

**INVASIVE *PHRAGMITES* MANAGEMENT PLAN
FOR THE MUNICIPALITY OF LAMBTON SHORES, ONTARIO**



December, 2013

Photo: Shoreline at the Lambton United Church Centre, September 2012

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1. Introduction

Phragmites australis has become pervasive throughout the Municipality of Lambton Shores (MLS) (Figure 1.1, Figure 1.2). This invasive reed is most often observed along roadside and agricultural ditches, although the main areas impacted extend along the Lake Huron coastline. Here, well established, dense monoculture *Phragmites* cells have expanded across extensive sections of the shoreline negatively impacting recreational use, aesthetics and valuable coastal ecosystems. Not all of the shoreline is affected since areas remain where *Phragmites* has not yet established, is in the initial stages of colonization, or is actively being managed. However, unless a concerted effort is undertaken to control *Phragmites* throughout the entire region, and in a timely fashion, this aggressively spreading invader will continue to expand and increasingly become an issue.

Figure 1.1. Location of the Municipality of Lambton Shores within Southern Ontario.

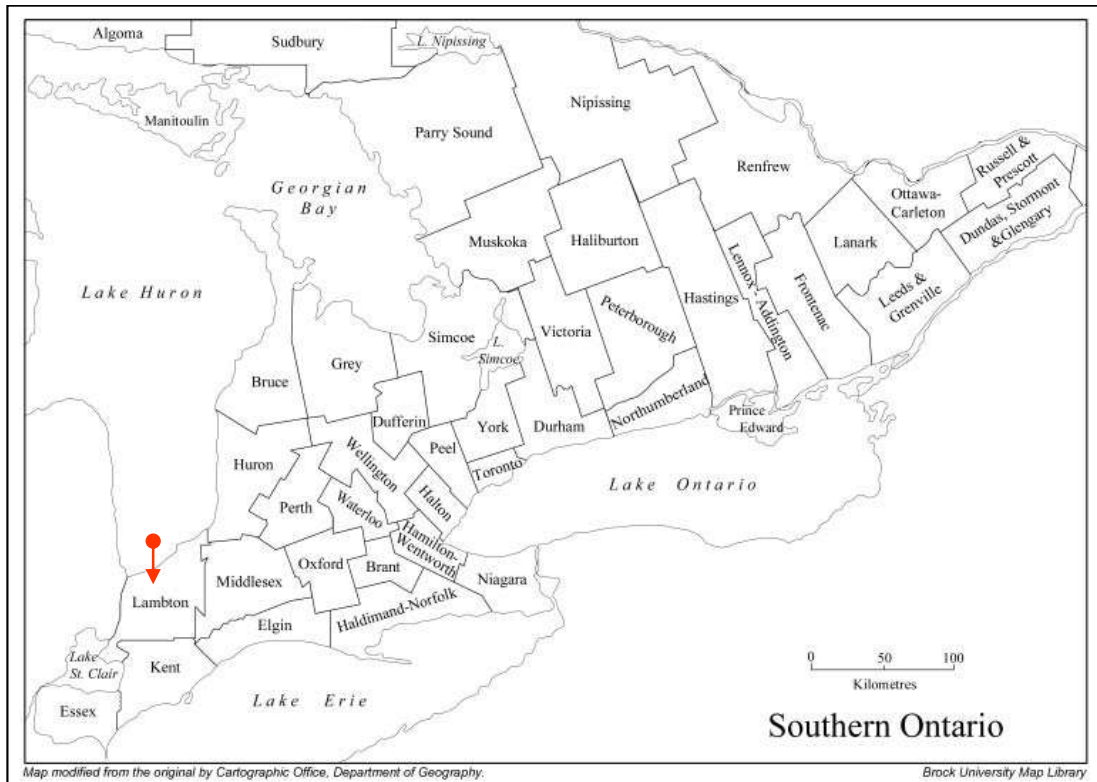
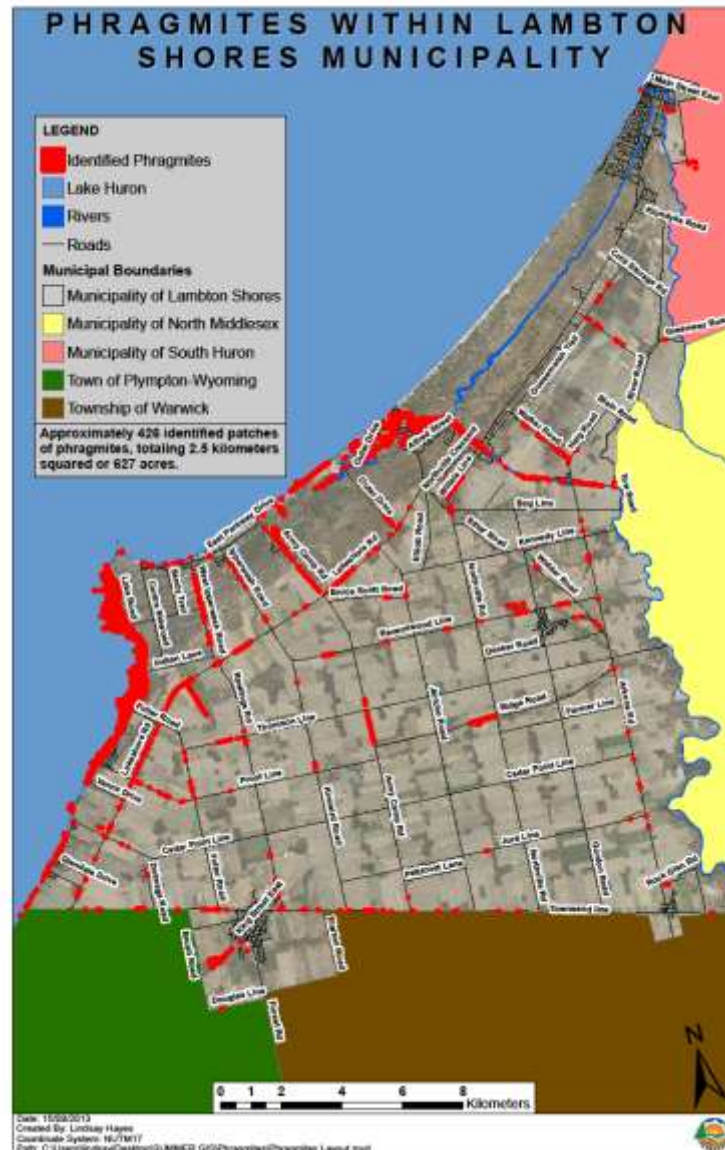


Figure 1.2. Location of invasive *Phragmites* throughout the Municipality of Lambton Shores.



Although the majority of the invasive *Phragmites* are present on non-municipal land, the MLS could provide an invaluable leadership role in supporting and guiding effective, efficient and environmentally responsible control efforts. Many shoreline property owners have been struggling with *Phragmites* for a number of years and have become frustrated with the challenges involved with their attempts to control it on their property. A number of private landowners have been trying to deal with the plant on their own and, in some cases, have employed environmentally harmful or ineffective management techniques. Other landowners have either found the problem too overwhelming to deal with, too expensive, or have decided that any efforts which they could do to control

Phragmites on their property would be futile without similar efforts being done on adjacent properties and throughout the area. Properties owned by the Ausable Bayfield Conservation Authority, the Nature Conservancy, the Crown and a number of NGO owned and private camps cannot be effectively managed for *Phragmites* in isolation. There are also large ‘orphaned’ wetlands that, despite being recognized as Provincially Significant and Globally rare coastal ecosystems, are not being managed or protected from *Phragmites*. And, the presence of *Phragmites* in agricultural and roadside ditches creates an impediment to field tile drainage while also acting as spread vectors.

Currently *Phragmites* is being managed in Port Franks through a cooperative endeavor spearheaded by the Lambton Shores *Phragmites* Community Group (LSPCG). This locally led, grass roots organization has formed partnerships with the MLS, the Ausable Bayfield Conservation Authority (ABCA), the Nature Conservancy of Canada (NCC) and private landowners in order to control *Phragmites* in the vicinity of Port Franks. Members of the LSPCG have also been instrumental in guiding a successful *Phragmites* control effort undertaken in Grand Bend during the summer of 2012 and providing outreach support to cottage associations, camps and private landowners throughout the Municipality.

The LSPCG and partners have recognized the need for a strategy encompassing the entire MLS in order to guide further efforts and systematically track efficacy. Councilors have unanimously expressed interest and support for this endeavor and, to that end, the MLS has requested the development of a *Phragmites* Control Management Plan. This Plan will provide guidance and direction for achieving control of the current infestation and long term maintenance.

Due to the extensive area to be controlled, and the complexity inherent in dealing with diverse land ownership, multiple jurisdictions, and differing stages of *Phragmites* management, the MLS has been divided into *Phragmites* Management Areas (PMAs). The PMA numbers are not intended to indicate priority ranking. If the required funding and project management needs are met, some or all of the PMAs could be engaged concurrently. For some PMA’s such as PMA I (Port Franks) and PMA II (Grand Bend), programs are already well underway. Within others such as PMA III (Ward 2), PMA IV (Ipperwash) and PMA V (West Bosanquet) control has been initiated or is being planned in a few areas but much more work is required. PMA VI includes all of the MLS roadside ditches and PMA VII encompasses agricultural drainage ditches. For each PMA recommended control options, where required, are outlined along with a management schedule, associated estimated costs, long term management strategies, challenges and options.

Areas which are outside of MLS jurisdiction including the Pinery Provincial Park, the former Ipperwash Provincial Park, the former Ipperwash Military Reserve, County and Provincial roads and adjacent municipalities also require *Phragmites* control strategies. Engaging the personnel managing these areas will be very important for keeping the efforts and costs for long term maintenance on adjoining properties minimal.

The Kettle and Stony Point First Nation (KSPFN) Reserve lands, also have a significant issue with invasive *Phragmites*. In 2012 a *Phragmites* Management Plan was developed for

the KSPFN Reserve property located between Wards 3 and 4 (Figure 1.3). A management program commenced in the fall of 2012 and is ongoing, contingent upon continued Canada/Ontario Resource Development Agency (CORDA) funding support. A summary of this Program is provided Appendix A.

Figure 1.3. Location of Kettle and Stony Point First Nation lands and Wards within the Municipality of Lambton Shores.



This *Phragmites* Management Plan is intended to be a ‘living’ document that can be adjusted for funding and infrastructure availability and project specific targets as required. Funding support from the Provincial and Federal Governments will likely be required to offset some of the financial burden this program will require. The initiative being undertaken within the MLS Shores should serve as a model for other municipalities throughout the province and demonstrate that, through a well designed, well managed, well funded, well supported, and cooperative approach, the goal of a ***Phragmites* free Municipality** can be achieved.

2. Background Information

European reed or *Phragmites australis* (here after referred to as *Phragmites*) is an aggressively spreading non-native, invasive grass. It is capable of out-competing all other plant species including cattails (*Typha spp.*), willows (*Salix spp.*), alders (*Alnus spp.*) and buttonbush (*Cephalanthus occidentalis*) resulting in expansive monocultures. Plants can exceed 5 m in height (Figure 2.1) and reach densities of over 200 stems per square metre. The high aboveground biomass is supported by an even greater amount belowground and roots may extend downward several metres to attain required water and nutrients. The roots also emit a chemical harmful to other plants further reducing resource competition.

Figure 2.1. Invasive *Phragmites* >5 m tall in a Lake Erie coastal wetland, Rondeau Bay, ON, 2007.



Phragmites colonizes new sites via seed and rhizome dispersal but, once established spreads colonially via rhizomes. These can emanate from each parent stalk in all directions and have been observed at 30 m lengths with new shoots emerging ~30 cm (Figure 2.2). The resultant yearly growth of an established colony can be exponential and expansion has noticeably increased with the decline in Lake Huron water levels (Figure 2.3).

Figure 2.2. New shoots of invasive *Phragmites* plants growing out of the rhizome from one parent plant, St. Josephs Island, Lake Huron, 2011.



Figure 2.3. Rhizomes growing lake-ward from parent invasive *Phragmites* plants as water levels declined along the Lake Huron shoreline, August, 2012.



Unlike native *Phragmites* (*Phragmites australis subsp. americanus*), the European strain has no apparent natural controls to keep the population in check. As a result, expansive mono-dominant stands develop and greatly reduce native plant diversity thereby altering habitat and significantly impacting wildlife. While bird and amphibian usage has been

observed within narrower tracts and along the edges of expansive *Phragmites* cells, interior areas are effectively dead zones. Within coastal ecosystems the impacts have the potential to be cumulatively devastating for many wetland dependant species, including a number of Species At Risk (SAR) which depend upon these habitats for all or a portion of their life cycle. For humans, *Phragmites* negatively impacts aesthetic and recreational values, by blocking views and making access to shorelines difficult and unpleasant. During the dormant season, fire hazards, especially in residential areas, are increasing as are traffic hazards from blocked views at intersections.

3. Control Options

Effective control methods in Ontario are limited and site specific and for *Phragmites* in standing water are minimal to non-existent. Ontario must have access to those same water safe herbicides currently being used in the United States to control *Phragmites*. Without access to these effective tools, control efforts throughout the province will be far more costly and in many cases ineffective or not feasible.

A number of considerations must be taken into account when determining the most appropriate control strategy. These include cell size, density, proximity to water, timing, presence of desirable plant species, habitat value, presence of wildlife including SAR, human activity, funding, ownership, and long term management plans. For small areas, with low to medium density, mechanical control may be feasible. Larger areas of infestation can only be controlled using herbicides.

Emerging research on novel ways to control *Phragmites*, such as gene silencing, is currently being pursued (see Great Lakes Phragmites Commission website). Bio-controls are currently being investigated by a research team lead by Dr. Blossey at Cornell University. This laboratory was instrumental in indentifying the appropriate beetles to control the once troublesome purple loosestrife. It is estimated that many more years of research are required before host specific herbivores to control the European strain of *Phragmites* can be introduced. The fact that native *Phragmites* also exists in North America may hinder this progress. Even if bio-controls are found and a release program implemented, many more years may pass before any noticeable impact takes place given the considerable biomass production and reproduction rates of *Phragmites*. Ultimately the advent of natural controls provides the only long-term viable solution for dampening the spread of this highly aggressive plant. However, the amount of habitat impacted during the estimated several decades, if not centuries (if *Typha angustifolia* is any indication), that will pass before this will take effect dictates that action be undertaken now wherever possible. It is also important to note that even where this strain of *Phragmites* occurs naturally in Europe, it has developed into monoculture stands and been problematic.

a) Non-chemical Control

Throughout Ontario and elsewhere many control options, including cutting, drowning, smothering, covering, excavation, grazing, and burning have been attempted with varying success. Control efficacy was related to cell density, size, site conditions and labourer tenacity. Each of these mechanical control methods has limitations and can also have negative impacts.

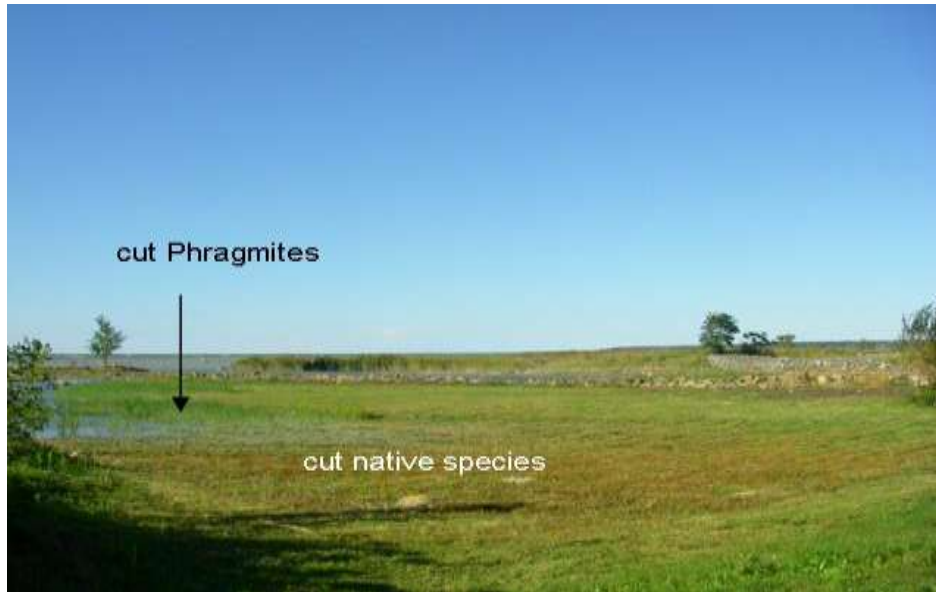
i) Cutting

There are a number cutting methods that have been used to reduce *Phragmites* along beaches and in coastal wetlands. Tractors have been used in sites where access is available and the substrate is solid enough that a machine will not get stuck. These activities must often be repeated throughout the growing season due to *Phragmites* tendency for vigorous growth. Repeated cutting has resulted in reduced plant size, stand density and seed head establishment (Figure 3.1). This is accompanied by native plant re-establishment and the return of wildlife such as frogs, toads, turtles and snakes. The issue with cutting, however, is that once these species return they can be harmed or killed during the repeated cutting activities that are required to maintain low *Phragmites* densities (Figure 3.2).

Figure 3.1. Section of dense *Phragmites* along the Lake Huron shoreline at Kettle Point, that had been cut.



Figure 3.2. Section of shoreline in West Bosanquet, Lambton Shores, that had been cut.



Targeting individual *Phragmites* plants using hand held cutting devices, such as a gas powered sickle bar cutter, is another option but one that is much more labour intensive (Figure 3.3). This method reduces the degree of harm to native plants and wildlife that can occur using tractors, but also requires repeated efforts throughout the growing season and on an annual basis.

Figure 3.3. Cutting standing dead *Phragmites* along the Shawshawanda Creek, Kettle Point.



Another cutting method that is very labour intensive but, has been found to be highly effective on sandy shorelines, is the use of a straight edge shovel to cut the stems below the sediment surface. This method causes little disturbance to the surrounding soil, has minimal harm to native plants, and further reduces *Phragmites* spread. Total removal of the stem is more effective than cutting the stalks above ground since this completely removes the plants ability to photosynthesize thereby significantly weakening the belowground structures.. One cutting event is generally required within a growing season beginning anytime after the first week of July. Using this method a dense cell of *Phragmites* ~30 m x 15 m within a coastal meadow marsh was completely controlled after 5 years and was replaced by willows, sedges, reeds, Marram grass, wildflowers, and other native plants (pers. comm. Lynn Short).

ii) Drowning

Flooding *Phragmites* to promote drowning can be difficult. Studies have shown that for established stands water depths must exceed 1.5 m for at least 6 weeks. Cutting stalks to enhance drowning opportunities in non-diked sites may be an option if high water periods occur. However, all stalks must be cut and located in flooded zones for this method to be effective. Logistically, the target area needs to be dewatered to allow for cutting, since the use of cutting equipment in water can be challenging. In some areas cutting is not an option due to unfavourable site conditions, including access issues, soft substrate, and expansive stand size.

iii) Smothering or Covering

Smothering with thick, dark plastic has been attempted with limited success. The method can be laborious as *Phragmites* stalks must first be cut and tarps must be secured to ensure they remain in place during high wind and storm events. Because rhizomes can extend out from under the covered area, the tarps should extend well past the cell edge. This method has stand size and location limitations, since covering large areas or flooded areas with tarps would be impractical.

The use of a 'tent-like' structure could be used in a flooded area. This entails securing a dark tarp to a framework that extends above the water surface (Figure 3.4). A skirt around the side of the structure reduces sunlight but allows for wildlife to move freely through the area. A series of tents or pods could be constructed to increase the area that can be covered within a growing season. This method is laborious and may not be practical in areas exposed to waves and high winds.

Figure 3.4. Securing a tarp to a frame over *Phragmites* in standing water, Kettle Point, Lake Huron, May, 2012.



iv) Excavation

Tractors with harrows have been used to disk up *Phragmites* along shorelines. The exposed rhizomes must be pulled out and, along with the stalks, collected and properly disposed of. This method has generally been restricted to areas with high recreational use since it is extremely destructive to the ecosystem and is not a healthy option for the lake as a whole. Another very destructive method that has been employed is the use of a backhoe or other heavy equipment to dig out *Phragmites* cells. This activity also has very limited conditions under which it could be employed as a control option and should not be allowed in sensitive habitats. Care must be taken to remove and properly dispose of all excavated material or the *Phragmites* will re-establish on the dredge spoil (Figure 3.5).

Figure 3.5. *Phragmites* re-establishing in dredge spoil from an excavated *Phragmites* cell along the Lake Huron shoreline, West Bosanquet.



v) *Grazing*

Although the use of grazing animals such as cows, sheep and goats have been used to reduce *Phragmites* vigour during the growing season, suitable sites for this control option are limited to upland, degraded or developed areas. There are a number of potential negative impacts associated with the use of grazing animals, which include non-select grazing, waste (manure), trampling, soil erosion, containment of animals, and the high number of animals required to eat a dense cell. Although this is not viewed as an effective control option for most areas, the strategic placement of a few *Phragmites* grazing goats could be used for educational purposes and for garnering media attention.

vi) *Burning*

Fire has also been used to try to reduce *Phragmites* densities but, most often, burning only results in thinning out the standing dead biomass. The use of fire alone to control *Phragmites* is not an effective control method since *Phragmites* tends to thrive during the growing season after a burn has occurred. The use of fire to reduce dead stalks and seed heads has its limitations since not all sites lend themselves to being burned due to wetness or safety concerns.

b) *Chemical Control*

The most effective and efficient control of *Phragmites* in the United States has been achieved using two herbicides Rodeo® (glyphosate) and Habitat® (imazapyr). Both products can legally be applied over water and aerially and have an efficacy of between 80 – 100% control after one treatment. The best results were obtained when the two herbicides were combined. Both chemicals kill the plant by shutting down key enzyme

production within the belowground structures. Since these same enzymes are not present in non-plant life, the chemicals pose little risk to humans and wildlife. Unfortunately neither Rodeo nor Habitat is available in Canada.

Legal chemical options in Canada are limited to two products, Weathermax® and Vision®, and neither product can legally be applied over water. Both are glyphosate based and, although this active ingredient is safe for overwater application, both products also contain the surfactant polyethyloxyated tallowamine (POEA) which is harmful to aquatic life. Vision, which is more expensive, is used by the forestry industry and can be applied aerially. Weathermax is the best option available for on-the-ground *Phragmites* control when no surface water is present.

Timing herbicide applications to occur when no water is present has allowed for some seasonally wet sites to be sprayed. However, for coastal areas including wetlands, the timing window for dewatered conditions can be rather short and can change year to year. Usually even with dewatered sections interspersed wet areas will usually remain, making effective and efficient control very difficult. Site specific conditions, such as wildlife use of *Phragmites* edges and adjacent habitats for breeding, brood rearing, foraging or the presence of SAR plants, and recreational use of beach areas, also impact the timing window.

Although glyphosate is a broad spectrum herbicide, and it kills all vegetation non-selectively, it's use within dense, mono-dominant *Phragmites* stands does not create issues since native plant presence is rare and, if present, they are generally under the *Phragmites* canopy and would not receive spray drift. However, in less dense stands or along the edges of *Phragmites* cells, native species can be quite prevalent. In these situations, timing spray events to occur early to mid fall, before a heavy frost when most native species have already senesced but *Phragmites* is still green, has resulted in successful *Phragmites* control and positive native species response the following growing season. Spot spraying using backpack units or hand wicking can be used to control sparse *Phragmites*. Using these methods of herbicide application broadens the timing window since plants can be targeted anytime during the growing season after they have reached ~1m in height and they have sufficient leaf surface for chemical uptake. Depending upon the weather and location, *Phragmites* plants may reach this stage as early as mid May but, in most of Southern Ontario, this stage is generally reached around mid June.

c) Herbicide Application Options

i) Industrial grade all terrain track vehicles

The large, dense *Phragmites* cells would be most effectively controlled by using a retrofitted all terrain vehicle such as a Centaur. This equipment is currently being used by Frank Letourneau of Dover Agri-serve who is a licensed pesticide applicator and the most experienced *Phragmites* control contractor in Ontario. His machines are equipped with commercial grade herbicide application equipment (tank, pump) and a spray deck and have been used at numerous sites throughout the province to control *Phragmites* (Figure 3.6). These machines can traverse rough terrain and access more remote and difficult to reach cells. Depending upon weather and site conditions up to 8.5 ha (21

acres) of *Phragmites* can be sprayed in one day using this equipment. The herbicide used is Weathermax® (registration No. 27487) which is mixed with clean water at 4-5% concentration. The surfactant MSO Concentrate Methylated Seed Oil (Adjuvant commercial, active ingredients 70% methylated soybean oil, Registration No. 28385) is also added to increase plant uptake and improve efficacy of the herbicide.

Figure 3.6. Shown is Frank Letourneau, (Dover Agri-serve) spraying *Phragmites* from the deck of his modified Centaur (a, b).



The recommended timing for control using the Centaur within the MLS is dependent upon site specific conditions including wildlife presence, recreational use and lake water levels. These factors are addressed, where required, for the PMAs (Section 5).

ii) Lightweight all terrain vehicles

In large areas with medium *Phragmites* density or dense, short stands, effective control may be accomplished using smaller, light weight off road vehicles equipped with commercial grade spray equipment. These include ATVs or a track vehicle such as a Kubota unit as shown in Figure 3.7. These vehicles allow for more area to be covered and spray to be applied at a more consistent rate than a crew on foot using backpack spray units. They also provide for better management and control of spray volume than could be applied using the Centaur since the operator is closer to the ground and the spray pressure is significantly reduced.

Figure 3.7. Frank Letourneau, (Dover Agri-serve) using his retrofitted Kubota to control medium density *Phragmites* in a coastal meadow marsh, Kettle Point, Lake Huron.



iii) Trailer Spraying

Sites which can be easily accessed, such as roadside ditches and residential properties, can be controlled on foot using a spray unit secured to a trailer or pickup truck (Figure 3.8). This set up is more efficient than backpack units while also allowing for the same select spray application benefits.

Figure 3.8. Controlling invasive *Phragmites* along a road in Kettle Point, fall 2013.



iv) Backpack Spraying

Backpack sprayers come in a variety of styles and can be either hand pump (Figure 3.9) or battery operated. The hand pump style is much lighter, without the need for a battery pack, and tends to have more spray reach. The herbicide and surfactant used is identical to that used in the Centaur. All applicators must have the required certification and liability insurance. The herbicide cannot be applied over water and care must be taken to ensure spray drift lands only on the intended target.

Figure 3.9. Controlling a patch of invasive *Phragmites* within a sensitive habitat in Rondeau Provincial Park using a hand pump backpack sprayer.



Backpack spraying is recommended for sites considered too sensitive for the Centaur to enter, sparse or small patches, cells located along streams and rivers, or in areas where there may be too many boulders or other obstructions for the Centaur to effectively navigate through. Since backpack spraying is far less intrusive on wildlife that may be present, the timing window for application is wider. Frogs, nesting birds or other wildlife are more likely to be observed and avoided by the backpack operator. As long as surface water is not present, backpack spraying can occur anytime after the plant reaches sufficient height and continue until natural senescence. Targeting the plant before it develops a mature seed head would be highly advantageous

The removal of the standing dead stalks either by rolling, cutting, or fire, prior to the growing season greatly increases the ease in spray application to the targeted plants. It is also safer since the applicator does not have to navigate through the brittle stalks or risk “tripping” hazards. Backpack spraying requires the applicator to follow a strategic plan to ensure that cells are sprayed in a systematic fashion. This reduces the chances of missing sections or spraying sections more than once. Laying out a spray pattern prior to

starting, with flagging tape or other markers, will greatly assist with this process. Since all areas being sprayed must be posted, these markers will also serve as a visual aid to keep people out of the sprayed areas. It is recommended that the site be assessed ~3 weeks after the spray event to control any *Phragmites* plants that remain green and alive.

v) *Herbicide Wicking*

In some areas where SAR plants are located within a low density *Phragmites* cell, or on very windy days, hand wicking may be a better option than backpack spraying. Wicking by hand entails the application of the chemical directly to each *Phragmites* plant. The applicator wears a chemical resistant glove under an absorbent mitt. The mitt is either dipped into a bucket with the herbicide or the chemical is sprayed onto the glove using a spray bottle. The applicator then grabs the *Phragmites* stalk near the bottom and wipes upward toward the tip (Figure 3.10). The herbicide and surfactant used is identical to that used with the other methods. All workers must be certified pesticide applicators.

Figure 3.10. Handwicking invasive *Phragmites* along the Lake Huron shoreline on a windy day, September 2008.



This method also has minimal impact on any wildlife that may be present. The timing window for wicking is quite large, from the time the plant reaches ~1m in height up until the first heavy frost. Targeting the plant before it develops a mature seed head is preferable. Much like backpack spraying, a systematic plan for wicking should be established to reduce plants being missed or wicked more than once. A dye can be added to the herbicide to assist with identifying wicked plants. It is also recommended that a grid pattern be flagged to help guide the wickers.

d) Combined Control

Phragmites control efficacy is greatly enhanced when both herbicide and fire are combined. The best results occur when the standing dead biomass can be rolled or cut and then burned prior to being sprayed (Figure 3.11, Figure 3.12). This serves to remove the standing dead stalks, which can make up to 70% of the biomass in a live stand. Rolling or cutting just prior to burning ensures for drier and safer conditions and promotes the incineration of seed heads. Burning should occur sometime between late fall and early spring when all standing stalks are dead and dry to improve effectiveness and reduce smoke (Figure 3.13). With the removal of this biomass, new shoots emerging the following growing season can be easily observed. If conditions allow, these plants can be sprayed when they are ~1m in height and have sufficient leaf surface to absorb the chemical. This is well before the plants reach maximum growth and seeds mature, which reduces the amount of herbicide needed and new introductions via seed dispersal. The burning of *Phragmites* should only be undertaken by experienced personnel, as these fires burn quickly and can be extremely intense. For large *Phragmites* cells, or those close to residential areas or structures, a burn plan should be developed. No fires should occur without the knowledge and input of the local fire department.

Figure 3.11. Rolling large, dense cell of dead *Phragmites* prior to burning, Kettle Point.



Figure 3.12. Cutting standing dead *Phragmites* prior to burning, Kettle Point.



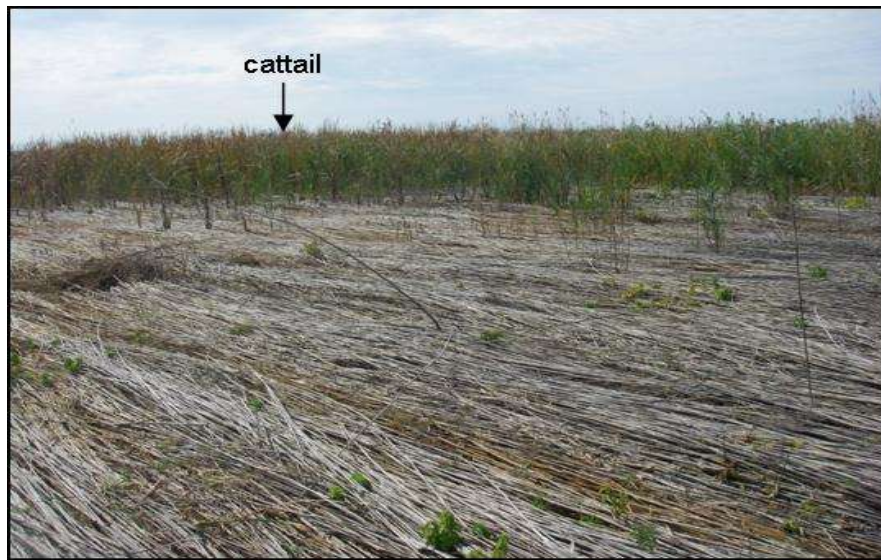
Figure 3.13. Kettle and Stony Point First Nation volunteer fire department burning cut *Phragmites* along Shawshawanda Creek, April 2013.



In many cases *Phragmites* cannot be burned because of safety concerns, or if the site is too wet or for other reasons. In these situations rolling or cutting the standing dead stalks would still provide additional control and restoration benefits. Standing dead *Phragmites* stalks are very recalcitrant to decay and have been observed to remain standing for at least six years. By contrast, prone stalks, particularly in damp sites, have become soft and pliable within ~1 year and, depending upon the thickness of the duff layer, native plants may be able to penetrate through (Figure 3.14). Rolling or cutting may also further stress

remnant live belowground structures if the site floods during the spring. With the removal of the standing ‘straws’, which normally provide a conduit for oxygen diffusion, the rhizome becomes susceptible to drowning. Rolling or cutting also reduces wind dispersal of the seeds.

Figure 3.14. Dense *Phragmites* cell that had been sprayed with herbicide and rolled but could not be burned, Rondeau Provincial Park, 2011.



It should be noted that, since *Phragmites* has become so pervasive throughout Southern Ontario, total eradication on a site level is practically impossible. Seed and rhizome dispersal from uncontrolled sites, combined with human activity will ensure constant re-infestations. For this reason it is highly recommended that an ongoing monitoring and rapid response control program be implemented to ensure that *Phragmites* densities do not return to pre-control conditions. This can only be achieved by monitoring sites during the growing season and controlling new shoots by either mechanical (cutting, pulling) or chemical (backpack, handwicking) means. A reduction in these efforts should be realized each subsequent year as control efforts throughout the region continue to expand.

4. *Phragmites* Control Strategy

Eleven key components are required for a *Phragmites* Control Program to be successful within the MLS: 1) an understanding of the scope of the problem, 2) establishment of a Program Coordinator position, 3) acquisition of sufficient funds, 4) implementation of an education program, 5) engagement of the local community, 6) appropriate initial control efforts and follow up control measures, 7) long term control program, 8) tracking of activities, efficacy, success and challenges, 9) listing *Phragmites* as a noxious weed, 10)

expansion of Control Program outside of Municipal jurisdiction, and 11) availability of herbicides appropriate for overwater use.

1) Understanding of the scope of the problem

Implementing an effective *Phragmites* Control Program requires knowing where the *Phragmites* is located, how much area is infected, and at what density. This information is needed to inform decisions about optimum control methods for a particular site, decisions which will consider the appropriate timing for control efforts to be employed, how much funds will be required, what legal requirements will have to be fulfilled (i.e. Letter of Opinion), landownership and engagement considerations, and what precautions will have to be taken into account due to factors such as proximity to water, Species at Risk habitat, and recreational or residential areas.

Most of the Municipality of Lambton Shores (MLS) has been mapped and assessed for *Phragmites*. Exceptions include the Pinery Provincial Park and interior areas of the former Ipperwash Military Reserve. There may also be hidden pockets of *Phragmites* throughout the MLS that were not observed during ground surveys. *Phragmites* within the Port Franks community was mapped by members of the LSPCG between 2011 and 2012. This exercise was conducted in collaboration with the Ausable Bayfield Conservation Authority (ABCA), who mapped *Phragmites* on their properties along the Ausable River, and the Nature Conservancy CA, who mapped *Phragmites* on their Port Franks area property. The Grand Bend & Area Horticultural Society identified *Phragmites* locations throughout the town of Grand Bend in 2012. *Phragmites* sites along the shoreline of the former Ipperwash Military Reserve were obtained from a Lake Huron Centre for Coastal Conservation (LHCCC) 2011 report which identified *Phragmites* locations along the Lake Huron shoreline between Sarnia and Owen Sound. The shoreline from the southern boundary of the Municipality at Townsend Line north to Army Camp Road as well as interior areas around Ipperwash Beach, the Ausable River, and roads and agricultural lands throughout the MLS were surveyed by J.M. Gilbert in 2012/13. Information was gathered on *Phragmites* cell locations, densities, site specific conditions, and wildlife and recreation use to inform control options, timing, challenges and other considerations.

In 2013 the MLS hired Lindsay Hayes, a College student with GIS skills, to pull together all of the mapping data collected throughout the Municipality. Lindsay also travelled throughout the region noting *Phragmites* locations in roadside and agricultural ditches. The information gathered was used to create large and small scale maps which will be useful for control planning and program tracking. It is recommended that a summer student be hired once again in 2014 to work with the LSPCG and a *Phragmites* Program Coordinator to develop a MLS *Phragmites* tracking system. This system would ideally be used to collect and keep track of site specific actions undertaken, associated costs, community involvement, contact information, planned activities, control efficacy, issues and other pertinent information, and update maps to show *Phragmites* controlled sites within the MLS area. The student could also create a *Phragmites* information link on the Municipality's website.

2) *Phragmites* Program Coordinator

Having a person designated to coordinate *Phragmites* control efforts throughout the MLS would greatly improve the program effectiveness. This person would be responsible for a number of duties including: 1) facilitating local community engagement and development of area/community specific *Phragmites* working groups. to spearhead on the ground activities in their specific area, 2) engaging the local agricultural community, 3) facilitating the forming of partnerships, 4) providing advice and assistance to local community groups regarding the Letter of Opinion, fund raising, public education meetings, control program implementation, training, educational materials, 5) sourcing out potential funding sources and developing grant applications, 6) answering public enquiries, 7) writing annual reports highlighting local programs underway and planned activities, 8) updating Municipal council on program status, and 9) giving presentations at relevant events and meetings. To date, many of these activities are being carried out on a volunteer basis by Nancy Vidler and other members of the LSPCG. However, as the efforts throughout the MLS increase over the coming years, there will be a need to have increased responsibilities beyond the capacity of this volunteer organization. This position would best be positioned within the LSPCG organization to ensure continuity of efforts and effective sharing of required activities. This arrangement would also provide the Program Coordinator with a neutral position that would operate independently from government agencies, which may prove beneficial when working with the general public. Support for this position, both financial and in kind, could occur through a joint partnership with the Municipality, ABCA, SCRCA, NCC, local cottage associations, the agricultural community, and the LSPCG. Additional financial support could be sought through applicable granting agencies.

3) Sufficient Funding

The issue of who pays for *Phragmites* control can become rather convoluted. In some cases the control costs will be minimal and easily absorbed by the landowners. In other cases landowners will need funding assistance and partnerships will have to be developed. Some sections of highly infested coastline do not appear to have clear land ownership and these so called 'orphaned' sites need to be 'adopted' and restored.

A few Provincial and Federal funding programs will support *Phragmites* control and a *Phragmites* Program Coordinator could seek out these and other funding opportunities. The MLS may decide to set aside funds to offset costs for local control efforts or institute landowner incentives such as tax rebates for *Phragmites* control related expenses. This financial burden could be offset by instituting a MLS tax levy that would be used exclusively for *Phragmites* control efforts or through requests for financial assistance from the Provincial or Federal Government.

Although acquisition of initial control funds is important, ensuring funds are in place for maintaining restored conditions is just as important. There are numerous examples in Ontario and the United States where valuable funds and effort were wasted because follow up control did not occur after the initial efforts, and within a few years *Phragmites* had once again taken over. Funds required to control *Phragmites* can be anticipated to be highest during the initial control efforts and substantially decrease in subsequent years.

Depending upon the project scope and local community engagement in control efforts over the next few years, the financial burden for the MLS should start reducing by Year 6 and become substantially reduced by Year 10. On a site specific scale the costs will be highest within the first two years and substantially decrease in year three and beyond. For many sites this estimate is based upon having water approved herbicides available which would ensure that all of the *Phragmites* present can be controlled. Initial control costs will depend upon a number of factors including cell densities, areal coverage, location, available control options, site conditions, control timing, and project scope. Follow up control costs will be site specific and dependent upon factors such as initial scale of infestation, control efficacy from first efforts, opportunities for volunteer engagement, and available control options.

Acquiring sufficient funds to enable required control efforts of the larger, well established cells will be a challenge. The section of shoreline in the Woods Drive area will be most challenging due to the extensive area and density that needs to be dealt with (see Section 5.c ii, iii). This is also a high priority site for control due to its extremely valuable natural heritage attributes and ecosystem rarity along the Lake Huron coastline. Inaction is not an option and hopefully, through the continued tenacity of Nancy Vidler and fellow LSPCG members, the MLS staff and Councilors, the SCRCA, and others, required funds can be secured.

4) Education

Increasing public awareness and understanding of *Phragmites* issues will be important for engaging the local community and visitors to the area. Information dissemination about the *Phragmites* Control Program could be provided on the MLSs' website. Informative signs could be posted at key locations including MLS boundaries, beach access points, and control sites where high visitation occurs. Updates or informational advertisements could be provided in local newspapers, on local radio programs and/or within the annual tax information package. A committee consisting of representatives from the MLS, the two local Conservation Authorities, NCC, LPCWG, Kettle and Stony Point First Nation, Cottage Association representatives and others should be formed to ensure effective, accurate, and consistent messaging is provided. The *Phragmites* Program Coordinator could facilitate and guide this committee.

5) Community engagement

Since most of the required *Phragmites* control efforts are not on MSL properties, local community involvement/input is needed, from initiation through implementation of the control program, to ensure for success. A *Phragmites* Program Coordinator could be the liaison with landowners, cottage associations, agencies, land managers and others. The Coordinator could provide logistic support, assist with planning local information sessions, workshops, information dissemination, organization of volunteers, training, monitoring, and instituting long term monitoring and control plans.

6) Appropriate initial control efforts and follow up control measures

Effective control options are site specific and require a well planned, coordinated effort.

Control efforts must be timed accordingly for each of the areas targeted for treatment to reduce impact on such things as recreational use, wildlife, natural vegetation, and aquatic habitat. If the control option to be undertaken involves herbicides, legal considerations will have to be dealt with including Letter of Opinion requirements and contracting of experienced, licensed herbicide applicators. Currently, herbicide control is limited to dewatered sites and effective control options for wet sites are few to nonexistent. The larger and more established the infestation, the more difficult it will be control. Since 100% mortality is rarely achieved after one treatment, follow up efforts, to deal with the surviving plants, are critical. These efforts should ideally occur within the same growing season as the initial activity but this is not often feasible. The amount of touch up effort required will increase exponentially each year the site is not treated and could return to pre-control conditions within just a few years. For this reason sufficient funds must be in place to ensure that the required control needed at each site can occur following the initial treatment.

7) Long term maintenance

Since *Phragmites* has become so pervasive throughout Southern Ontario, maintaining the Municipality of Lambton Shores as a *Phragmites* Free Zone, will require the development and implementation of a monitoring and rapid response control program. Hopefully, through the proven success of this program, other Municipalities will follow suit and infestation rates will significantly decline over the next decade.

There are a number of programs that could be implemented to ensure *Phragmites* remains under control. The MLS could mandate that the Clean Equipment Protocol, which was recently developed by the Ontario Invasive Plant Council, must be followed by Public Works staff and contractors. The MLS could put a protocol in place to insure that *Phragmites* along Municipal, County and Provincial roads and agricultural drains will be dealt with in a timely fashion. A *Phragmites* hotline could be established to enable sightings by the public to be reported. This information would be monitored by either a local volunteer or the *Phragmites* Program Coordinator and distributed to the appropriate contact person for each of the *Phragmites* Management Areas as designated in the Rapid Response Program. Depending upon the location, control activities could be undertaken by trained Municipal staff, Conservation Authority staff, Kettle and Stony Point First Nation staff, properly trained and licensed local community volunteers, and/or hiring a licensed contractor. Property owners could opt to pay a low annual fee for this service or pay as required.

8) Tracking

Annual updates on the status of the various *Phragmites* control activities occurring throughout the Municipality will be required in order to ensure objectives are being met and to enable annual reporting obligations to the various funding agencies. This system will provide a gauge for the MLS and partners to determine how well the *Phragmites* Control Program is working. A schedule should be developed each year for all control efforts with stated targets and timelines. This tracking system would include maps illustrating areas where *Phragmites* control is 100% complete, areas in various stages of

control and areas still requiring control. A summer student hired by the Municipality could assist the *Phragmites* Program Coordinator with developing this system.

9) Designation of *Phragmites* as a noxious weed

The Municipality has the ability to designate *Phragmites australis* as a noxious weed within their boundaries, and there would be a number of advantages to doing so. This action would set a precedent within the Province and send a strong message that the MLS is committed to becoming *Phragmites* Free and remains a leader in this endeavour. It would also send a message to the Provincial and Federal Governments that this Municipality is serious about this initiative and expects them to be as well. This action could be leveraged in conversations with adjoining Municipalities to follow similar efforts. It would also put additional pressure on land managers outside of Municipal jurisdiction to deal with their infestations. And, for sites within Municipal jurisdiction, it would allow for *Phragmites* control in situations when enforcement of this action is the only remaining option.

10) Expansion of the program to areas outside of Municipal jurisdiction

The Pinery Provincial Park, other Crown Land, the former Ipperwash Provincial Park, the former Ipperwash Military Reserve, County and Provincial roads and adjacent Municipalities also require *Phragmites* control strategies. *Phragmites* within the Pinery Provincial Park appears to be mainly confined to the southern portion of the Old Ausable River. This area is adjacent to the Attawandaron Scout Reserve and the ABCA properties which also have *Phragmites* along their portion of this riparian corridor. Where possible, *Phragmites* is being managed in this area, by the ABCA and volunteers from the Scout Reserve. Continued efforts will require engagement of the Park staff and a cooperative approach. The *Phragmites* Program Coordinator could help facilitate this partnership with the support of the Municipality.

Additional areas of Crown Land are located around the mouth of the Ausable River and the former Ipperwash Provincial Park (IPP). The pockets of land around the Ausable River mouth have received initial *Phragmites* control actions paid for by the ABCA. However, the financial burden to continue supporting touch up efforts and long term maintenance cannot continue to be absorbed by the ABCA due to the high cost of controlling their own properties. *Phragmites* on the former IPP land is mainly found in small, sparse pockets throughout the sand dunes along the lakeshore. In order to make sure that *Phragmites* is properly dealt with in these areas a partnership will have to be established between the ABCA, the MNR, Kettle and Stony Point First Nation and the Municipality. The *Phragmites* Program Coordinator could play a role in facilitating this, while concurrently pursuing significantly increased funding support from MNR, targeted specifically for restoration efforts in the Provincially Significant Wetlands in the Woods Drive area.

Phragmites within the former Ipperwash Military Reserve property boundaries needs to be dealt with at some point. However, the control of *Phragmites* in that area will have to be initiated by the Kettle and Stony Point First Nation (KSPFN) band council. When the timing is right for this activity to be pursued the KSPFN band council would be able to

present a strong case for obtaining Federal financial assistance. As with all *Phragmites* infested sites, the longer this initiative is left the more costly it will be to control. If requested by KSPFN band council, the *Phragmites* Program Coordinator could provide guidance and support.

Through a cooperative effort between Lambton County and the MLS, the county roads within the municipal boundaries were targeted for *Phragmites* control in 2013. MTO also controlled *Phragmites* along the Highway #21 corridor within the Municipality in 2013. The Municipality should continue to pursue these cooperative projects to ensure that required touch up in 2014 will take place and that a long term agreement can be developed.

The long term success of this program will be highly dependent upon the initiation of a similar *Phragmites* control strategy within the adjacent municipalities. This is particularly the case for those municipalities which border Lambton Shores to the south, (Plympton-Wyoming) and north (South Huron). *Phragmites* can easily be spread along the Lake Huron coastline from contaminated areas during high wind and storm events. Therefore, increased *Phragmites* control efforts along the shoreline will result in lower rates of spread and associated control costs. The municipalities along the interior boundaries (Warwick, Adelaide Metcalfe, North Middlesex) must also be engaged, as *Phragmites* along drains, creeks, rivers and roads that connect to those within Lambton Shores will continually be sources for re-infestation. Provision of informational materials about the *Phragmites* initiatives taking place within the MLS and the reasons why it is taking place will help to increase interest and support. The MLS could also request that County roads within these adjoining municipalities also become a priority for controlling *Phragmites*.

11) Availability of herbicides appropriate for overwater use

There are a number of infested areas throughout the Municipality that cannot be effectively controlled due to the presence of water. The Municipality can play an important role in lobbying the Provincial and Federal Governments to ensure water safe herbicides become available within a timely fashion. Garnering support from other Municipalities would also help. One innovative approach that could be pursued would be for the Municipality to form a coalition with the Kettle and Stony Point First Nation, ABCA, SCRCA, and NCC. This coalition could request that the OMOE and the Pesticide Regulation Management Agency (PMRA) grant a special permit to allow use within the MLS of the same products currently being used in the United States to control *Phragmites* in their Great Lakes coastal wetlands. If successful, this initiative could pave the way for similar arrangements throughout the Province.

5. Phragmites Management Areas

Due to the extensive area to be controlled, the Municipality has been divided into seven *Phragmites* Management Areas (PMAs). For each PMA information is provided on the extent of *Phragmites* and, where applicable, control activities to date, recommended

follow up actions, control activities required, associated control schedules, estimated costs, and challenges or barriers to success.

a) PMA I: Port Franks

i) Background Information

Residents within the Windsor Park Association (WPA) community in Port Franks first started noticing *Phragmites* on their beach in 2009. *Phragmites* was by this time well established within the mouth of the Ausable River and Mud Creek which empty into Lake Huron at Port Franks. A core group of individuals headed up by Nancy Vidler and Bill MacDonald decided that control of *Phragmites* was very much needed in their area, and they took the initiative to become more informed about this invasive plant and set into action a plan to prevent further spread and restore the infested areas. They successfully engaged other local property owners including the Port Franks Beach Homeowners Association (PFBHA), Ausable Bayfield Conservation Authority, the Nature Conservancy of Canada, and the Municipality of Lambton Shores to partner in restoration initiatives. The PFBHA and the WPA applied for a Letter of Opinion from the Ministry of Natural Resources (MNR) to allow herbicide control. They also presented their plan to the Municipal Council in March 2011 and received financial and in-kind support for local *Phragmites* management initiatives. The group recognized the importance of educating the public prior to control efforts taking place and partnered with the Municipality of Lambton Shores (MLS) and the ABCA to organize a well attended Community Information Night which was held in August 2011.

Phragmites control efforts commenced in the fall of 2011 and focused on the PFBHA owned beach and the ABCA owned Mosquito Island located in the mouth of the Ausable River. This highly visible island was covered in dense, tall *Phragmites* and became a demonstration site for the community. It was also a logical place to begin restoration efforts due to its importance for Species at Risk (SAR) turtles and other wildlife prior to *Phragmites* invasion. Assessments for vegetation and wildlife presence were conducted by ABCA staff pre and post *Phragmites* control and continue to be monitored by volunteers within the community. Frank Letourneau of Dover Agri-Serve, who is a *Phragmites* control contractor and the most experienced in the Province for restoring sensitive habitats, was hired to undertake this work. ABCA staff also assisted with backpack spraying as well as local volunteers who had received training and certification. Other volunteers assisted with logistics including boat and barge coordination, communication with nearby homeowners, work crew and volunteer coordination, safety precautions, signage and other required actions.

In the spring of 2012 the Lambton Shores *Phragmites* Community Group (LSPCG) was officially formed by members of the PFBHA and surrounding communities with a mandate is to restore and protect the rich natural heritage of Lambton Shores. LSPCG initiatives in 2012 included a successful proposal to the Municipal council to extend the beach control efforts to Mud Creek and Sunfish Bay. They also partnered with Nature Conservancy Canada (NCC), MLS, ABCA and private landowners to continue restoration within the L Lake and Watson property areas and communicated with property owners to obtain necessary approval and signatures on permission forms. Since

their inception, the LSPCG have coordinated *Phragmites* mapping tours, assisted with grant applications, provided numerous outreach support, assisted with on the ground control activities, and arranged educational site visits with the local MPP, Provincial Government representatives, local government agency staff and media. They are also active members with the Ontario *Phragmites* Working Group and play a leading role in many *Phragmites* initiatives in the Province including helping to organize the first Municipal *Phragmites* Training Session.

ii) *Phragmites* Control Activities

The low density pockets of *Phragmites* present along the section of shoreline owned by the WPHA was controlled by a trained crew using backpack spray units in 2011 (Figure 5.1). Touch up control was undertaken in the summer of 2012 and 2013. The WPHA community remains committed to quickly dealing with new invasions to ensure their beach remains free of *Phragmites* long term.

Figure 5.1. Location of the initial *Phragmites* control efforts undertaken on the Port Franks shoreline.



Controlling the *Phragmites* along the Ausable River and interior habitats poses far greater challenges. Cell densities and sizes are much higher and in many sites access is difficult and requires much more logistics. Some areas have very rough terrain making it hard on the equipment and creating safety concerns. And, many sites are wet and rarely experience water level drawdown to allow herbicide use. Despite these difficulties there are areas being restored.

The small island demarcated as Cell A in Figure 5.2 was covered in dense *Phragmites* and became a demonstration site. It was sprayed in the fall of 2011 and the standing dead

stalks were subsequently cut. Regeneration of native plants were evident the following growing season (Figure 5.3). A local volunteer looked after the touch up work in 2012. In the fall of 2012 the Cells labeled B through G in Figure 5.2 were sprayed using a Centaur and backpack crew. Where possible, the cells were rolled or cut and burned in March 2013. The ABCA were able to secure funds to cover this work which included the Crown Land portions.

Figure 5.2. Location of *Phragmites* cells controlled near the mouth of the Ausable River. Areas outlined in red are ABCA lands while those in cross hatching are Crown Land.



Figure 5.3. Images of a small island in the mouth of the Ausable River used as a *Phragmites* control demonstration site showing, a) dense *Phragmites* covering the entire island in the summer of 2011, and b) natural re-generation of native species post control in the summer of 2012.



There were eight *Phragmites* cells identified around Mud Creek and Sunfish Bay (Figure 5.4). These were all sprayed in the fall of 2012 with the exception of sections of Cells D, E and H along the river's edge which were in water. The majority of these areas were also rolled and burned the following March 2013 (Figure 5.5). Touch up work occurred in 2013.

Figure 5.4. Location of *Phragmites* cells controlled around Mud Creek.



Figure 5.5a,b. Images of a prescribed burn of *Phragmites* in the Mud Creek area of Port Franks, March 2013.



There were nine *Phragmites* cells identified in the Watson East area owned by NCC and ABCA (Figure 5.5). Cells A, B, and G were sprayed in 2012. The remaining cells could not be controlled due to the wet conditions. Water levels were even higher in 2013 which prevented further control efforts from occurring including touch up work (Figure 5.6).

Figure 5.5. Location of *Phragmites* cells in the Watson East area of Port Franks.

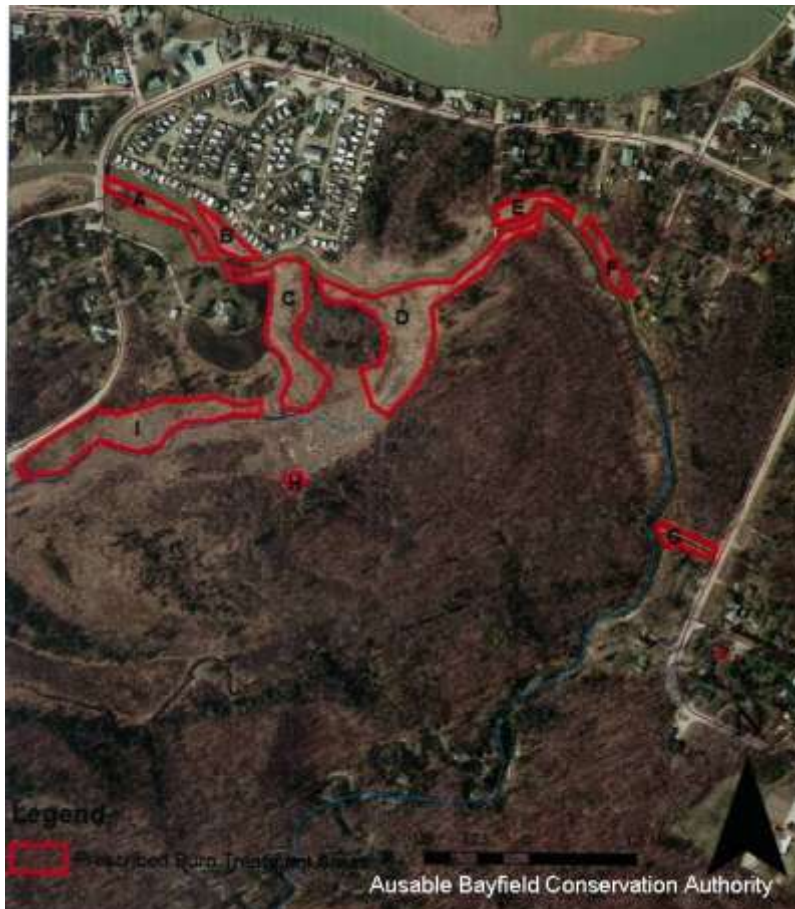


Figure 5.6. Water in NCC property, Port Franks, August, 2013.



Of the seven *Phragmites* cells in the Watson West area all but two were sprayed in the fall of 2012 (Figure 5.7). Cells K and P could not be controlled at that time, due to wet conditions. This was also the case in 2013, when even higher water levels prevented touch up work from taking place. A few of the cells were rolled in March 2013, but none were able to be burned (Figure 5.8)

Figure 5.7. Locations of *Phragmites* cells within the Watson West area of Port Franks.



Figure 5.8. Images of the NCC property in March 2013 showing a) Frank Letourneau rolling standing dead *Phragmites* with his Centaur, and b) same area after rolling was completed.



Phragmites locations along the banks of the Ausable River were determined during a boat tour in June, 2012. Scattered cells were found from the river mouth up to the first bridge (Figure 5.9). Control of these sites was undertaken by the ABCA in the summer of

2013. Control timing was chosen to allow for natural vegetation re-growth to reduce potential erosion along the steeper banks.

Figure 5.9. *Phragmites* observed during a recognizant tour of the Ausable River June, 2012, a) between docks in a residential area and b) along the river bank.



iii) Recommended next steps

Despite the tremendous strides made in restoring the habitat within Port Franks, large tracts of *Phragmites* remain. These are located in areas that are not easily accessible or are continuously wet. The access issues could be resolved for most of the sites with some additional planning and site preparation. These challenges will impede control efforts but they are not insurmountable. Currently, the greatest impediment to getting this PMA under control is the lack of available herbicides for over water application. Without access to these chemicals the restoration of many cells will not be feasible. Hopefully, this issue can be resolved in a timely fashion. Until then, plans should remain in place to continue with the control efforts that had been planned for 2013. If water levels decline to 2012 levels, some cells would dewater and could be targeted. Timing control events to take advantage of low water periods will require having sufficient funds and resources as well as a plan, and required infrastructure in place and ready to implement on short notice.

Ensuring that sufficient funds are in place for the required *Phragmites* control efforts over the next several years is critical. Money will have to be in place for initial control efforts, touch up efforts, cutting or rolling where required, and prescribed burns where possible. Having similar funds to those obtained for 2013 would ensure that sufficient control efforts can be supported in 2014. Maintaining this same level of investment will be required for at least three to five more years due to the large areas that remain to be treated and the complications with access and water levels.

Those cells that have been controlled to date will require touch up spraying in 2014. This will be particularly important for the areas that were sprayed in 2012 but did not undergo touch up in 2013. The larger, higher density cells will require much more effort and a longer period to achieve full control. It should be anticipated that Big Island and the other large, high density cells will require touch up on an annual basis for the next three

to four years. However, the amount of effort required should significantly reduce each subsequent year and at some point bi-annual touch up will be sufficient.

Sometime during the 2013-2014 dormant season, the denser *Phragmites* cells along the banks of the Ausable River, should be cut and if possible, burned on site or removed to a safe location for burning. This would reduce seed dispersal and increase the ease and effectiveness of required touch up work in 2014. The cells located in front of residential areas will require the engagement of the landowners which could be facilitated by the LSPCG and/or ABCA staff.

Ensuring the roadsides throughout this PMA remain free of *Phragmites* could be accomplished by implementing an annual maintenance program. This would entail driving all of the roads in this area once during the growing season and treating *Phragmites* with herbicide. The timing of these activities should coincide with dry periods to ensure there is no water in roadside ditches and before the plants develop mature seeds. The required treatment should be possible using backpack spray units or a commercial spray unit in the back of a pickup truck. This work could be undertaken by MLS staff alone or with the assistance of LSPCG volunteers which would reduce costs. Another option would be for the MLS to hire a local contractor on an annual basis to ensure all MLS roads remain *Phragmites* free (see section 5f. PMA VI).

b) PMA II: Grand Bend

i) Background Information

In 2012 members of the Grand Bend & Area Horticultural Society (GB&AHS) learned about *Phragmites* through the LSPWG and the ABCA. During 2012, they identified 12 locations throughout the town of Grand Bend where *Phragmites* was establishing. These cells ranged in size from ~2 ha (5 ac) to a few strands with low to medium densities (Figure 5.10). The GB&AHS formed a partnership with the ABCA, LSPWG, landowners, and Dover Agri-Serve and developed a plan to allow them to quickly control these areas and keep the town *Phragmites* free over the long term. The plan included: 1) training local residents to recognize and report upon the presence of *Phragmites*, 2) determining that herbicide treatment using backpack spray units was the most appropriate control method, 3) training local people with the proper licenses to use herbicides in an effective, environmentally responsible manner, 4) forming a team to handle the coordination required for control and 5) instituting a monitoring and rapid response program (Figures 5.11, 5.12). The Horticultural Society also successfully raised sufficient control funds by engaging and educating local residents about the issue. Volunteers also assisted with the initial control efforts which took place in early September 2012. Follow up control occurred in early July 2013 and, due to the success of the initial control actions, reoccurring *Phragmites* was significantly reduced.

Figure 5.10. *Phragmites* establishing in the backyard of a new residential area in Grand Bend.



Figure 5.11. Images showing Grand Bend community involvement in a) a *Phragmites* identification workshop, b) backpack control training for *Phragmites* in sensitive areas, c) control of dense *Phragmites* cell, and d) assessing controlled patch for signs of re-growth.



Figure 5.12. Images in Grand Bend showing a) *Phragmites* growth along a trail in the summer of 2012, b) the same *Phragmites* patch post-control the following growing season, c) backpack spray crew controlling *Phragmites* in a field in September 2012, and d) the same field during the growing season 2013.



ii) Control Information

The GB&AHS has a monitoring and rapid response program in place for the Grand Bend area. This organization is committed to maintaining their portion of the MLS ‘Phragmites free’ through partnerships with the LSPCG and ABCA.

c) PMA III: Ward 2

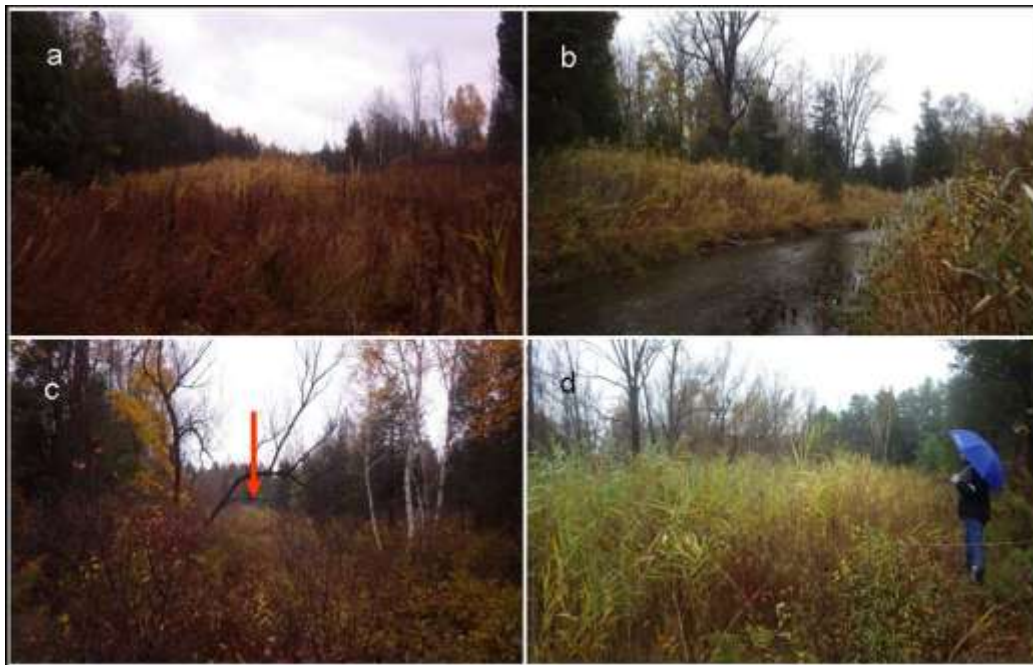
i) Background Information

Phragmites cells in Ward 2 were observed along the Old Ausable River channel, the Ausable River cut and the flood plain (Figure 5.13). The *Phragmites* along the banks of the Old Ausable River stretches from the river mouth where it flows into the Ausable River cut, up stream for ~700 m. In some areas the *Phragmites* occurs as a narrow band at the waters edge and in others it extends inland for ~40 m where it is scattered throughout a meadow and thicket. The bank along the north side of this channel is on the Pinery Provincial Park property while the southern bank is on the Attawandaron Scout Reserve (Boy Scout property). Since this river is only ~4 m wide, both banks should be controlled at the same time. Within the flood plain, there are two larger cells that have received initial control and a number of smaller cells which have not. These cells are on the Boy Scout and ABCA properties and should also be controlled together (Figure 5.14).

Figure 5.13. Location of *Phragmites* on adjoining properties in Ward 2.



Figure 5.14. Images of *Phragmites* within Ward 2 showing a) *Phragmites* cell (C2) on the Boy Scout property which was controlled in the fall of 2013, b) *Phragmites* along the banks of the Old Ausable River, c) small *Phragmites* cell in a thicket on the Boy Scout property, and d) *Phragmites* cell (C3) on the ABCA property which requires control.



ii) Control Information

Cell 1 (Figure 5.13) was sprayed and rolled in 2012 under the ABCA's *Phragmites* Control Program but did not receive touch up control in 2013. Cell 2 was sprayed in the fall of 2013 with funds acquired by Attawandaron Scout Reserve volunteers and should be rolled or cut in the 2014 winter/early spring. Both cells should receive touch up control in 2014 which could be achieved by a backpack crew (Table 5.1). The cells that have yet to receive any control activity should also be cut or rolled in the winter/early spring of 2014. Most of these cells, including those along the river, could be burned by fire experts if sufficient funds are available. A well thought out low complexity burn plan would have to be developed and implemented for a safe burn to take place in this area. Ideally this would take place in the winter/early spring of 2014.

Table 5.1. Summary of *Phragmites* control information for PMA III.

Control Location	Acreage ha (ac)	Density	Control	Timing		Comments
				yr 1	yr 2	
Scout Camp property	1.2 (3.00)	low- med	backpack	sum- fall	sum- fall	Cell 2 was controlled in the fall of 2013 using a Centaur; standing dead stalks should be rolled/cut and burned (if possible) during winter/ early spring 2014; touch up using backpack units in 2014 would require ~2 people for one day; <i>Phragmites</i> along banks of Old Ausable River channel and small interior pockets could be controlled by backpack crew of ~3 persons; est. time 3-5 days due to the rough terrain; <i>Phragmites</i> in water along edge of banks should be cut to prevent seed development
ABCA property	0.44 (1.10)	low- med	Centaur/ backpack	sum- fall	sum- fall	<i>Phragmites</i> in Cell 2 was sprayed and rolled in 2012/13; requires touch up in 2014; 2 person backpack crew; est time ½ day; Cell 3 requires spraying; could be done using Centaur (1 hr) or backpack crew (1 day); should be controlled summer to fall and at same time as work on boy scout property
Pinery Prov. Park property	0.49 (1.21)	low- med	backpack	sum- fall	sum- fall	<i>Phragmites</i> along banks of Old Ausable River for ~700m and in some areas inland ~40 m; rough terrain; could be controlled using backpack spray units; crew of 3-4, would take ~2-3 days; <i>Phragmites</i> in water should be cut before seed set

Touch up and initial control of all of the sites could be accomplished by a backpack crew. Accomplishing control of all cells using a backpack crew will be time consuming due to the rough terrain that has to be navigated. However, most of the cells are too small to justify using a Centaur and control on foot will have less negative impact. Cell 3, on the ABCA property, could be controlled by a Centaur but bringing this machine in to control this one area would not be cost efficient. Control of *Phragmites* along the Old Ausable River banks could also be achieved using backpack spray units with the exception of the *Phragmites* growing in the water. These plants should be cut sometime during the growing season to ensure mature seed heads do not develop and to stress the plants to slow rhizome growth and spread.

Timing for backpack spraying would be best during the summer months when the plants are ~1 to 2 m in height. However, if this area is used for recreational purposes control activities could occur in the fall. Efficient and effective control of this area will only be achieved through a cooperative approach by the three adjacent property managers. Efforts should be made to form a working partnership to ensure that a coordinated plan is in place. This should occur early in 2014 so that cutting and/or rolling can take place this winter/early spring. And, if sufficient funds are in place, a low complexity burn could then occur. This would greatly improve conditions for the backpack crew. A partnership between the Attawandaron Scout Reserve and the ABCA will also negate the need for the Scout Camp to obtain a Letter of Opinion to allow for herbicide control on their property.

A partnership between the ABCA, Attawandaron Scout Reserve, and Pinery Provincial Park will also significantly reduce control costs since the required work can be done at the same time by the same backpack crew without concern for leaving cells partially controlled because they cross property boundaries. Estimate control costs for this area are based upon a cooperative partnership being in place and are for cutting/rolling and backpack spraying and do not include low complexity burn costs (Table 5.2). If all cells could be controlled in concert, the required touchup efforts by the third year should be substantially reduced. A backpack crew will likely still have to do touch up work, but the required herbicide should be minimal. The one exception will be along the river banks where *Phragmites* in standing water will need to be dealt with, at some point, using herbicides approved for overwater use. A possible alternative would be to construct tent structures over the wet cells. This could be accomplished with a partnership between the park and the Scout camp whereby boy scouts construct the tents and the Pinery Provincial Park supplies the required materials. This project would provide an excellent educational opportunity for the scouts and also the park visitors.

Table 5.2. Estimated costs for controlling *Phragmites* in PMA III.

Control Location	Year 1	Year 2	Year 3	Total
Boy Scout property	(\$500)	\$2,400	\$700	\$3,600
ABCA property	(\$250)	\$1,250	\$500	\$2,000
Pinery Prov Park property	\$2,000	\$1,000	\$500	\$3,500
Total	\$2,000	\$4,650	\$1,700	\$9,100

(est. costs of control work already completed)

A long term monitoring and rapid response program for this area could be developed and supported by the ABCA, Attawandaron Scout Reserve, and Pinery Provincial Park. The Phragmites Program Coordinator and/or LSPCG members could assist with the development of this program if requested.

d) PMA IV: Ipperwash

i) Background Information

Phragmites within the Ipperwash area are mainly confined to the shoreline and roadside ditches (Figure 5.15). *Phragmites* cells are also within interior areas, particularly where there has been human disturbance such as along cottage laneways, trails, ditches and the Ipperwash pump house. Although *Phragmites* is not extensive within the Ipperwash area, it is important that it is brought under control quickly. The sites with *Phragmites* already present will experience exponential growth as the belowground structures continue to develop. The mature plants with seed heads will further local dispersal which is of particular concern for the high value habitats in the area. Dealing with these *Phragmites* cells quickly will also help to keep initial control and long term maintenance costs down.

Figure 5.15. Satellite image showing areas requiring *Phragmites* control throughout the Ipperwash area.



ii) Control Information

The shoreline between Pat's Point and the Army Camp Road has numerous small *Phragmites* cells scattered throughout the dunes. In some areas the *Phragmites* is in the initial stages of colonization and is short in stature and sparse while in others it is more

established (Figure 5.16). All of these patches could be controlled using backpack spray units or hand wicking. Some areas could also be controlled by cutting the stalk below the sand although total eradication may take longer using this method than using the herbicide. The dunes remain dry throughout the growing season and therefore herbicide control timing is restricted more by recreational use and high winds. Due to the high number of users of this beach during the summer, herbicide control is best left until after Labour Day weekend. This would allow for easier control of areas around cottages and where people are normally recreating (Figure 5.17).

Selecting a calm day to use the backpack spray units would reduce spray drift to non-target areas. On windy days the herbicide could be applied using the handwicking method. If the manual cutting method is to be used, this should be done between the middle of July and the middle of August.

Figure 5.16. Images of *Phragmites* within the Ipperwash Beach dunes in 2013 showing a) initial colonization of *Phragmites* among native dune plants and b) a larger, more established cell.



Figure 5.17. Images of *Phragmites* in the Ipperwash Beach area showing a) *Phragmites* along the edge of a cottage lot and b) plants establishing in a cottage laneway.



Phragmites control costs for this entire stretch of shoreline should not be exorbitant. A backpack crew of four people should be able to cover this area in about two days given the right weather conditions. If handwicking is employed, this can be expected to take another day or two. The crew will need to have the proper credentials and training for applying herbicides in sensitive habitats and around residential areas. The West Ipperwash Beach Association (IBA) is partnering with the KSPFN to co-manage their section of shoreline. The IBA has raised sufficient funds to hire the KSPFN *Phragmites* Crew (see Appendix A) to control their beach. This work was planned to take place in the fall of 2013, but did not occur due to the large volume of control required at Kettle Point. Control work is now planned for the fall of 2014. There are two cells along this stretch that are in wet areas. One cell is on rock outcrop that remained wet for most of 2013 (Figure 5.18). If lake levels drop in 2014 this cell may be able to be controlled using either backpack spray units or by handwicking. However, if lake levels remain at or above those occurring in 2013, this patch should at the very least be cut to prevent seed heads from developing. The other wet section is located just north of Pat's Point where wet beach and swales promoted growth of native wetland vegetation and provided habitat for shorebirds, amphibians, muskrats and other wildlife (Figure 5.19). This area gets mowed during low water periods in the summer and although this reduces the stature of the *Phragmites* it also negatively impacts this rare coastal habitat. Alternative measures should be undertaken to control the *Phragmites* while maintaining the integrity of this coastal meadow marsh. If the site dewater, control could occur using backpack spray units or handwicking. If water remains at the site, and overwater herbicides are not available, *Phragmites* could be cut using handheld gas powered units to reduce harm to native plants and wildlife. Control efforts should not occur during bird nesting season.

Figure 5.18. Images of *Phragmites* along the Ipperwash Beach shoreline showing a) an established cell on a rock outcrop and b) plants in water during a higher lake level period.



Figure 5.19. Section of the West Ipperwash Beach where a rare coastal meadow marsh is present with a) shallow water pockets with native wetland plants, and b) muskrat den within a wet depression surrounded by *Phragmites*.



The centre and eastern sections of Ipperwash Beach have *Phragmites* within the dune portions and around the lakeside edges of cottage lots. There are also a few cottage laneways that require attention. Control of these areas could easily be accomplished by applying herbicide with either backpack spray units or hand wicking. Manual control by cutting the stalks below the sand surface could also be employed. This work will require community engagement by both seasonal and full time residents. Approval to conduct control on private property will have to be obtained as will funds to pay the backpack crew. The ideal scenario would be for the community to pool their resources to ensure that all the *Phragmites* gets controlled regardless of whose property it happens to be on. Logistically, control efforts would be more efficient and cost effective if undertaken in partnership with the West Ipperwash Beach Association and the KSPFN. The *Phragmites* Program Coordinator and the LSPWG could help to facilitate this partnership and community education and engagement. Long term maintenance of the shoreline will require volunteer efforts by member of this community. Once the initial control efforts have occurred, emerging new shoots could be kept under control manually by pulling or cutting or by periodically hiring a backpack crew.

Phragmites located throughout the interior sections of Ipperwash Beach, with a few exceptions, will not be as easy to control. This is because these areas are difficult to access or navigate, the cells are larger, and portions of the sites are in water (Figure 5.20). For these sites, control costs can be anticipated to be higher because of the increased logistics and efforts required to ensure successful control. A rough estimate for controlling *Phragmites* in the area around the Ipperwash pump house and along the slough up to West Ipperwash Road is ~\$3,600 to \$6,000 for the initial work. Touch up control the following year should be anticipated at slightly reduced costs. A long term monitoring and rapid response program will have to be developed for these areas. Volunteers from the local area could assist in these efforts. The MLS may decide to absorb the cost of this control or could possibly share costs with the Ipperwash Beach Associations. An experienced contractor will need to be hired to do this work. A centaur or similar equipment would be best for controlling the reservoir upstream of the pump house while a backpack crew will have to control the edges of the wet sloughs either on

foot or working out of a small boat (Figure 5.21). Since *Phragmites* has not yet developed into a monoculture in these areas, timing would be best in the fall to reduce harm to native plants. At the time of the site assessment, *Phragmites* was in the water above the pump house dam. If that water cannot be drawn down to allow herbicide control much of this area cannot be controlled. The *Phragmites* has a high density in this area and cutting and burning prior to control would be beneficial.

Figure 5.20. Images of *Phragmites* within interior sections of Ipperwash showing a) mature *Phragmites* growing among native vegetation at the roadside edge of a slough and b) *Phragmites* growing along the side of an interior slough.

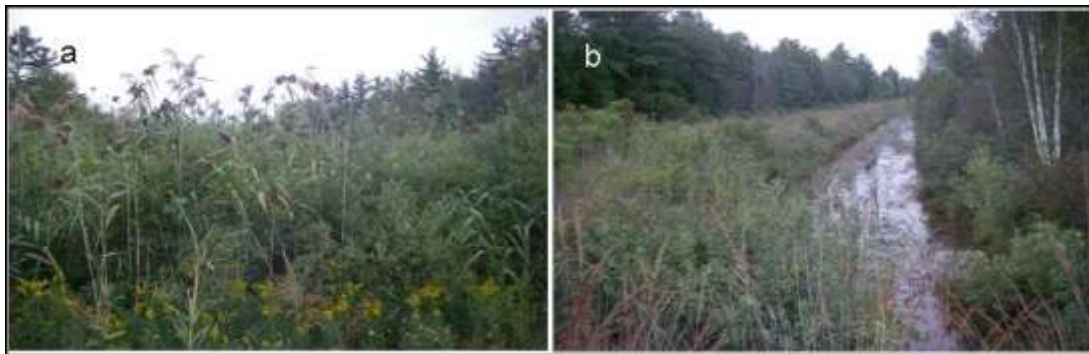
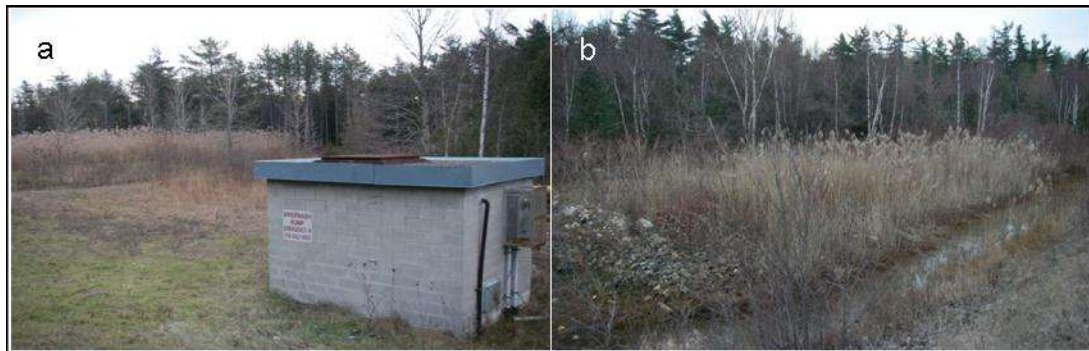


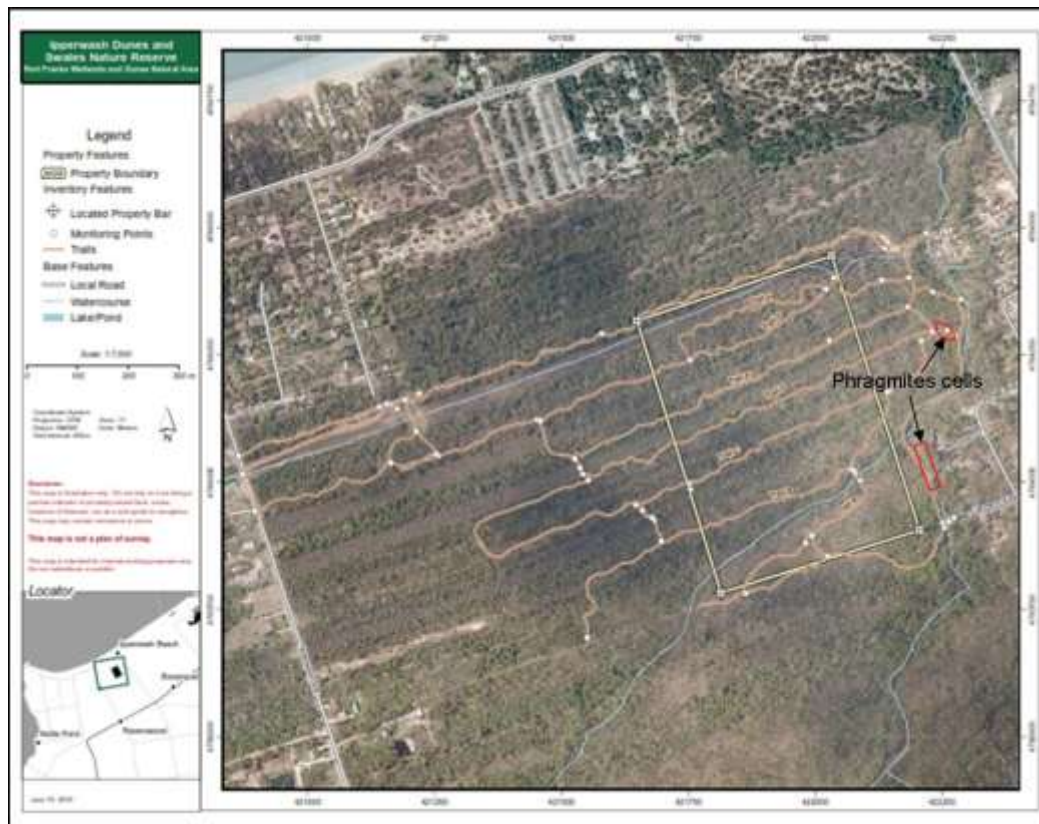
Figure 5.21. Images of *Phragmites* a) around the Ipperwash pump house and upstream reservoir, and b) downstream of the pump house along the ditch.



Small *Phragmites* patches were observed along an interior ATV trail coming from the back end of a trailer park off of Army Camp Road. This area is close to NCC property within the Ipperwash Dunes (Figure 5.22). *Phragmites* was not observed in the sloughs within the NCC property boundary but the close proximity of the cells poses considerable risk to this sensitive habitat. It is for this reason that these cells are a high priority for control and must be dealt in 2014. The standing dead plants should be cut and removed to a safe location for burning this winter to get rid of the seeds and allow easier control the following growing season. The small cell sizes and locations along trails will allow for

relatively easy control by a couple of people using backpack spray units in the summer of 2014. This work could be undertaken by either NCC or ABCA staff working with volunteers or by hiring a local contractor. A rough estimate of control cost is ~\$300 and could be lower if volunteers are involved or through in-kind support of either the NCC or ABCA. These efforts should only take a couple of hours for the initial visit and even less time for return touch up which could occur a few weeks later. Control costs could be offset by the owners and residents of the adjacent trailer park who must become engaged in *Phragmites* control efforts. Education should be initiated this winter prior to the cutting and burning. The trailer park owners/property managers could be approached by members of the West Ipperwash Beach Association and the LSPCG or NCC and ABCA staff to initiate dialogue. During the summer months, when the trailer park population is at its peak, educational material could be distributed or an information session could be planned to engage this community. This will be particularly important for ATV owners and others who use the trail system in order to reduce *Phragmites* spread and ensure the area is managed over the long term. Volunteers from this community could be responsible for collecting information on *Phragmites* sightings along the trail system and implement a rapid response program. The Lambton Shores Nature Trails association should also be approached since this organization could provide an important role in monitoring and rapid response for this trail system and others throughout the area.

Figure 5.22. Location of *Phragmites* cells along trails behind trailer parks along the Army Camp Road, Ipperwash.



A summary of required control efforts for this PMA is provided in Table 5.3. This includes the beach area along the lake edge and dunes, the interior dunes, cottage laneways, the area around the pump house and, the adjacent slough. The associated estimated costs to control these areas over the next three years are provided in Table 5.4.

Table 5.3. Summary of *Phragmites* control information for PMA IV.

Control Location	Acreage ha (ac)	Density	Control	Timing		Comments
				yr 1	yr 2	
shoreline, dunes, laneways	9.92 (24.51)	low- med	backpack/ hand wicking	fall	sum- fall	the <i>Phragmites</i> in the dunes, on cottage lots, and laneways can be controlled using backpack spray units or handwicking; timing is best after Labour Day to reduce impact on recreational users; the <i>Phragmites</i> has low density and will not need to be rolled/cut or burned pre or post control; control of the wet areas will have to be timed during low lake level periods; cutting <i>Phragmites</i> in these areas should only be done using handheld cutters to reduce negative impacts; touch up control the following year should be substantially reduced and may only require mechanical methods such as pulling or cutting; control efforts for the entire shoreline would be best undertaken during the same year
pump house and interior sloughs	0.81 (2.00)	med- high	Centaur and backpack	fall	fall	<i>Phragmites</i> around the pump house should be rolled/cut and, if possible, burned during the dormant season prior to control; control will require a Centaur and backpack crew; water levels in the reservoir above the pump house may prevent herbicide control; control along the sloughs should only be done by a backpack crew either on foot or working from a small boat; control is best timed for fall

Table 5.4. Estimated costs for controlling *Phragmites* in PMA IV.

Control Location	Year 1	Year 2	Year 3	Total
West Ipperwash Beach	\$1,300	\$600	\$100	\$2,000
Centre Ipperwash Beach	\$ 700	\$200	\$100	\$1,000
East Ipperwash Beach	\$ 500	\$100	\$100	\$ 700
Interior Dune Trails	\$ 300	\$ 50	\$0	\$ 350
Ipperwash Pump House	\$1,600-\$3,000	\$1,000-\$2,000	\$500-\$1,000	\$3,100-\$6,000
Interior Sloughs	\$2,000-\$3,000	\$1,000-\$1,500	\$500-\$800	\$3,500-\$5,300
Total	\$6,100-\$8,500	\$2,850-\$4,350	\$1,300-\$2,100	\$10,650-\$15,350

e) PMA V: West Bosanquet

i) Background Information

The majority of the *Phragmites* within West Bosanquet can be found along the shoreline bordered by Townsend Line to the south and the Shawshawanda Creek to the north. Along this ~6 km stretch there are seven distinguishable communities: Wood's Drive, Lake Valley Grove, Sunnidale, Pinetree, Cedarview, Glendale, and Lakeview. There are also two seasonal trailer parks, two recreational camps (Lambton United Church Centre and Forest Cliff Camp) and large sections of privately owned shoreline. Inland from the shoreline *Phragmites* is located in one patch in the middle of an agricultural field to the north of Cedar Point Road. *Phragmites* control is already underway in some of these areas, either through a community supported program or initiatives by individual landowners. However, currently there are large sections of shoreline remaining without a control program in place (Figure 5.23).

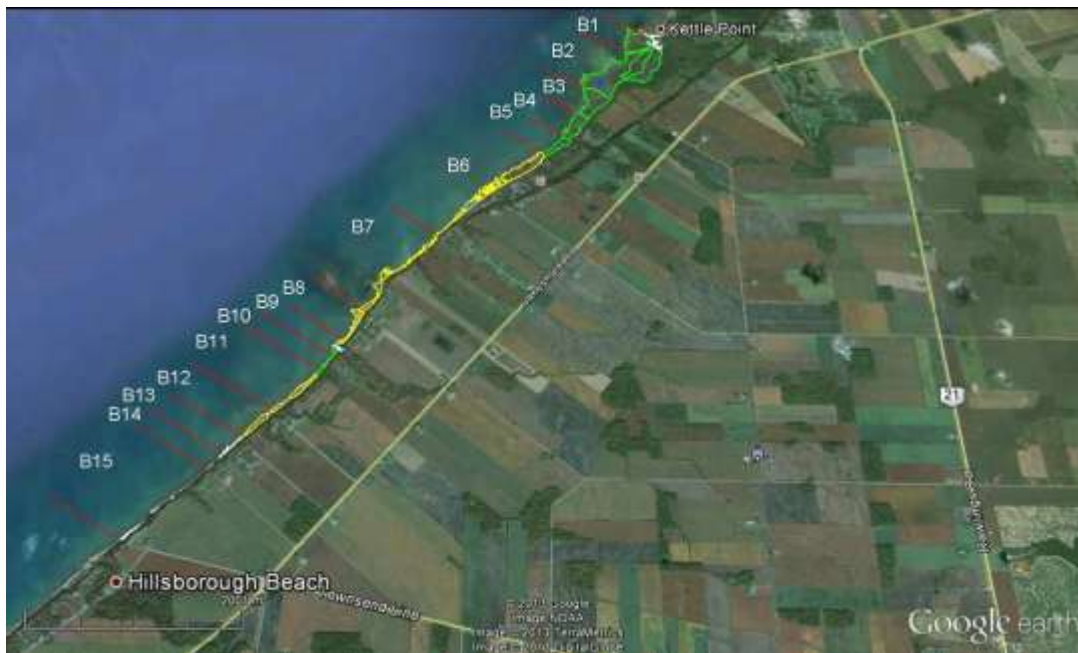
Figure 5.23 Lake Huron shoreline in West Bosanquet showing areas where *Phragmites* is being controlled and where it is not controlled.



Between September 2012 and June 2013 the West Bosanquet shoreline was surveyed to record *Phragmites* locations and densities as well as wildlife presence, wet locations, native plant species, terrain conditions, access points, landowner control initiatives and other relevant information. *Phragmites* was observed in approximately 90 ha (223 acres) of this shoreline and where present was either in dense cells or scattered throughout.

The shoreline was divided into 15 manageable sections or Blocks with boundaries based upon logical landscape breakpoints, land ownership or Community boundaries (Figure 5.24). Maps for each Block showing *Phragmites* densities and recommended control options were developed using the program Expert GPS and Google Earth images into which the GPS waypoints had been uploaded. Cells outlined in solid green lines represent where all terrain track vehicle (Centaur) use is required. Sections within the solid white lines represent areas that should be controlled using backpack sprayers or handweeding. Areas outlined in yellow demarcate sections where both the Centaur and backpack crews should work in concert. At some sites *Phragmites* was in the water during the time of the assessment, either along the edge of the lake, at creek mouths or in shallow depressions, and all sites should be evaluated prior to any control activities taking place. Detailed control information for each Block is provided below.

Figure 5.24. Location of *Phragmites* control Blocks assessed for densities and management options along the West Bosanquet shoreline.

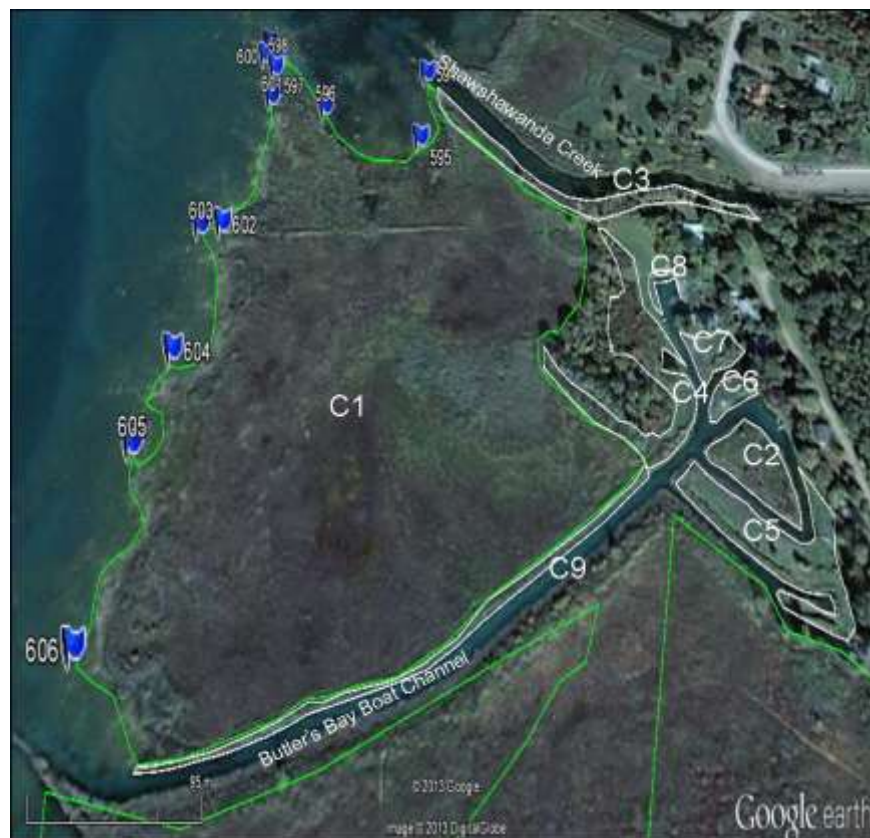


ii) Block 1

Block 1 is bordered by the Shawshawanda Creek to the north and the Butler's Bay boat channel to the south (Figure 5.25). Much of this Block encompasses a coastal meadow

marsh which is designated as being Provincially Significant. The Ontario Ministry of Natural Resources (OMNR) does not take ownership for this coastal wetland and therefore, restoration responsibilities are not clear. If the OMNR does not take a leadership role in controlling *Phragmites* on this section of coastline a Letter of Opinion will be required before a control program involving herbicides can commence. An exception to this requirement could be made if the St. Clair Region Conservation Authority (SCRCA) agrees to manage this project and hire the required contractors. The funding required to conduct this control effort will need to be acquired through Grants and/or partnerships. The site can be accessed off of Woods Drive and cottage owners should be notified prior to activities taking place. Engagement of the local community in the control efforts would also be of benefit since local knowledge of the area and assistance may be needed.

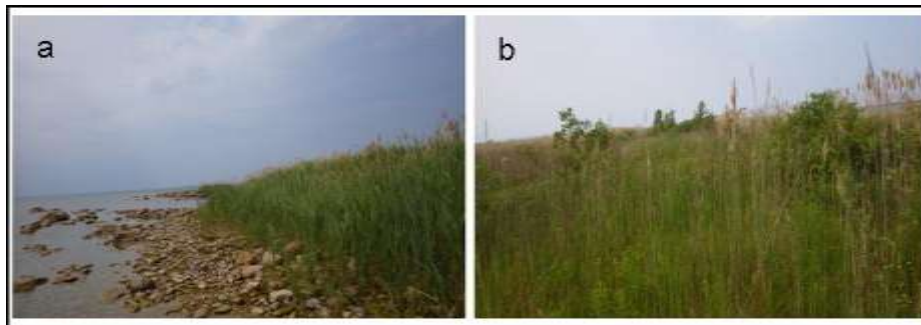
Figure 5.25. Satellite image showing areas requiring *Phragmites* control in Block 1.



The section outlined in green (C1) should be controlled using a Centaur or similar equipment; the areas demarcated by white lines (C2 – C8) can be controlled using backpack spray units.

In Block 1 the *Phragmites* is densest and most widely dispersed throughout Cell 1 (C1) covering ~ 10.5 ha (~26 ac). The remaining ~1.4 ha (~3.6 ac) of the Block are divided into eight cells where *Phragmites* is mainly sparse with occasional smaller, dense patches (Figure 5.26).

Figure 5.26. Images of shoreline in Block 1 showing a) dense cell of *Phragmites* along the Lake Huron shoreline and b) *Phragmites* scattered throughout the coastal meadow marsh.



Cell 1 should be rolled and burned prior to herbicide treatment and additionally after the first treatment. Herbicide application will require a Centaur or similar type of equipment due to the expansive area and high density of *Phragmites*. Timing for this activity would be best between early September and mid fall (before the plants begin to naturally senesce). This timing will reduce negative impact on wildlife in the area and remnant patches of native vegetation which are adjacent to, or scattered throughout, the dense *Phragmites* patches. *Phragmites* control along the shoreline or in wet depressions will have to coincide with lower lake levels, which may hamper control efforts. Rolling and burning activities should take place between the period when plants have senesced and dried but before spring rejuvenation. Touch up herbicide treatment will be required the second year after initial treatment and should also be timed between early September and mid fall, since a Centaur or similar equipment type will likely be required. During the third growing season after initial treatment, remnant *Phragmites* should be able to be controlled using backpack spray units. This activity could occur from early July, when nesting birds will have fledged, up until plant senescence, sometime in mid fall. Touch up requirements in subsequent years will be dependent upon the degree of remnant *Phragmites* and the rate of new colonization, and will need to be managed accordingly.

Phragmites within the remaining areas in this Block are demarcated by Cells 2 through 9. Two of these cells (C2, C9) will have to be accessed by boat, while the remaining areas can be reached on foot. Most of these cells would be best treated with herbicide using backpack spray units, especially where the *Phragmites* is sparse. In portions of cells C3 and C9 *Phragmites* is dense, however, due to the rough terrain and proximity to the creek along C3 and boat channel along C9, use of the Centaur is not practical. Control along the Shawshawanda Creek could be done on foot using backpack spray units. Sections along the boat channel would be best accessed from a boat equipped with a small tank and spray unit. The preferred method to address the densest patches would be to cut and burn them prior to treatment, and this activity should occur between late fall and early spring. Suggested timing for the first herbicide application would be starting in early September and continuing until late fall to reduce impact on wildlife and native vegetation. Any touchup requiring backpack spray units could safely take place in subsequent growing seasons, between early July and late fall. In addition to the initial

treatment, *Phragmites* in these cells will likely require follow up treatment during the second growing season, but at a significantly reduced effort. A summary of Block 1 spray events is provided in Table 5.5.

Table 5.5. Summary of *Phragmites* control information for Block 1 cells.

Cell ID	Area ha (ac)	Density	Control	Timing		Comments
				yr 1	yr 2	
B1C1	9.0 (22.3)	high	Centaur	fall	fall	control of shoreline and wet depression sites will be lake level dependent which may hamper timing and efficacy
B1C2	0.2 (0.4)	low-med	backpack	fall	sum-fall	small island in channel in front of cottage
B1C3	0.3 (0.8)	low-high	backpack	fall	sum-fall	narrow trip along Shawshawanda Creek; too rough for Centaur equipment
B1C4	0.4 (1.0)	Low	backpack	fall	sum-fall	strip along edge of boat channel and marsh
B1C5	0.3 (0.7)	Low	backpack	fall	sum-fall	in front of cottages, some sections have been cut
B1C6	0.1 (0.2)	low-high	backpack	fall	sum-fall	in front of cottage, close to channel
B1C7	0.1 (0.2)	low-high	backpack	fall	sum-fall	in front of cottage, close to channel
B1C8	0.1 (0.2)	low-high	backpack	fall	sum-fall	patch along edge of channel in front of cottage
B1C9	0.1 (0.2)	low-high	backpack	fall	sum-fall	strip along channel; need to use boat

It can be anticipated that the cost for *Phragmites* control in Block 1 will be highest during the first two years and substantially decline in year three. After this period, costs should remain at a low annual level to ensure control of new invasions. However, as more control activity is undertaken along the shoreline and throughout the interior of the Municipality, re-infestation rates would be anticipated to significantly reduce, as would the annual maintenance requirements. One caveat to these cost projections is the degree of control efficacy that can be achieved due to water issues. Without the availability of a chemical approved for overwater treatment of *Phragmites* there will be patches that cannot be controlled efficiently. Where feasible, manual control efforts may have to be used. Wet areas that cannot be controlled will remain constant spread vectors. Estimated costs to control *Phragmites* in Block 1 are provided in Table 5.6. These estimates are based upon hiring licensed pesticide applicators with experience controlling *Phragmites* in sensitive habitats. Other project related expenses, including herbicide and surfactant, spray equipment, cutting equipment, safety equipment, equipment repairs, training, liability insurance, labour, and travel have been factored into these costs. These are rough estimates and may need to be adjusted as the program warrants.

Table 5.6. Estimated costs for controlling *Phragmites* in Block 1.

Cell ID	Year 1	Year 2	Year 3	Total
B1C1	\$14,000	\$10,000	\$6,000	\$30,000
B1C2-C9	\$ 4,000	\$ 3,000	\$1,000	\$ 8,000
Total	\$18,000	\$13,000	\$7,000	\$38,000

After the initial control efforts have commenced throughout Block 1, long term *Phragmites* management would ideally become a Wood's Drive community initiative. A local program could be established that would incorporate training for identification of new colonization and rapid response options. This program could be developed and implemented with the guidance of the Municipality's *Phragmites* Coordinator.

iii) Block 2 and Block 3

The section of shoreline demarcated as Blocks 2 and 3 is a continuance of the coastal meadow marsh covered in Block 1 (Figure 5.27). Block 2 is bordered by the Butler's Bay boat channel to the north. The southern boundary is demarcated by a vehicle track coming from the end of Fuller Road out to the shoreline. Block 3 starts on the southern side of this track and ends at the property boundary for the Lambton United Church Centre. These boundaries also roughly follow property lines. According to Land Registry records, the upland property adjacent to Block 2 is owned by the Kersey's while the upland property adjacent to Block 3 is registered to the Brown's. Block 2 is ~39 ha (~97 ac) in size of which ~85% is covered in dense *Phragmites* (C1), ~6 ha (~14.7 ac) has sparse *Phragmites* (C2) and ~0.3 ha (~0.7 ac) is a wet depression. Block 3 covers ~9 ha (~23 ac) and has medium to high *Phragmites* densities throughout (Figure 5.28).

Figure 5.27. Satellite image showing areas requiring *Phragmites* control in Block 2.



The section outlined in green (C1) has dense *Phragmites*, the area demarcated by a white line (C2) has sparse *Phragmites*, and the area outlined in blue is a wet depression.

Figure 5.28. Satellite image showing areas requiring *Phragmites* control in Block 3.



The section outlined in green (C1) has dense *Phragmites*.

Both of these Blocks should be controlled in concert and ideally during the same time period that control activity takes place in Block 1. However, due to the extensive area to be treated, and contractor availability, this may not be possible. As with Block 1, the dense *Phragmites* sections should be rolled and burned prior to herbicide application. Retrofitted Centaurs or similar equipment will be required to apply herbicide to the majority of this area. The sparse *Phragmites* within Cell 2 (C2) in Block 2 can be controlled by a crew with backpack spray units. Dense *Phragmites* surrounds a wet depression located in Cell 1 of Block 2 and water levels will dictate whether these plants can be sprayed or if alternative control efforts will have to be explored (Figure 5.29). There is also a remnant boat channel running through the centre of Block 3 from the tree line out to the lakeshore and the presence of water may also hamper control efforts (Figure 5.30).

Figure 5.29. Dense *Phragmites* along the edge of a wet depression located in Block 2.



Figure 5.30. Dense *Phragmites* along the edge of an old boat channel in Block 3.



As with Block 1, the best timing for control efforts within these two Blocks is from early September through to natural senescence. This will reduce the impact on any remnant native vegetation which remains around the edges of the dense *Phragmites* and also reduce disturbance to wildlife (Figure 5.31). Regardless of control timing, freshwater mussels can be present within shallow water along the shoreline at all times of the year and these animals can easily be crushed by a Centaur or other large vehicle. Therefore, care should be taken to avoid traversing through these waters. Amphibians were also observed along the edges of the *Phragmites* cells and special care must be taken to ensure that none are crushed or sprayed. A waterfowl hunting blind is located along the shoreline in Block 2 and the owners of this structure should be notified if control activity coincides with waterfowl hunting. ATV and larger 4 wheel drive vehicle tracks are evident throughout this section and regulations curtailing their use should be enforced to reduce future impacts, including the spread of *Phragmites* post control.

Figure 5.31. Images of shoreline in Block 2 showing a) native wetland vegetation communities along the edges of dense *Phragmites* cells, b) low density *Phragmites* scattered throughout the meadow marsh, c) interior of high density *Phragmites* cell, d) waterfowl blind along shoreline amongst dense *Phragmites*, e) American toad burrowed in sediment along shoreline in front of dense *Phragmites*, f) freshwater mussel filter feeding in shallow water along shoreline, g) tracks from 4 wheel drive vehicle out to shoreline, and h) ATV tracks through meadow marsh.



During the second year of control, areas that can be touched up by a backpack crew on foot can be targeted as early as mid June. *Phragmites* plants are generally at least 1 metre in height by this time and have sufficient leaf structure to absorb the herbicide. Traversing the area on foot and use of the backpack units will ensure that only target plants receive the herbicide and possible disturbance to wildlife can be minimized. If vehicles are to be used, the timing should be delayed until at least August to reduce potential impact on nesting birds. The sections where *Phragmites* is dense will likely require another treatment using either a Centaur or Kubota, or similar equipment, and activity should therefore not occur prior to early September. Depending upon treatment efficacy in the first two years of control, remnant *Phragmites* will likely be controllable using backpack spray units in year three and beyond.

In the areas where dense *Phragmites* occurs, the rolling and burning activities should take place during the late fall through winter prior to the initial herbicide application (Table 5.7). Ideally a second rolling and burning activity should occur sometime during the late fall through winter after the first spray event has taken place.

Table 5.7. Summary of *Phragmites* control information for Blocks 2 and 3.

Cell ID	Area ha (ac)	Density	Control	Timing		Comments
				yr 1	yr 2	
B2C1	33.04 (81.61)	high	Centaur	fall	fall	control of shoreline and wet depression sites will be lake level dependant which may hamper timing and efficacy ; this cell can be accessed for control off of the end of Fuller Rd. down a steep gradient and rough track
B2C2	5.94 (14.67)	low	backpack	fall	sum- fall	section with sparse Phragmites scattered among native meadow marsh vegetation; cell access should be the same as for C1
B3C1	9.34 (23.08)	med- high	Centaur	fall	fall	control of shoreline and old channel section will be lake level dependant which may hamper timing and efficacy; access is the same as B2

BP= back pack unit; F= fall (early Sep until natural plant senescence); S=summer (after early July)

The costs for controlling Block 2 are estimated at ~\$63,500 for the first year, ~\$38,000 for the second year and ~\$17,000 for the third year (Table 5.8). Block 3 is smaller and therefore control costs are much lower with year 1 estimated at ~\$14,000, year 2 at ~\$11,000 and year 3 at ~\$5000 for a total of approximately \$30,000. Depending upon site conditions, weather, and daily efficiency rates during the period planned for spraying these costs may have to be adjusted upward or downward.

Table 5.8. Estimated costs for controlling *Phragmites* in Block2 and Block 3.

Cell ID	Year 1	Year 2	Year 3	Total
B2C1	\$49,000	\$34,000	\$15,000	\$ 98,000
B2C2	\$14,500	\$ 4,000	\$ 2,000	\$ 20,500
B3C1	\$14,000	\$11,000	\$ 5,000	\$ 30,000
Total	\$77,500	\$49,000	\$ 22,000	\$148,500

After Year 3 of the control program it should be anticipated that the major infestation within Blocks 2 and 3 will be dealt with. Remnant *Phragmites* plants should be easily targeted on foot using backpack spray units. One caveat to this timeline is how much of the shoreline, boat channels and wet depression areas can be controlled if lake levels do not sufficiently recede. The availability of a herbicide approved for over water application will alleviate this issue and help to bring control costs down.

A long term management strategy for this section of shoreline will need to be developed. Annual or bi-annual site visits should occur to spot new *Phragmites* colonization and initiate appropriate rapid control response. Since this coastal wetland has no apparent oversight it has been labeled as ‘orphaned’ and will need to be ‘adopted’ to manage the long term control program. This could be undertaken by the Municipality in partnership with the St. Clair Region CA (which oversees this area), or Kettle and Stony Point First Nation, an NGO, a local interest group, the *Provincial* Government, or a consortium of some or all of these entities.

iv) Block 4

The parcel of shoreline demarcated by Block 4 is owned by the Lambton Presbytery United Church Centre (Figure 5.32). This stretch of shoreline had high to medium *Phragmites* density which was hindering recreational opportunities for the Centre’s visitors and impacting the shoreline habitat (Figure 5.33). The Centre’s manager had tried various control methods including cutting and covering with limited success. Dover Agri-Serve was hired in 2013 to control the *Phragmites*. In May the standing dead *Phragmites* was rolled and then burned. The new growth was subsequently sprayed in the summer using a Centaur. Follow up control is planned for 2014.

Figure 5.32. Satellite image showing areas controlled for *Phragmites* in Block 4.

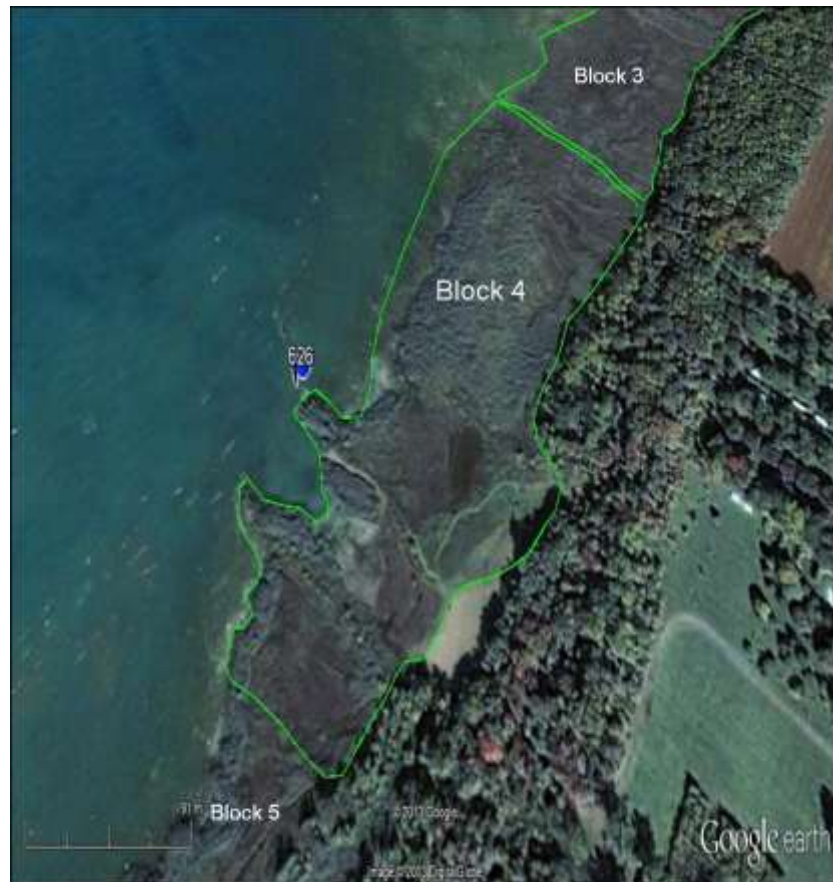


Figure 5.33. Images of shoreline in Block 4 showing a) former swimming area for Lambton Centre visitors and b) unsuccessful control efforts using tarps .



v) *Block 5*

The ~427 m (1400') of shoreline encompassed by Block 5 has high *Phragmites* density throughout (Figure 5.34). According to Land Registry records, the 48 ac parcel of land

connected to this shoreline is co-owned by Cartref Enterprises Ltd. and GMS Mortgage Investment Corp. In the summer of 2013, a representative of the G.M.S. Mortgage Investment Corporation, M.E. Leff, was contacted by Nancy Vidler in an effort to engage them in *Phragmites* control efforts. In a response letter to this request Mr. Leff stated that they were “unable to give permission at this time for use of our land for a buffer”. Since control efforts are occurring on the adjacent shoreline properties it is imperative that the *Phragmites* along this stretch is also dealt with. Block 5 encompasses ~2.9 ha (7.1 ac) and due to the high density, control efforts would be enhanced by rolling and burning the standing dead *Phragmites* pre- and post-herbicide application. The initial cost for *Phragmites* control (including rolling, burning, herbicide application) is estimated at ~\$4,500. This should drop to ~\$2,500 the following year and ~\$1,000 in year three. A program for long term monitoring and rapid response will have to be developed for this property. Options for such a program are discussed in Section 6.

Figure 5.34. Satellite image showing areas requiring *Phragmites* control in Block 5.



vi) Block 6

The 1.7 km section of shoreline covered in Block 6 encompasses the communities of Lake Valley Grove, Sunnidale and Pine Tree Estates (Figure 5.35). This section is an active recreational area with numerous shoreline alterations including groins, ‘sea walls’ and landscaping. Some property owners had been actively managing the *Phragmites* where they could while others had not. This stretch of shoreline therefore had pockets of high to low to no *Phragmites* density (Figure 5.36).

Figure 5.35. Satellite image showing areas controlled for *Phragmites* in Block 6.



Figure 5.36. Images of shoreline in Block 6 showing a) showing high density *Phragmites* along rocky groin, b) high density of *Phragmites* along a ‘sea wall’, c) island of high density *Phragmites*, and d) shoreline property where *Phragmites* has been controlled.



In the fall of 2012 Nancy Vidler made contact with some of the residents from the Pine Tree Estates, Sunnidale and Lake Valley Grove communities and as a result a local *Phragmites* Project Team was formed. This Project Team developed a local communication network and was successful in gaining the acceptance of all shoreline property owners to partake in a *Phragmites* control program. They also raised funds (~\$3,000) which will offset some of the control costs and support a long term monitoring and rapid response program.

Along with the assistance of N. Vidler, Bill MacDonald, J.M. Gilbert and Municipal staff (Brent Kitmer), the Pine Tree Estates, Sunnidale and Lake Valley Grove communities were successful in obtaining a grant of \$11,000 from the Land Stewardship and Habitat Restoration Fund (LSHRF) for 2013. A partnership was then formed with the Municipality and the St. Clair Region Conservation Authority who hired Dover-Agri-Serve to manage the *Phragmites* control activities.

Control efforts commenced in early May 2013, at which time the high density *Phragmites* cells were rolled and burned. This was conducted under the consent of the local fire chief and in adherence with local by-laws. In July, these same areas were sprayed with herbicide using the Centaur and backpack spray units. Some *Phragmites* pockets were in standing water at that time and had to be left. Follow up touch up spraying using backpack units took place in August and once again water levels

prevented some *Phragmites* cells from being sprayed. A burn event is planned for the late fall 2013. These control efforts are estimated to use up most of the \$11,000 from the LSHRF.

The targeted sites should experience little to no re-growth in 2014. Shoots that do emerge should be controllable by the local community under the guidance of the *Phragmites* Team. The *Phragmites* cells that were in standing water will, however, have to be dealt with. Ideally a herbicide, approved for overwater application, becomes available in the very near future. In the interim the remaining cells could be cut three to four times a year by a crew of local volunteers. Due to the high exposure of these cells it is unlikely that tenting or covering methods could be employed. If lake levels due recede enough to allow for spraying, a certified contractor will have to be hired. Depending upon the number of areas to be treated, these communities could absorb this cost through more fund raising events or they may have to seek financial assistance.

vii) *Block 7*

Block 7 covers ~1.2 km of a narrow strip of shoreline. According to Land Registry records there are three property owners along this strip, Parklee Land Limited, Round Tree Estates and Sifton Developments. The Block is divided into three cells based roughly on these property boundaries (Figure 5.37). *Phragmites* is established along this entire stretch and the three cells should be controlled at the same time to reduce costs and increase control efficacy. The properties to the south and the north of this section underwent control activity in 2013 and will be re-contaminated rather quickly if this section is also not controlled.

Figure 5.37. Satellite image showing areas requiring *Phragmites* control in Block 7.



The *Phragmites* occurs in well established dense pockets along the base of the steep incline and in some areas extends out to the edge of the lake (Figure 5.38). Control efforts will require using both a Centaur or similar type of equipment and a backpack crew. (Table 5.9). The timing for control efforts will be dependent on lake levels. If they remain similar to those in 2013 most if not all of the areas should be dewatered throughout the summer and fall unless storm or high wind events occur. Spraying using a Centaur or other large vehicle should not occur before early July to reduce potential harm to nesting birds.

Figure 5.38. Images of shoreline in Block 7 showing a) cut *Phragmites* within a small embayment in the southern end looking north, b) *Phragmites* fringe along the shoreline in the southern section of the Block, c) *Phragmites* cells at the base of a steep incline in the northern edge of the Block looking south, and d) *Phragmites* cells along the shoreline in the northern section of the Block looking southward.



Table 5.9. Summary of *Phragmites* control information for Block 7.

Cell ID	Acreage ha (ac)	Density	Control	Timing		Comments
				yr 1	yr 2	
B7C1	0.86 (2.14)	med-high	Centaur and backpack	sum- fall	sum- fall	Control in year 2 may only require a backpack crew; timing will have to take into account lake levels and bird nesting activity; access to this section will have to occur through C2 and C3
B7C2	1.05 (2.59)	med-high	Centaur and backpack	sum- fall	sum- fall	Control in year 2 may only require a backpack crew; timing will have to take into account lake levels and bird nesting activity; access to this section will have to occur through C3
B7C3	1.95 (4.83)	med-high	Centaur and backpack	sum- fall	sum- fall	Control in year 2 may only require a backpack crew; timing will have to take into account lake levels and bird nesting activity; Phragmites was cut in 2013 and this activity should not occur if a spray event is planned for 2014.

The estimated cost to control this ~3.9 ha (9.6 ac) area during the first year is ~\$6,000 which includes rolling, burning and spraying (Table 5.6). If this section is sprayed in July a touch up spray event could occur at an appropriate time, determined by the contractor, in the same growing season. This could then be finished with a roll/cut and burn that fall. The approximate costs for this second control activity would be similar to those estimated for Year 2 in Table 5.10. If touch up is necessary the following year, this should only require a backpack crew. This activity could occur any time between mid June (when the plant is of sufficient height) and late fall (before natural senescence). The lake levels will dictate control timing. These costs may be able to be absorbed by the property owners otherwise other options will have to be pursued which may further delay control. These areas will require a Letter of Opinion or alternatively the property owners could partner with the SCRCA.

Table 5.10. Estimated costs for controlling Phragmites in Block 7.

Cell ID	Year 1	Year 2	Year 3	Total
B7C1	\$1,300	\$700	\$250	\$2,250
B7C2	\$2,000	\$800	\$250	\$3,050
B7C3	\$2,600	\$1,500	\$500	\$4,600
Total	\$5,900	\$2,000	\$1000	\$9,900

viii) Block 8

Block 8 covers the Cedar View area which is a stretch of the shoreline beginning at the Cedar Cove Marina and ending at boundary for the Orchard View Trailer Park (Figure 5.39). This shoreline has a high level of recreational use and the *Phragmites* patches are mainly confined to areas around the Cedar Cove Marina and a few rocky points (Figure 5.40).

Figure 5.39. Satellite image showing areas requiring *Phragmites* control in Block 8.

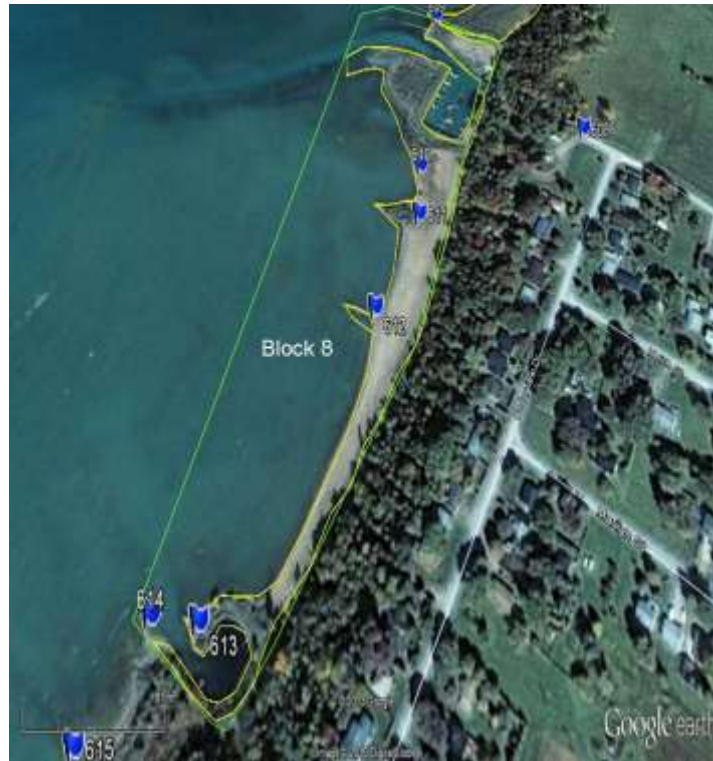


Figure 5.40. Images of shoreline in Block 8 showing a) *Phragmites* around the Cedar Cove Marina, b) looking south from the Cedar Cove Marina, c) *Phragmites* cell along the shoreline and d) sandy shoreline used by seasonal residents.



The *Phragmites* cells within Block 8 were controlled in 2013 by F. Letourneau. This work was paid for by the local residents in partnership with the St. Clair Region Conservation Authority. Touch up work required in 2014 will also take place with the same partners.

ix) Block 9

This Block encompasses a section of shoreline managed by the owners of the Orchard View Trailer Park (Figure 5.41). *Phragmites* infestation is an issue all along this shoreline and the trailer park owners and seasonal residents have a beach clearing work party every year to mechanically remove *Phragmites* from the sandy recreational section (Figure 5.42). The areas outside of this section have thick *Phragmites* cells which need to be controlled. When approached in 2013, the owners of the trailer park were not interested in hiring a contractor, but did express interest in continuing their own efforts and expanding their control initiatives. The *Phragmites* Program Coordinator should follow up in 2014 to see how control efforts are progressing.

Figure 5.41. Satellite image showing areas requiring *Phragmites* control in Block 9.

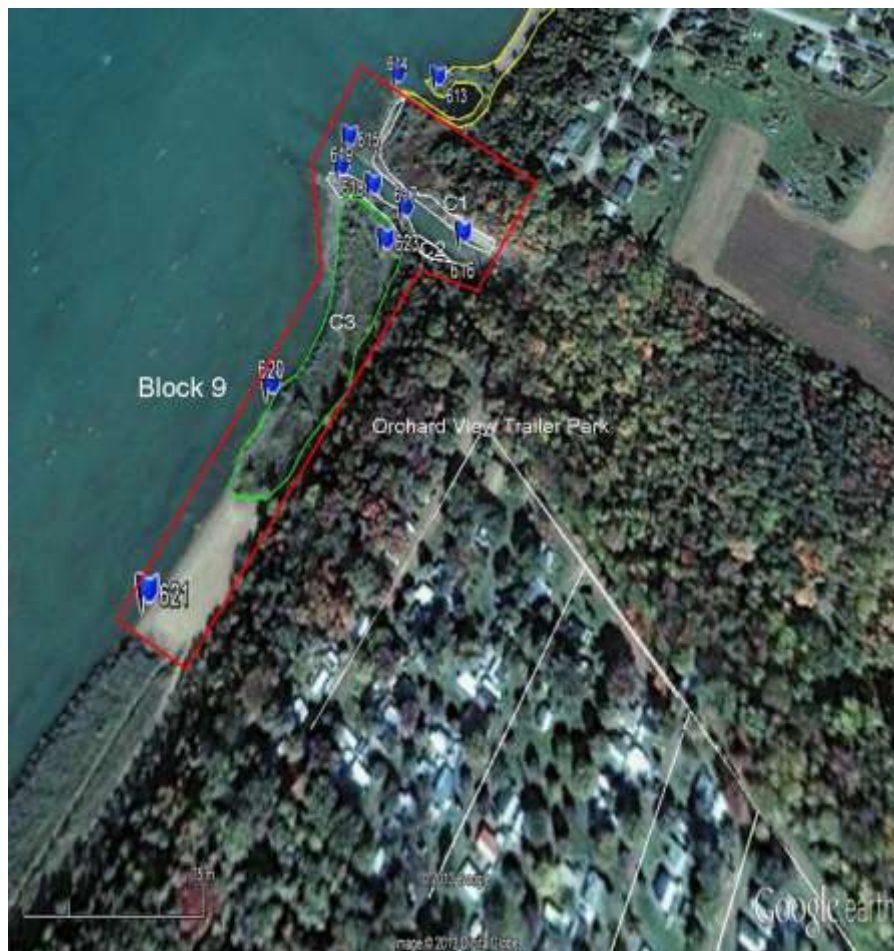


Figure 5.42. Images of Block 9 shoreline showing a) *Phragmites* along north side of creek flowing into Lake Huron, b) *Phragmites* around boat docking area for Orchard View Trailer Park visitors, c) *Phragmites* cut around recreational area, d) *Phragmites* along shoreline, e) *Phragmites* along edge of tree line and f) *Phragmites* cleared from sandy beach section.



Due to the rough terrain, control of Cells 1 and 2 would be best done using backpack spray units (Table 5.11). The dense *Phragmites* in these two cells occurs in narrow strips along the edge of a creek and the lakeshore and care will need to be taken to ensure no spray drift reaches the water. At the time of site assessment in September 2012 and May 2013 some plants were in water and if these areas do not dewater the plants cannot be sprayed. However, cutting the stalks may stress the plants and perhaps promote drowning if the water depths remain high enough for a sufficient amount of time. These cells would be easier to control if they are first cut and burned to remove all of the standing dead biomass. The presence of docks and boats in the Cell 2 area will require extra precautions are taken to ensure property damage does not occur when the piles of dead *Phragmites*

are set on fire. Proper permits must be acquired prior to this activity occurring. With the removal of the standing dead stalks, the new growth of *Phragmites* will be easier to see and spray and the plants could then be targeted anytime after they reach sufficient height. Cell 3 is much larger and too large an area to control efficiently using backpack spray units alone. A commercial spray unit on a machine such as a Centaur would be capable of controlling this area more effectively especially the sections with high *Phragmites* density. The areas with lower density should be sprayed using backpack spray units. Trees, shrubs and native herbaceous plants are scattered throughout this cell and timing for control would be best later in the fall to reduce potential impact to wildlife and native plants. This timing may also be better suited for the seasonal trailer park residents. After the initial control has taken place follow up touch up for all areas would be best using backpack spray units and/or hand wicking.

Table 5.11. Summary of *Phragmites* control information for Block 9.

Cell ID	Acreage ha (ac)	Density	Control	Timing		Comments
				yr 1	yr 2	
B9C1	0.08 (0.20)	med- high	backpack	sum- fall	sum- fall	<i>Phragmites</i> occurs in narrow strips along the waters edge; plants in the water could be cut to promote drowning; this cell would benefit from being cut and burned during the dormant season
B9C2	0.08 (0.20)	med- high	backpack	sum- fall	sum- fall	<i>Phragmites</i> along the edge of a creek and around docks; this section would also benefit from being cut and burned during the dormant season; timing for backpack spraying should occur off season to reduce impact on recreational use; plants in the water could be cut to promote drowning
B9C3	0.50 (1.25)	med- high	Centaur and backpack	fall	sum- fall	<i>Phragmites</i> intermixed with trees and shrubs with native plants in the less dense sections; timing for control would be best in late fall to reduce impact on wildlife and native plants; some pockets may be able to be cut and the dried stalks burned however, care should be taken to ensure fire does not spread through entire cell

If the property owners decided to hire a contractor to control the *Phragmites*, an estimated cost for the initial control efforts would be ~\$1,250 (Table 5.12). The estimated costs for the touch up work would drop significantly each year after the main infestation has been dealt with. Regardless of who does the control work, if herbicides are to be used, a Letter of Opinion will have to be obtained.

Table 5.12. Estimated costs for controlling *Phragmites* in Block 9.

Cell ID	Year 1	Year 2	Year 3	Total
B9C1	\$125	\$100	\$50	\$275
B9C2	\$125	\$100	\$50	\$275
B9C3	\$900	\$400	\$100	\$1,400
Total	\$1,250	\$500	\$200	\$1,950

x) Block 10

The section of shoreline covered by Block 10 is ~0.54 ha (1.33 ac) in size (Figure 5.43). According to Land Registry records the adjoining upland property is owned by Burkhard Koldeway and there is no evidence that this shoreline is being used. Dense *Phragmites* covers this entire section from the edge of the lake back to the tree line. The adjacent property owners must continually control the *Phragmites* which encroaches from this cell onto their cleared beaches (Figure 5.44).

Figure 5.43. Satellite image showing areas requiring *Phragmites* control in Block 10.



Figure 5.44. Images of shoreline in Block 10 showing a) *Phragmites* at the property boundary between Blocks 10 where it is controlled and Block 11 where it is not controlled, and b) high density of *Phragmites* along the shoreline which extends back to the tree line.



This dense patch of *Phragmites* would be best controlled using a Centaur or similar type of equipment (Table 5.13). Control efforts would be enhanced if the cell could be rolled and burned during the dormant season prior to spraying. The first spray event could then occur any time between mid June (when the plant reaches sufficient height) and late fall. If the cell is not sprayed until the fall it will likely need to be rolled and burned once again to remove the new growth. Depending upon mortality success, touch up control could likely be done using backpack spray units. The estimated cost to control this Block is ~\$2,300 (Table 5.14). A Letter of Opinion approval for this work will have to be obtained.

Table 5.13. Summary of *Phragmites* control information for Block 10.

Cell ID	Acreage ha (ac)	Density	Control	Timing		Comments
				yr 1	yr 2	
B10 C1	0.54 (1.33)	med- high	Centaur	sum- fall	sum- fall	will need to time control when lake levels are sufficiently low to allow a buffer between the <i>Phragmites</i> and the waters edge; touch up control should be doable using backpack spray units

Table 5.14. Estimated costs for controlling *Phragmites* in Block 10.

Cell ID	Year 1	Year 2	Year 3	Total
B10C1	\$1,300	\$700	\$300	\$2,300

xi) Block 11

Block 11 encompasses the shoreline in front of the Cedar View Campground (Cell 1) and the Forest Cliff Camp (Cell 2) as well as a section along the Coultis Drain (C3; Figure 5.45). Almost half of the shoreline has been cleared of *Phragmites* by the two adjacent property managers. The remaining shoreline has low to high density *Phragmites* (Figure 5.46). *Phragmites* is also present along the Coultis Drain ravine which runs through the Forest Cliff Camp (Figure 5.47). Controlling *Phragmites* in this section will be a challenge due to the difficult terrain but is possible with a crew using backpack spray units. According to the Forest Cliff Camp manager, the source of the *Phragmites* was likely due to construction work. As a precaution, the upstream reaches should be checked for *Phragmites* when control efforts are undertaken.

Figure 5.45. Satellite image showing areas requiring *Phragmites* control in Block 11.

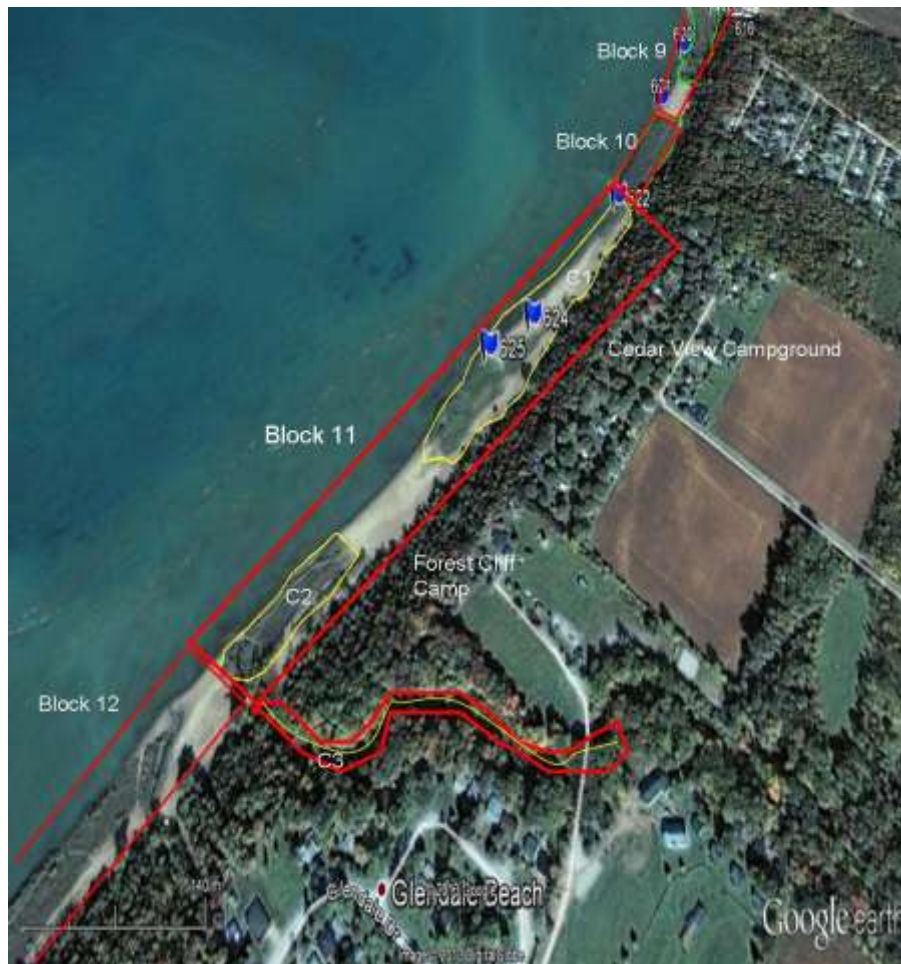


Figure 5.46. Images for Block 11 showing a) *Phragmites* at property boundary between Blocks 10 and 11, b) section controlled for *Phragmites* at the Cedar View Campground (C1), c) area where *Phragmites* has been cut except for a strip remaining along edge of lake (C1), d) section where *Phragmites* has been cut, e) shoreline where *Phragmites* is actively controlled, at the Forest Cliff Camp (C2), f) new *Phragmites* shoots encroaching on cleared beach (C2), g) larger patch of *Phragmites* in the southern end (C2), and h) patch of *Phragmites* along the shoreline (C2).



Figure 5.47. Images for Block 11 Cell 3 showing a) *Phragmites* along the top edge of the Coultis Drain ravine and b) *Phragmites* scattered down into the ravine.



The areas requiring *Phragmites* control in Block 11 covers ~2 ha (4.8 ac). The largest section is in the area demarcated as Cell 1 (C1) which is managed by the Cedar View Campground and covers ~1.5 ha (4 ac; Table 5.15). The section of shoreline demarcated as Cell 2 (C2) is managed by the Forest Cliff Camp and encompasses ~0.4 ha (1 ac). Most of the *Phragmites* in these two Cells has been thinned out due to control efforts over the years and does not need to be burned. However, cutting and burning is recommended for the few remaining dense pockets. Control would be most efficient using a combination of a Centaur, Kubota and backpack crew. Given the high summer recreational use here, the timing for control efforts would be best left until the fall. The *Phragmites* within the ravine (Cell 3) will be more challenging to control due to the difficult terrain and although it does not cover a large area it will take more time and effort which does raise control costs. Estimated costs to hire a contractor to control the entire Block are ~\$4,950 which includes initial control and two follow up treatments (Table 5.16). Regardless of who does the control work, if herbicides are to be used, a Letter of Opinion will have to be obtained.

Table 5.15. Summary of *Phragmites* control information for Block 11.

Cell ID	Acreage ha (ac)	Density	Control	Timing		Comments
				yr 1	yr 2	
B11 C1	1.54 (3.79)	low- high	Centaur Kubota and backpack	fall	sum- fall	the areas where <i>Phragmites</i> has been cut will not need to be rolled/cut or burned; smaller dense pockets could be cut and burned (dormant period) prior to spraying; one large section could be controlled using the Kubota or backpack spray units; larger pockets could be sprayed with Centaur or backpacks; touch up control in all sections feasible with backpacks; control of <i>Phragmites</i> along the lake edge will have to be timed with low lake levels
B11 C2	0.43 (1.05)	low- high	Centaur and backpack	fall	sum- fall	<i>Phragmites</i> has been controlled along ~ half of this shoreline; low to high density sections within the remaining area; dense areas could be cut and burned (dormant period) prior to spraying; can control using backpack spray units but would be more efficient to use a Centaur; touch up control feasible using backpack spray units; <i>Phragmites</i> along the lake edge will have to be timed with low lake levels
B11 C3	0.10 (0.25)	Low-med	backpack	sum- fall	sum- fall	<i>Phragmites</i> along a steep ravine; rough terrain and hard to access; will be time consuming and labour intensive; can be controlled from mid June to late fall

Table 5.16. Estimated costs for controlling *Phragmites* in Block 11.

Cell ID	Year 1	Year 2	Year 3	Total
B11C1	\$1,300	\$600	\$200	\$2,100
B11C2	\$ 400	\$150	\$100	\$ 650
B11C3	\$1,200	\$800	\$200	\$2,200
Total	\$1,900	\$800	\$300	\$4,950

xiii) Block 12

Block 12 covers a section of shoreline which encompasses the Glendale Beach community in the north and ends at the Lake View Haven community to the south (Figure 5.48). The area in the vicinity of the Glendale Beach has been actively controlled to allow for recreational use however, the remaining ~1 ha (3 ac) section of shoreline is covered with *Phragmites* (Figure 5.49).

Figure 5.48. Satellite image showing areas requiring *Phragmites* control in Block 12.

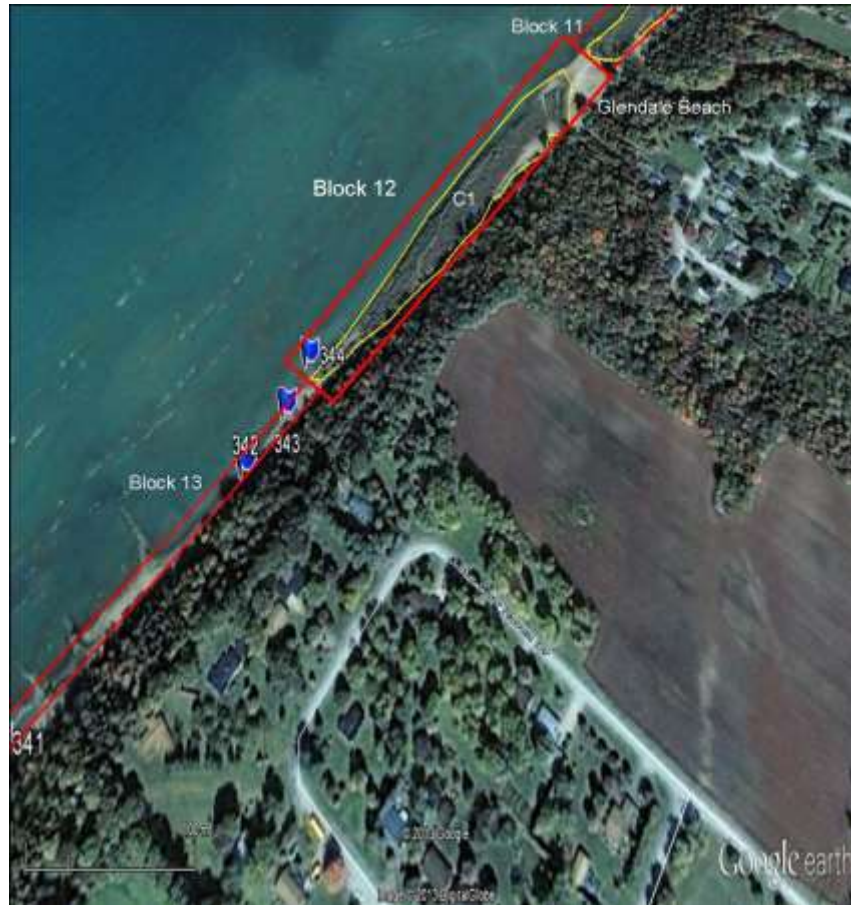


Figure 5.49. *Phragmites* along the shoreline in Block 12 looking north.



The *Phragmites* along this stretch of shoreline should be cut and burned during the dormant season. The new growth could be controlled using either backpack spray units or a Centaur (Table 5.17). Timing for control would be best after the plant reaches sufficient size (around mid June) and before seed establishment. This would reduce the need for another burn post spraying. Timing the control activity during a period when lake levels are low will ensure a sufficient buffer exists between the water and the *Phragmites*.

Table 5.17. Summary of *Phragmites* control information for Block 12.

Cell ID	Acreage ha (ac)	Density low- high	Control	Timing		Comments
				yr 1	yr 2	
B12 C1	1.54 (3.79)		Centaur and/or backpack	sum- fall	sum- fall	<i>Phragmites</i> is mainly confined to a narrow fringe between the base of the hill and the lake; should be cut and burned (dormant period) prior to spraying; could be controlled using backpack spray units alone or with a Centaur; touch up control feasible with backpacks; control will have to be timed with low lake levels

If an experienced contractor is hired to control the *Phragmites*, costs are estimated at ~\$3000 (Table 5.18). The issue of who will pay for this work and obtainment of landowner approval needs to be worked out. Local community engagement will also be required to assist with the initial control efforts and ensure a long term control program is in place. The *Phragmites* Program Coordinator could facilitate these actions and also assist with the obtainment of a Letter of Opinion which will be required.

Table 5.18. Estimated costs for controlling *Phragmites* in Block 12.

Cell ID	Year 1	Year 2	Year 3	Total
B12C1	\$2,000	\$1,000	\$200	\$3,200

xiii) Block 13

Block 13 covers ~ 230 m of shoreline which is used by the Lake View Haven community (Figure 5.50). The relatively short *Phragmites* along this stretch occurs in low density, scattered patches (Figure 5.51). The sandy shoreline is not very wide and the *Phragmites* is confined by the lake edge and the natural incline. A few *Phragmites* plants were observed near the base of the densely vegetated slope. This entire section could be controlled using backpack spray units. Control activity could take place anytime during the growing season, after the plants have reached sufficient size. This should be planned for a time when the shoreline is not being used by the local residents and the lake levels are low. Control cost estimates are ~\$600. This includes the initial control actions and

two touch up events if required. This community is already trying to deal with the *Phragmites* on their own using mechanical means. Their continued involvement in a control program could reduce control costs and also ensure long term maintenance. If control efforts involve the use of herbicides, legal requirements will have to be followed including applicators having the proper license and obtainment of a Letter of Opinion. A *Phragmites* Program Coordinator could assist the Lake View Haven community with implementing an effective *Phragmites* control program both short and long term.

Figure 5.50. Satellite image showing areas requiring *Phragmites* control in Block 13.

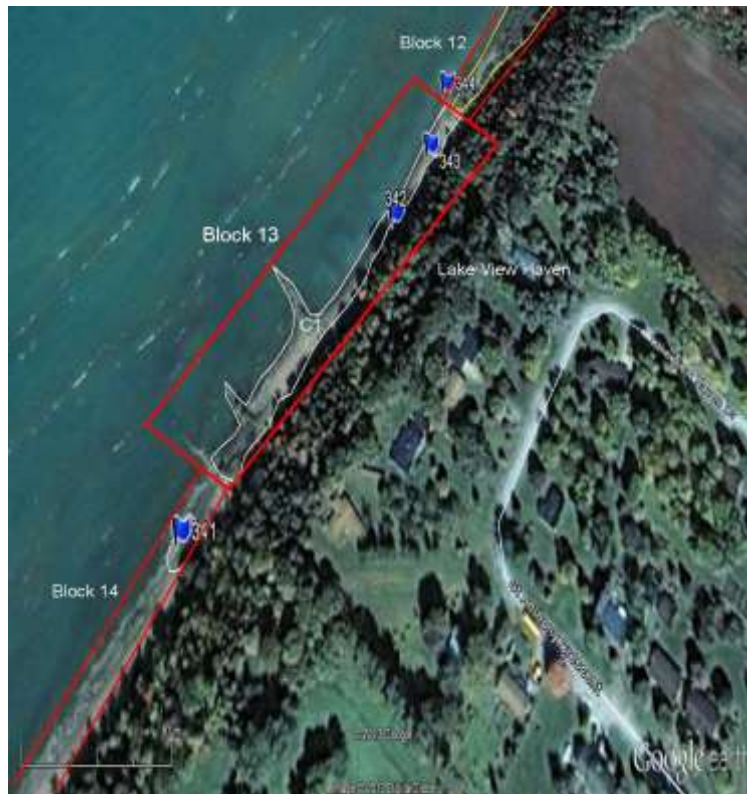


Figure 5.51. Images for Block 13 showing a) short, scattered *Phragmites* along the drier section of shoreline, b) area where local residents have been manually removing *Phragmites*, c) recreational area with scattered *Phragmites*, and d) *Phragmites* around eroded area.



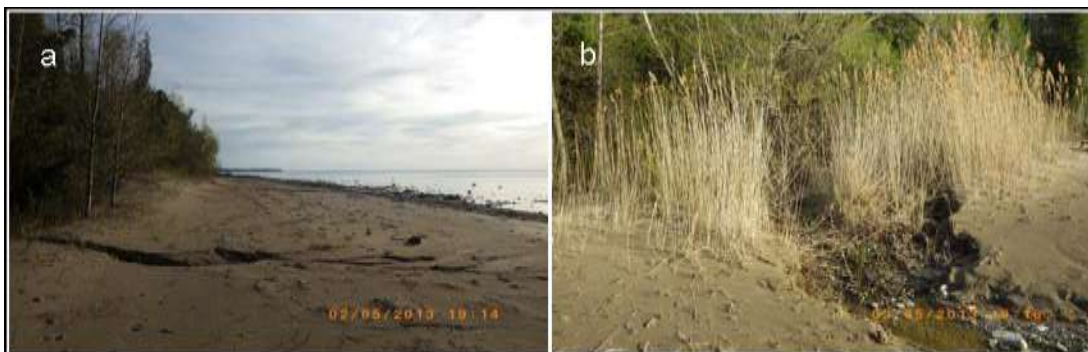
xiv) Block 14

The section of shoreline demarcated as Block 14 only had three cells of low density *Phragmites* when surveyed in May 2013 (Figure 5.52; Figure 5.53). These cells ranged in size from $\sim 50 \text{ m}^2$ to $\sim 230 \text{ m}^2$ and could easily be controlled using backpack spray units. They could also be controlled by mechanical means such as covering or tarping or cutting the stalks below ground. Control costs would be anticipated to be minimal ($\sim \$100$) if hired out or this could be done by volunteers. Given the small amount of *Phragmites* along this section in comparison to the two adjoining Blocks it is likely that control activity has already been occurring. The *Phragmites* Program Coordinator should contact the property owner to inform them about the Municipality wide efforts under way and provide assistance if requested.

Figure 5.52. Satellite image showing areas requiring *Phragmites* control in Block 14.



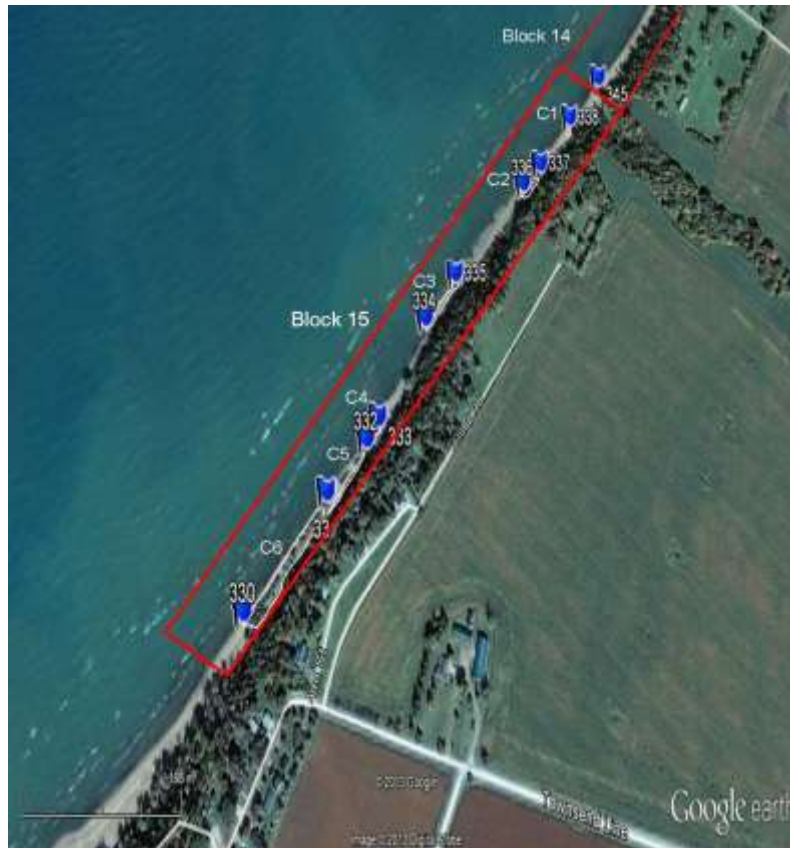
Figure 5.53. Images for Block 14 showing a) shoreline devoid of *Phragmites*, and b) small *Phragmites* cell along edge of tree line at base of hill.



xv) *Block 15*

This Block covers the remaining and southern most section along the shoreline in West Bosanquet (Figure 5.54). It ends at the Municipal boundary along the Townsend Line Road with the Municipality of Plympton-Wyoming to the south. There were six pockets of low density *Phragmites* along this ~800 m stretch which collectively covered ~0.33 ha (0.81ac).

Figure 5.54. Satellite image showing areas requiring *Phragmites* control in Block 15.



The *Phragmites* were mainly confined to narrow strips along the base of the densely vegetated hill (Figure 5.55). The *Phragmites* is kept from migrating out toward the lake by high energy events which have in some areas removed the plants. However, these events enhance the spread of *Phragmites* all along the shoreline.

Figure 5.55. Images for Block 15 showing a) shoreline with *Phragmites* along edge of tree line, b) sparse *Phragmites* interspersed among native vegetation, c) area where *Phragmites* plants that have been ripped out during storm events, and d) section devoid of *Phragmites* (small cell in distance).



The control of the *Phragmites* could be accomplished using backpack spray units and activity could occur between mid June and late fall. Ideally control would occur before the plants mature and seeds have developed. Due to the sparseness of the *Phragmites*, cutting and burning of the standing dead plants will not be critical but would help to reduce seed dispersal. Estimated costs to control this block is ~\$1,600. This includes cutting and burning prior to the first spray event, spraying all of the cells initially and then returning two more times to conduct any touch up required. These costs may be reduced if the residents of the Hillsborough community, who are the main users of this beach, volunteered to assist with control activities. A *Phragmites* Program Coordinator could assist with getting a local community group established, and also help to engage those shoreline property owners in the Plympton Wyoming Municipality. Depending upon the degree of community engagement, control costs could be absorbed by these local residents or funding assistance to help offset costs will have to be pursued. If herbicides are to be used a Letter of Opinion (LOP) will have to be acquired and experienced, licensed pesticide applicators employed. Forming a partnership with the St. Clair Region CA would reduce the need for a LOP and also help facilitate effective and environmentally responsible control actions.

f) PMA VI: Municipal Roadside Ditches

i) Background Information

All of the roads throughout the MLS, including Provincial, County and Municipal, were surveyed for *Phragmites* in 2012 and 2013. Information was collected on cell location (northing/easting, which side of the road the cell was on), approximate size, density, and proximity to residential areas and crops. *Phragmites* observed in lagoons and agricultural ditches were also noted during these surveys and information for these areas is provided in section g) PMAVII. There did not appear to be any discernable pattern to *Phragmites* cell locations although the major roads with Arkona Line in the east, Lakeshore Road/Highway #21 to the west and Townsend Line to the south all had high cell numbers (Figure 5.56). In 2013, Lambton County and the MOE initiated control of *Phragmites* along the sections of their roads which cross through the MLS. The MLS undertook to control their roads within the Port Franks area and West Ipperwash Road in 2012 and Ward 4 roads to the west of Lakeshore Road in 2013. These sections will all need to be assessed for required touch up efforts in 2014.

Figure 5.56. Location of *Phragmites* cells along roads throughout the Municipality of Lambton Shores.



ii) Control Information

The road surveys undertaken in 2012 were conducted by J.M. Gilbert who identified *Phragmites* cells on 16 municipal roads. Additional surveys were undertaken in 2013 by L.Hayes for the MLS who located cells on an additional 15 roads. Information obtained during the 2013 survey was not available for inclusion in this document. Therefore, using the map that L. Hayes developed (Figure 5.56), estimates of cell numbers and sizes were made. If more than one cell was shown, it was assumed that the cells were located on both sides of the road so that control costs would not be greatly underestimated. With the exception of the Army Camp and Ipperwash Roads, all of the roads west or northwest of Lakeshore Road and Highway #21 have been sprayed. The MLS has expressed interest in managing the remaining roads in the Ipperwash area in 2014 which will coincide with plans by the local community for control efforts on the beach.

Information on the location and number of *Phragmites* cells observed along the MLS roads in the Ipperwash area is summarized Table 5.19. As previously mentioned, the ditch along the eastern side of West Ipperwash Road was controlled in 2012. The western side of this road is on Kettle and Stony Point First Nation property and was controlled in the fall of 2013. Touch up efforts will be required for both sides of the road in 2014 and the MLS may wish to explore a potential partnership with the KSPFN to keep this road free of *Phragmites* long term.

Table 5.19. Summary of *Phragmites* cell information for the three municipal roads in the Ipperwash Beach area.

Road Name	Location	Ditch side N/S/both	Cell no.	Est. distance one way (m)	Comments
Army Camp Rd.	North of Hwy#21 to E. Parkway Dr.	both	5	3,200	cells along ~70% of road
Ipperwash Rd.	North of Hwy#21 to E. Parkway Dr.	both	11	3,100	small cells
West Ipperwash Rd.	North of Hwy#21 to Victoria Ave.	N	5	3,100	was sprayed in 2012, requires touch up

The Army Camp Road has the highest *Phragmites* infestation with cells starting at the Highway #21 intersection and ending ~3 km toward the lake from that point. Control efforts along the northern ditch will require a cooperative approach with the KSPFN since *Phragmites* is present on the inside of the property line for the old Army Camp and should be dealt with at the same time to reduce recontamination. Some of the cells along the southern ditch are close to residential areas and seasonal trailer parks and the owners of these properties should be contacted prior to control actions being undertaken. Ipperwash Road has a number of smaller cells on both sides and will be much easier to control. Suggested timing for control work on all three Ipperwash roads is after Labour Day due to the high volume of traffic in the summer months.

Thirteen of the MLS roads which run in roughly a north to south direction were found to have *Phragmites* along them (Table 5.20). The most heavily infested of these roads was Arkona Road, Army Camp Road south of Highway #21, and Indian Hills Trail. Six of these roads had only one or two small cells present. The roads with *Phragmites* cells running in roughly an east to west direction included Main Street on the outskirts of Thedford and King Street West heading out of Forest (Table 5.21). Both of these roads had 4 cells present and four roads had only 1 or 2 cells present. The most heavily infested were Ravenswood Line, Proof Line, Ridge Road and Bog Line.

Table 5.20. Summary of *Phragmites* cell information for the municipal roads which run in a north to south direction throughout the MLS.

Road Name	Location	Ditch side E/W/both	Cell no.	Est. distance one way (m)	Comments
River Road	Between Blain Rd. and Bog Line	E	1	3,700	sparse ~5mx20m
Haig Rd.	Between Walker Rd and Blair Rd	unknown	1	2,025	L.H. data
Goosemarsh Trail	Between Greenway Road and Cold Storage Rd.	unknown	2	2,045	L.H. data
Arkona Rd.	Between Townsend Line and Walker Rd.	both	12	15,280	numerous small cells
Widder R.	Between Arkona Rd. and Gordon Rd.	unknown	4	2,380	L.H. data
Willsie Line	From Northville Rd. to Eric St.	both	4	1,610	~1/2 distance has cells small cells
Northville Rd.	From Hwy #21 to Bog Line	both	2	1,005	
Jericho Rd.	Between Ravenswood Line and Kennedy Line	unknown	3	2,065	
Army Camp Rd.	Between Townsend Line and Hwy#21	both	4	10,905	3 small, 1 long cell ~1km
Kinnaird Rd.	Between Ravenswood Line and Proof Line	unknown	3	3,740	L.H. data
Indian Hills Trail	West off Lakeshore Rd. dead end	unknown	1	1,200	L.H. data
Fuller Rd.	Between Thomson Line and Proof Line	E	5	2,855	cells combined ~1.5km
Dolmaga Rd.	Between Cedar Point Line and Townsend Line	unknown	1	1,810	L.H. data

L.H.= Lindsay Hayes data on file at MLS office

Table 5.21. Summary of *Phragmites* cell information for the municipal roads which run in an east to west direction throughout the MLS.

Road Name	Location	Ditch side N/S/both	Cell no.	Est. distance one way (m)	Comments
Greenway Rd.	Between Mun. S. Huron border and Goosemarsh Trail	unknown	8	4,290	L.H. data
Walker Rd.	Between Haig Rd. and Goosemarsh Trail	unknown	5	2,435	L.H. data
Bog Line	Between Northville Rd. and Tow Rd.	both	10	5,620	numerous small cells
Bruce Scott Rd.	Entire length	unknown	2	2,570	L.H. data
Ravenswood Ln	Between Kinnaird Rd. and Arkona Rd.	unknown	12	10,260	L.H. data
Main St., Thedford	Between Decker Rd. and Third St.	both	4	1,505	small cells
Thomson Line	Between Rawlings Rd. and Fuller Rd.	S	3	2,080	2 small, 1 long cell ~0.5km
Proof Line	Between Lakeshore Rd. and Rawlings Rd.	both	11	2,195	numerous small cells
Cedar Point Line	Between Lakeshore Rd. and Dolmaga Rd.	S	2	1,725	small cells
King St. W. Forest	Up to Brush Rd.	unknown	4	2080	L.H. data
Jura Line	Between Jericho Rd. and Arkona Rd.	both	3	6,210	small cells
Douglas Line	Between Brush Rd. and Forest Rd.	unknown	1	1,885	
Rock Glen Rd.	Between Arkona Rd. and Ann St.	unknown	2	290	L.H. data
Ridge Rd.	Between Jericho Rd. and Northville Rd.	unknown	11	2,060	L.H. data

L.H.= Lindsay Hayes data on file at MLS office

Due to funding constraints it is probably not feasible or reasonable to expect control of all of the roads to occur in the same year. The roads have therefore been ranked in terms of priority to provide a guide to targeting as funds become available (Table 5.22). The highest priority is given to those roads with cells closest to Lake Huron or rivers and streams. High priority is also given to roads with cells of high density, mature plants in order to reduce seed dispersal. Control cost estimates were calculated for each road using the current rates for ditch spraying. Included in the cost factoring was the number of cells, cell size estimates, and the mileage to be travelled. Cell sizes varied from ~2 m wide and 5 m long up to ~5 m wide and 9,500 m long. When cell sizes were not available, a median size value was used in the calculation. When cell locations were not available and more than one cell was present on a road it was assumed that both sides of the road had to be treated which doubled the cost estimates. The roads that have already been controlled in the Port Franks and Ward 4 areas were not included in these cost estimates.

The roads estimated to require the highest costs to control are Arkona Road at ~\$15,900, Army Camp Road (south of Highway #21) at ~\$11,100, and Ravenswood Line at ~\$11,000. These high cost estimates are due to the number of cells, the fact that the cells are located on both sides of these roads, and the distance which must be travelled to control the entire road. The roads could be divided into smaller sections to allow for some measure of control when funds are not available to control the entire stretch.

Table 5.22. Priority ranking and estimated associated costs for *Phragmites* control of MLS roads.

Road Name	Priority	Est. cost	Comments
Army Camp Rd. N of Hwy #21	high	\$3,450	Will require partnership with KSPFN to be most effective
Ipperwash Rd.	high	\$3,650	Priority due to proximity to beach and interior swales
West Ipperwash Rd	high	\$ 500	Touchup required
River Rd.	high	\$1,900	Close proximity to Ausable River cut
Walker Rd.	high	\$2,700	Close proximity to Ausable River cut
Haig Rd.	high	\$2,100	Close proximity to Ausable River cut
Willsie Line	high	\$1,670	Close proximity to Ausable River cut
Northville Rd.	med	\$1,100	Close proximity to Ausable River cut
Bog Line	high	\$6,100	Close proximity to Ausable River cut
Indian Hills Trail	high	\$1,250	Close proximity to creeks flowing to lake
Thomson Line	high	\$1,300	Close proximity to creeks flowing to lake
Proof Line	high	\$2,750	Close proximity to creeks flowing to lake
Cedar Point Line	high	\$1,000	Close proximity to creeks flowing to lake
Fuller Rd.	high	\$1,700	Close proximity to creeks flowing to lake
Greenway Rd.	high	\$4,700	Close proximity to river
Arkona Rd.	med/high	\$15,900	Eastern boundary of MLS and ditch connected to interior
Ridge Rd.	med/high	\$2,600	Many cells with mature plants
Army Camp Rd. S of Hwy #21	med/high	\$11,100	Many cells with mature plants
Goosemarsh Trail	med	\$2,150	Should be controlled with Greenway Road
Widder Rd.	med	\$1,390	Should be controlled at same time as Main St., Forest
Ravenswood Line	med	\$11,000	Should be controlled with cells on adjacent farm land
Main St., Thedford	med	\$1,710	Should be controlled with Ravenswood Line east
Bruce Scott Rd.	med	\$2,700	Should be controlled with Jericho Rd.
Jericho Rd.	med	\$2,200	Should be controlled with Bruce Scott Rd.
Kinnaird Rd.	med	\$3,900	Few cells that could be controlled quickly
King St. W., Forest	med	\$2,280	Should be controlled with lagoons and other cells in Forest
Dolmaga Rd.	med	\$1,900	Control costs could be lower if done with Cedar Pt. Line
Rock Glen Rd.	med	\$ 250	Control costs low if done at same time as Arkona Rd.
Jura Line	med	\$6,400	Control cost inflated due to travel distance
Douglas Line	med	\$1,940	Control cost inflated due to travel distance

Cost estimates are for the initial control efforts and for all but the small, sparse cells, touch up work can be anticipated. Touch up could take place during the same year as the initial control or the following year. Cost estimates for any required touch up will have to be obtained from potential contractors. It can be anticipated that control costs would be highest during the first year, be substantially reduced for touch up work and reach a minimal annual or bi-annual cost thereafter.

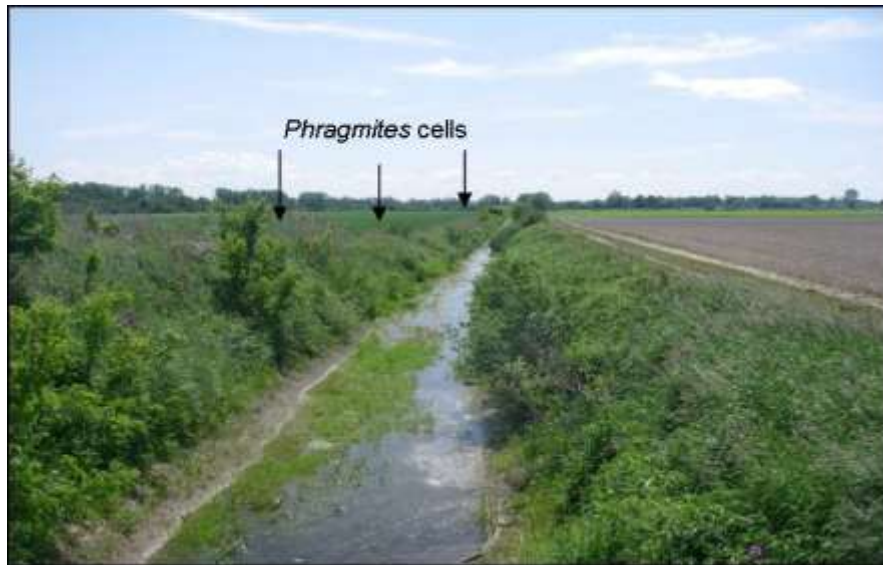
g) PMA VII: Agricultural Drainage Ditches, Lagoons, Golf Courses, Parks

i) Control Information

The presence of *Phragmites* in agricultural drainage ditches, lagoons, golf courses and a park was determined by L. Hayes during her *Phragmites* survey conducted in 2013 for the MLS. Information on the specific location of these cells is available at the MLS office. There were a number of ditches in agricultural fields with *Phragmites* present and

the majority of these had small, low density cells although many of the plants were producing seed heads (Figure 5.). There were as well a few larger, mature patches. Although these cells may not appear to be an issue at this time, if they are not controlled they will continue to expand and continue to be spread vectors. Given the nature of this plant, *Phragmites* will increase in stature and density and eventually plug ditches and drainage tile. Since it will be much cheaper and far easier to control the cells before they become noticeably problematic, the sooner control is initiated the better. Getting this message out to the agricultural community should be a priority for 2014. Nancy Vidler made initial contact with a few of the local farmers in the fall of 2013 and the LSPCG will be working to further information dissemination. Since many farmers have certification to use pesticides they could undertake herbicide control to deal with the *Phragmites* on their own. Alternatively, they could hire a contractor or work with volunteers. A plan will have to be developed to deal with those drainage ditches that remain unmanaged. With input from the LSPCG, the MLS, and the agricultural community, The *Phragmites* Program Coordinator could develop such a plan.

Figure 5.57. Small *Phragmites* cells along an agricultural drainage ditch, Municipality of Lambton Shores.



Phragmites was observed at sewage lagoons located off of King Street West in Forest and just east of Grand Bend and in Thedford. It was also present around lagoons that were in agricultural fields located along Ravenswood Line and Cedar Point Line (Figure 5.58). Control of these sites using herbicides may be limited if the plants are growing in water. If this is the case, the plants should at the very least be cut to prevent seed head development. Control using tent structures could also be pursued if herbicides approved for overwater use do not become available for the next growing season.

Figure 5.58. *Phragmites* around a lagoon in an agricultural field off Cedar Point Line, Municipality of Lambton Shores.



Phragmites was observed on the golf course in Forest and the adjoining park. Both areas could easily be managed as the cells are not yet extensive. However, for this to take place, the managers of these properties must first become aware of the issues with *Phragmites* and control options available to them. Provision of this information and any requested assistance could be undertaken by the LSPCG and/or the *Phragmites* Program Coordinator.

6. *Phragmites* Control Program Summary

There are a number of *Phragmites* control initiatives taking place throughout the MLS with encouraging results. However, there is much more work to be done before the goal of achieving a '*Phragmites* free zone' can be reached. *Phragmites* has been in the MLS area for more than two decades and it will not be brought under control without a concerted effort and dogged determination. Having a well thought out plan in place for each *Phragmites* Management Area will definitely help but there must be local community engagement for a successful outcome over the long term. Expanding *Phragmites* education and awareness to those communities that are not yet engaged will be a significant step toward expanding control efforts. It will also make it possible for *Phragmites* control efforts to be undertaken within all of the PMA's in 2014.

The largest barriers for achieving significant control across the MLS are the lack of required funds and the lack of available herbicides for effective control in wet areas.

These barriers are not insurmountable, but will require a significant and united effort. Control costs for each of the PMA's varies considerably and the biggest challenge will be obtaining sufficient funds to control the large infestations. Despite the significant impact that this invasive plant is having on valuable coastal habitats, there are limited funding opportunities available in Ontario to support *Phragmites* control when herbicides are involved. Having a Municipality-wide *Phragmites* Management Plan in place should be a real asset for garnering financial support from both the Provincial and Federal governments. One critical point that must be kept in mind when dealing with *Phragmites* management on the scale that is being recommended is that success can only be achieved with a long term commitment. If a *Phragmites* Control Program cannot be supported, both financially and through committed efforts beyond the initial control activities, valuable funds and substantial effort will be wasted. For smaller, less dense infestations, long-term maintenance following initial control will be minimal. However, for the larger, well established cells, gaining and maintaining control will take much more investment of money and effort.

The MLS's strong support and desire to achieve success is also of great value to the Ontario *Phragmites* Working Group and the LSPCG who are trying to obtain approvals for use of safe overwater herbicides in Canada. The MLS could significantly advance these initiatives by applying to the Pesticide Management Regulation Agency for a Minor Use Permit. This submission could be made with a number of partners including the NCC, ABCA, SCRCA, Ontario Parks, and KSPFN. If successful, this approval would be extremely beneficial for not only making great strides in *Phragmites* control throughout the MLS, but for also "paving the way" for herbicide use in wet areas throughout the rest of the Province.

7. Additional Recommendations

Suggestions for additional steps the MLS could take include placing *Phragmites australis* on the Municipality's noxious weed list. This would allow for the ability to deal with *Phragmites* on properties that have absentee ownership or when there is resistance to controlling the plant. If this is not an option the MLS Council is willing to pursue at this time, they could examine establishment of a by-law that would require property owners to, at the very least, remove and properly dispose of all seed heads.

The MLS could help to reduce further spread and new inoculations by developing and enforcing by-laws that keep ATVs out of sensitive coastal habitats. The Lambton Shores Nature Trails Association would be a valuable partner in this initiative. The MLS should also enact a policy whereby Municipal contracts can only be awarded to companies that implement the clean equipment protocol which was developed by the Ontario Invasive Plant Council. This will not only help to significantly reduce the spread of *Phragmites* but other invasive plants as well.

APPENDIX A

Summary of the Kettle and Stony Point First Nation *Phragmites* Control Program

First Nation lands at Kettle Point have been invaded by *Phragmites australis* for at least two decades. As a result, much of the coastal sedge meadows and interior marshes are currently dominated by large, dense *Phragmites* stands and the cumulative loss of habitat for wetland dependant wildlife has been substantial. There has also been a large impact on the local community due to the reduction in recreational opportunities and aesthetic enjoyment of the shoreline.

In the fall of 2010, the Kettle and Stony Point First Nation (KSPFN) Band Council sought out advice on how to deal with this problematic invasive on their Kettle Point Reserve. Due to the extent of the invasion it was advised that herbicide application was the only feasible option to control most of the area. Concern was expressed regarding the use of chemicals and it was therefore decided that as a first step a *Phragmites* control demonstration site would be set up within a visible section of the coastal wetland (Figure 1). The main intent of this undertaking was to show the local community that *Phragmites* could be controlled and the habitat restored safely and effectively using an approved herbicide. On September 6, 2011, a 1.8 ha (4.55 acre) plot was sprayed by Frank Letourneau who is a licensed pesticide applicator and the most experienced *Phragmites* control contractor in the province. The standing dead *Phragmites* was subsequently rolled and burned in the winter of 2012. An assessment of the vegetation community prior to control was undertaken and a follow-up assessment occurred in the summer of 2012 to track restoration success. As result of the very visible decline in *Phragmites*, and positive native vegetation response the following growing season, there was overwhelming support within the KSPFN community for the continuation of the program.

Figure 1. *Phragmites* control demonstration site, Kettle Point, ON, a) pre-control, September 2011, b) post-control, July 2012.



Funds were obtained through the Canada/Ontario Resource and Development Agreement (CORDA) to develop a management plan and begin control efforts in 2012. Development of the management plan required that all of the *Phragmites* locations throughout Kettle Point be mapped and assessed for control options. This work was undertaken in the winter of 2012 and *Phragmites* was observed along the Kettle Point coastline from the southern-most boundary at the mouth of Shawshawanda Creek to approximately 600 m east of Pat's Point (Figure 2). *Phragmites* was also established throughout the interior areas that have been opened up by roads, trails and other human activities, around residential areas and along the creeks and ditches that flow through Kettle Point (Figure 3).

Figure 2. Satellite image of Kettle Point showing extent of *Phragmites* along the shoreline from the Shawshawanda Creek at the southern most end of the Kettle Point First Nation's property to approximately 600 m east of Pat's Point.



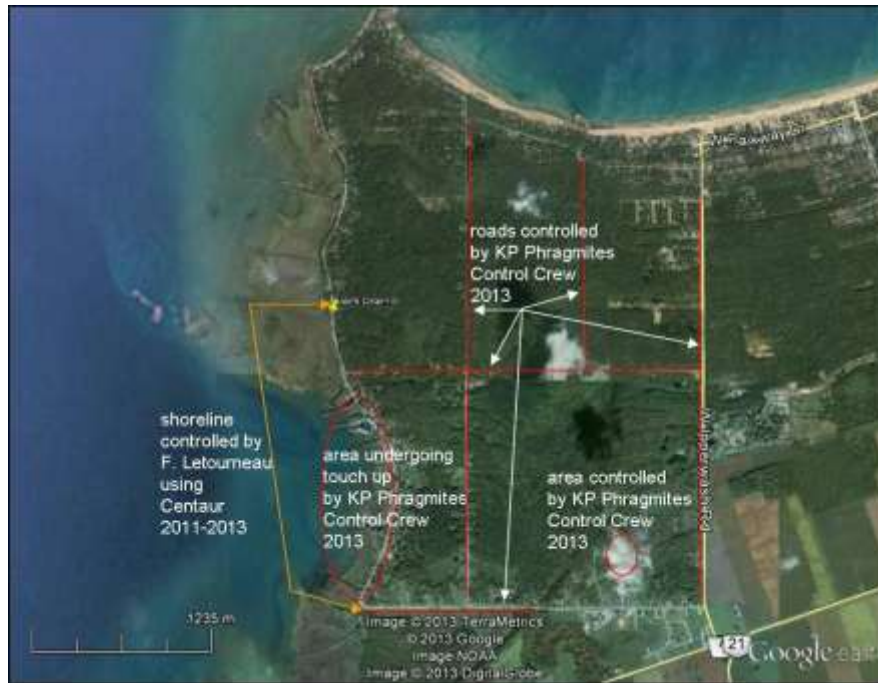
Figure 3. Blue flags illustrate areas throughout the Kettle Point First Nation's property where *Phragmites* was observed and densities recorded.



Approximately 91 ha (222 ac) of the coastal wetland had *Phragmites* present. Of this, ~50 ha (124 ac) had high *Phragmites* density representing 50% to 100% coverage. The remaining acreage had less dense to relatively scattered *Phragmites*. Within the interior wetland sites, ~ 14 ha (~34 ac) had high *Phragmites* densities and ~ 4.5 ha (~11 ac) had *Phragmites* scattered throughout.

In September 2012, ~ 9 ha (22 ac) of coastal wetland were sprayed by Frank Letourneau using his retrofitted Centaur. These areas were burned in early May 2013 and were assessed for vegetation response during the summer of 2013. In the fall of 2013, an additional 12 ha (30 ac) were controlled along the shoreline by Frank Letourneau and his crew using his Centaur (Figure 4). Due to water levels a ~15 m wet fringe along the edge of the lake was not sprayed. F. Letourneau also trained ten of the local residents to control *Phragmites* using a variety of methods and four of these people were hired in the fall of 2013 as the Kettle Point *Phragmites* Control Crew. The Crew managed to control ~80% of the roads, one large interior cell and conducted touch up in 5 large blocks along the shoreline before the cold weather set in and they could no longer use herbicide. They also cut dense *Phragmites* in water and along the edges of the boat channels to prepare sites for next year's control efforts.

Figure 4. Location of areas treated for *Phragmites* within the Kettle Point First Nation Property.



Additional funding will be pursued to support the required continued management of *Phragmites* in 2014 and subsequent years until the infestation is under control. Funding will also be pursued to support a long-term monitoring and rapid response program. The implementation of this program will ensure that *Phragmites* densities do not return to pre-control conditions thereby wasting effort, resources and money.