds in subsequent crop.

The pros and cons of various mechanical management practices to harvest or manage un-harvested crops.		
	Pros	Cons
Residue Stacking	<ul style="list-style-type: none"> • Many different methods to stack residue; collect straw and chaff directly from combine, forage chopper to cut and blow windrows into stacker, pull-type pick-up and wagon. • Most all types of residue, standing or swathed can be managed. • Residue stacks can be used as livestock feed and forage on field location; can be strategically placed. • Residue can easily be handled and removed from field and dealt with later. • If crop residue is removed from field, less volunteers in subsequent crop. 	<ul style="list-style-type: none"> • Residue spoilage if stacked at higher moisture; heating • More difficult to dispose of spoiled residue later • Could result in higher costs; depends on type of equipment and availability. • Can be labour intensive if collected.
Conventional Tillage (Disc & cultivator)	<ul style="list-style-type: none"> • Cuts, breaks and incorporates crop and residue. • Disc can handle more residue than a cultivator. • Dissipates and spreads crop material. • Many types of tillage tools; match the proper tool to field and crop conditions. • Moderate operating cost; fuel, machine wear and depreciation. • Readily available 	<ul style="list-style-type: none"> • Soil conditions must be dry. • May require multiple passes to manage un-harvested crop • Soil and stubble disturbance; reduces soil structure, quality and cover. • Releases green house gases. • Not always effective in heavy ground cover, un-harvested swaths. • The carbon offset market does not allow tillage practices (max. 10% of cropped area in the field) and will not pay offset dollars to producers if they till; carbon credits will be lost for that year on that field. • Volunteer plants and weeds in subsequent crop. • Can cause compaction in wet conditions.
Vertical Tillage, Multi-tool and Other Specialized Tillage & Residue Management Equipment	<ul style="list-style-type: none"> • Cuts, breaks and incorporates crop and residue • Dissipates and spreads crop material. • Many types of tillage tools; match the proper tool to the field and crop conditions. • Moderate operating cost; fuel, machine wear and depreciation. • Readily available • Vertical Tillage tools operate best at high speed; quick area coverage 	<ul style="list-style-type: none"> • May require multiple passes • Soil and stubble disturbance; reduces soil structure, quality and cover. • Results in release of greenhouse gasses. • Not effective for swathed crops, research the proper tool before use. • Has limitations in heavy residue situations. • Requires higher horsepower than conventional tillage equipment. • The carbon offset market does not allow tillage practices (max. 10% of cropped area in the field) and will not pay offset dollars to producers if they till; carbon credits will be lost for that year on that field . • Volunteer plants in subsequent crop.
Harrowing	<ul style="list-style-type: none"> • Dissipates and spreads residue piles. • Many types of harrowing tools; match the proper tool to the field and crop conditions. • Low soil disturbance. • Can operate at high speed; quick area coverage. • Can be operated with low horsepower depending on tool type and residue. • Low operating cost; fuel, machine wear and depreciation. • Readily available. 	<ul style="list-style-type: none"> • May require multiple passes. • Soil surface and stubble disturbance; reduces topsoil structure, quality and cover. • Not all harrow types will work in high residue situations. • Limited effectiveness in un-swathed or swathed crop. • Some equipment and residue situation may require high horsepower. • Volunteer plants and weeds in subsequent crop.

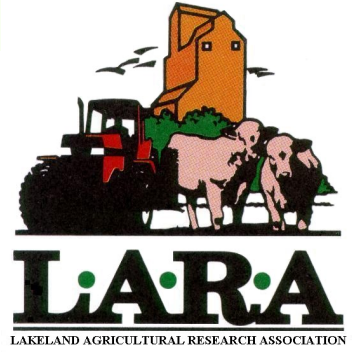
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Sustainable farming encompasses a wide range of practices and principles; combining environmental stewardship with profitability and ensuring that the family farm will be there for generations to come.



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LAKELAND AGRICULTURAL RESEARCH ASSOCIATION

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.

GENERATING ELECTRICITY FROM THE SUN

May 24, 2017 Craigend Hall

2 miles east from the junction of highway 36 and 55

10:00 AM - 3:00 PM Lunch included!



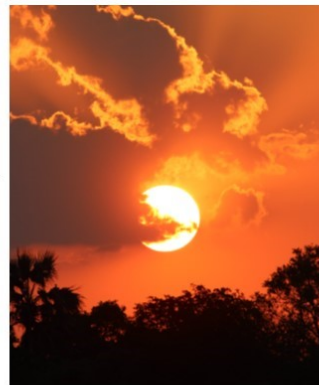
A one-day workshop on grid-tie solar options for Alberta farmers

It is becoming increasingly profitable for Alberta farmers to generate their own electricity and sell it to the grid, utilizing the renewable energy sources on available right on their property. This one-day workshop will cover solar electric system siting, installation, permitting process and economics.

Presenter Rob Harlan from the Solar Energy Society of Alberta



To Register Please
 Phone: 780-826-7260
 OR e-mail:
sustainag.lara@mcsnet.ca



Class Outline

- Alberta's solar resource
- Overview of farm applications for solar energy
- Alberta's Micro-Generation regulations
- How grid-tie solar systems work
- Equipment options
- Microinverters versus string inverters
- Determining site viability
- System design and sizing calculations
- Economics
- Case studies of successful Alberta Systems
- Growing Forward 2 On-Farm Energy Management Program

Food For Thought...

- * Since the beginning of the industrial revolution, the acidity of the ocean has increased about 30%
- * It is estimated that 90% of Alberta's glaciers will be lost by the end of the century
- * Global species extinction has occurred at a pace 50-100 times the natural rate since the year 1600
- * Canada has 431 plant and animal species at risk, 12 are extinct



WWW.LARAONLINE.CA