

Wisconsin State Wildlife Grant #1036

Preserve and Protect Niagara Escarpment in Bayshore Blufflands

Final Report, 1 July 2011 through 30 June 2013

By Daniel J. Collins and Nancy M. Aten

SUMMARY

Significant monitoring and control of widespread populations of priority invasive exotic species Buckthorn (*Rhamnus cathartica* and *R. frangula*), exotic Honeysuckle (*Lonicera* spp.), Olive (*Elaeagnus* spp.), Barberry (*Berberis thunbergii*), Reed Canary Grass (*Phalaris arundinacea*), Watercress (*Nasturtium officinale*), as well as detection and control of isolated early populations of priority invasive exotic species Garlic Mustard (*Alliaria petiolata*), Knapweed (*Centaurea biebersteinii*), exotic Thistle (*Cirsium* spp.), occurred during the report period. These species located on 247 acres within three zones were addressed by local contractors and experienced volunteers. Increased community support for land stewardship in the Bayshore Blufflands SNA is evidenced particularly by (1) a mini-grant program independently launched and underway by the SWG-supporting Bayshore Property Owners Association for adjacent private landowners to get professional assistance to manage exotic invasives; (2) the significant numbers of new people engaged through the five educational hikes and sixteen work days held during the grant period. To improve business development opportunities the contracted work for this grant was divided and offered to two qualified low-bid *local* contractors; this track record and local resource enabled additional funds for this project from US Fish & Wildlife and recently a Weed Management Area – Private Forest Grant through the Door County Soil and Water Conservation Department.

Landscapes of Place LLC
4811 W. Parkview Dr.
Mequon, WI 53092

September 2013

Preserve and Protect Niagara Escarpment in Bayshore Blufflands

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OBJECTIVE 1: Control widespread populations of priority invasive exotic species (e.g. exotic *Rhamnus*, exotic *Lonicera*, *Elaeagnus*, *Berberis*, *Phalaris*, *Nasturtium officinale*)

OBJECTIVE 2: Eliminate isolated early populations of priority invasive exotic species (e.g. *Alliaria*, *Centaurea*, exotic *Cirsium*)

OBJECTIVE 3: Build work demand that supports local restoration contractors to help keep costs down and ensure viable long-term land stewardship.

OBJECTIVE 4: Increase community support for and participation in volunteer land stewardship

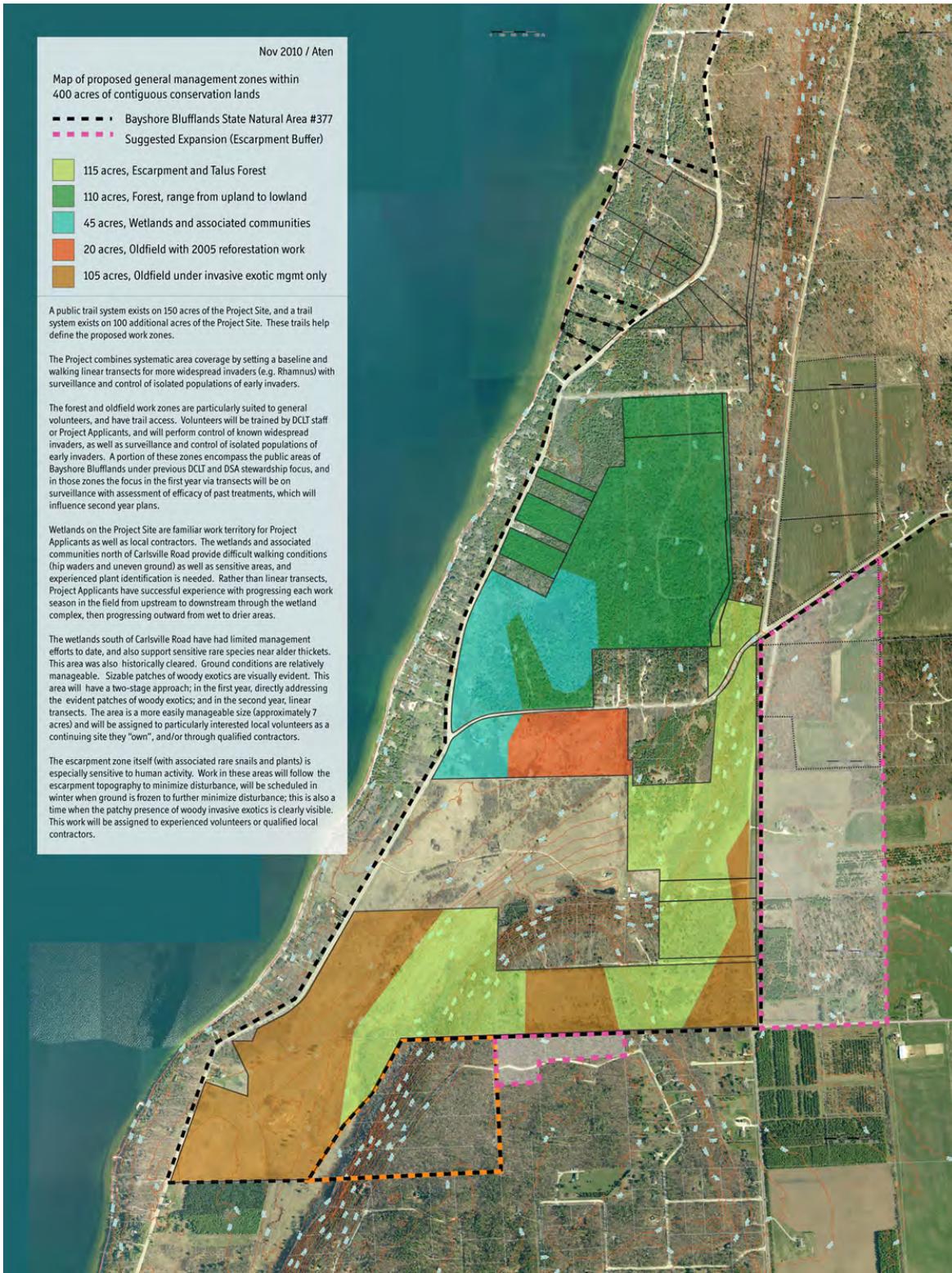
BACKGROUND:

The Project site within the Bayshore Blufflands State Natural Area comprises a contiguous 400 acres, of three landowners: the Door County Land Trust (DCLT), the Bayshore Blufflands volunteer Preserve Steward for DCLT, and the grant applicants.

About one-third of the Project Site has a history of substantial disturbance including clearing for agriculture. The remainder of the Site, although portions have a history of logging and a road cut, supports diverse natural escarpment, forested and wetland habitats, with a robust variety of species. Current floristic quality assessment for the project area is: $n = 288$, FQI = 93. Although the 400 acres are contiguous, its disturbed areas are interspersed. The invasion of exotic species is substantial in the disturbed areas, and this seed source has also spread into the natural areas, threatening their viability. This Project recognized the potential of the block of contiguous protected lands to more easily maintain the overall ecological health -- if the disturbed areas are no longer infested and no longer provide exotic invasive seed vectors.

With a fifteen-year history prior to the grant of substantial cooperative and volunteer-based work in exotic invasive species control, this Project has been aimed at the detection, aggressive control and monitoring feedback necessary to minimize the impact of exotic invasive species in the natural areas of the Site, and to reinforce, build and sustain the volunteer land stewardship community.

Project area by current land cover type:

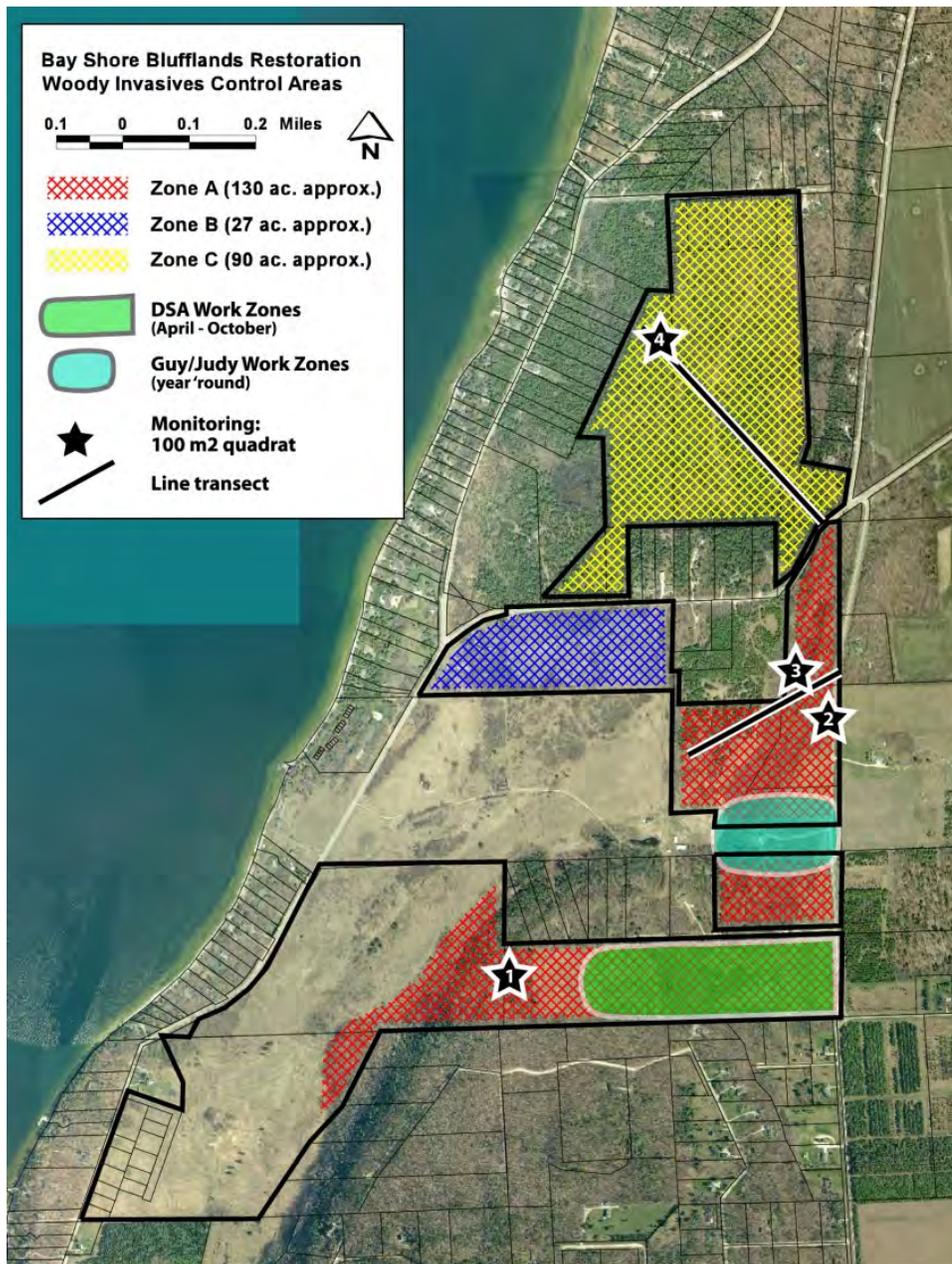


OBJECTIVE 1: Control widespread populations of priority invasive exotic species (e.g. exotic *Rhamnus*, exotic *Lonicera*, *Elaeagnus*, *Berberis*, *Phalaris*, *Nasturtium officinale*) and

OBJECTIVE 2: Eliminate isolated early populations of priority invasive exotic species (e.g. *Alliaria*, *Centaurea*, exotic *Cirsium*)

Control of widespread populations:

For control of widespread populations: Contractor 1 was assigned zone A; contractor 2 assigned zones B and C. This map also shows locations of 100 m² efficacy monitoring quadrats and two line transects for overall progress monitoring.



Work covered 247 acres of the three target zones designated for this project area by both contracted professionals and volunteers providing match hours. Primary species controlled are *Rhamnus cathartica*, *Rhamnus frangula*, exotic *Lonicera*, and *Phragmites*.

Contractors and supervised volunteers all used established BMP control methods and chemical concentrations. Significant execution of control methods were applied throughout the project area. Contractor for zone A estimated 60,000 exotic invasive woody stems treated, in January through March of both 2012 and 2013.



Contractor zone A; area w/ many seedlings



Contractor zone A

Early Detection and Control:

Already-known early invader sites were revisited during Volunteer work days. These include: *Alliaria* invasions along Bayshore Drive and at the intersection of Bayshore and Carlsville Rd; *Nasturtium* invasions in portions of the stream north of Carlsville Rd; and *Cirsium* invasions in portions of the large ephemeral wetland north of Carlsville Rd. Detection of new invasions was noted during volunteer and contractor work days and reports, and control treatment followed or will be scheduled. These include a *Centaurea* population in a recent land acquisition along Bayshore Drive (control treatment initiated by this grant project); and a new Crown Vetch (*Coronilla varia*) population noted in the public lands of Bayshore Blufflands during an educational hike and reported to DCLT.

Monitoring: Four 100 m² circular test quadrats were completed before and after the contract work. Two linear transects for woody exotic invasive cover were completed in the fall of 2012 and summer of 2013. With these baselines and post treatment data, some level of assessment of the efficacy of the treatment can be attempted, and the overall scope of progress. See Discussion, and data follows in Appendix A.



Quadrat 1, November 2011



Quadrat 1, Aug 2013, good control results



Quadrat 3, August 2013, effective control (arrow), with conditions of prolific past seed germination; future monitoring and control needed.



Quadrat 4, November 2011, showing extremely dense and multi-age buckthorn infestation. This will be a multi-year control effort.

Discussion and Attainment of Goals:

Floristic quality assessment for the entire project area stands at: $n = 288$, $FQI = 93$. In most of these acres the coverage of exotic invasive species can be described as sparse or non-existent. Select areas within the targeted zones that have ideal conditions for exotic invasives and robust seed banks show signs of strong exotic invasive seed and seedling persistence. The work of exotic invasive removal is being continued with a follow-on Weed Management Area – Private Forest Grant along with extensive on-going volunteer activities by DCLT, Door Stewardship Alliance and Bay Shore Property Owners Association (BSPOA). Both contractors have made recommendations for timing and priority of future work.

Qualitatively, good progress was made under this grant to preserving the habitat and unique areas on and near the Niagara Escarpment currently occupied by SGCN. Extraordinary treatment coverage of the land areas was achieved eliminating many populations of exotic invasives. 2011 and 2012 contractor meetings communicated and clarified the “hot spots” where we wanted to ensure good coverage, and elimination in those zones of large, dense fruiting populations was very successful. The unified effort of the community of stakeholders continues to demonstrate its capacity to protect and restore this land.

The circular quadrats were located on the margins of known major weed populations -- that is, would not be in the middle of the primary hot-spot target areas for work, but the margins. We were interested to assess efficacy in the margins. Monitoring data indicates that in some areas the treatment protocols work quite well and in some specific areas they didn't. For example, although quadrats where contractor work was completed show 95% treatment on large stems, on average the 18-month efficacy is 68%. Resprouts were observed largely not at the cut stump, but from the below-ground root system. The specific areas where treatments didn't work seem to correlate with conditions favoring invading species (hydric, eutrophic, or competitive), apparent age of infestation and density. These parameters (conditions, infestation age and density) are not currently collected by the project team but are considered for future work.

Line transects that recorded cover did not record age/size classes. Notes during surveys indicate that post-treatment surveys have fewer larger/fruiting specimens and that previously present larger specimens were accompanied in some cases by young seedlings in the baseline surveys. The line transects as completed did not effectively reflect reduction of mature

plants, when seedlings were also present. We recommend that future transects consider age/size classes or abundance at each pace.

Variance from plan

The coordinated plan, using both volunteer and contractor efforts, has proceeded as planned. Informal feedback from contractors and discussion in our August 2012 mid-point update meeting has kept us on the same track. We did re-prioritize work concentration zones with contractors during at the mid-point meeting to ensure certain tasks were completed.

Volunteer and In-kind work:

Sixteen volunteer work days were held at the Bayshore Blufflands during the project which were attended by 31 different individuals. At these work days more than 260 hours of volunteer efforts were applied to removal of invasive exotic species at the Bayshore Blufflands. These workdays were coordinated and managed on site by the DCLT staff (Jodi Milske and Bobbie Webster) for the Door Stewardship Alliance or by the DCLT Preserve Stewards (Guy Fortin and Ron Maloney) or by BSPOA.

In addition to the above hours, preserve stewards Guy Fortin and Judy Samida have logged 130 additional volunteer hours at the site during the grant period.

Grant recipient Nancy Aten and Dan Collins have logged 220 volunteer hours in addition to the above hours during the grant period.

The DCLT has provided more than 120 hours of staff time in the administration, organization and implementation of grant activities and exotic invasive removal efforts.

At the completion of the grant cycle a total complement of \$9,040 of required in-kind match hours, supplies, equipment and funds set out in the grant application was exceeded and is valued at \$11,935.



Typical work days at Bayshore Blufflands,
31 Jan 2012



10 April 2012 (garlic mustard control of
identified isolated population)

OBJECTIVE 3: Build work demand that supports local restoration contractors to help keep costs down and ensure viable long-term land stewardship.

To support this objective, the contracted work for this grant was divided and offered to two qualified low-bid *local* contractors; this track record and local resource enabled additional funds for this project from US Fish & Wildlife and recently a Weed Management Area – Private Forest Grant through the Door County Soil and Water Conservation Department.

OBJECTIVE 4: Increase community support for and participation in volunteer land stewardship

Posters: A large format version of this poster was placed at the upper and lower kiosks for the Bayshore Blufflands and cross-posted on the Niagara Escarpment Resource Network (NERN) website.

Preserve and Protect Niagara Escarpment in Bayshore Blufflands State Wildlife Grant 2011-2013

Goals:
 Management and removal of exotic invasive plant species that threaten the habitat of the Niagara Escarpment in the Bayshore Blufflands State Natural Area #377. Preserving habitat and protecting ecologically significant areas here is fully consistent with goals of local town, county, and conservation organizations working in the area.

Over the past eight years cooperative endeavors have thwarted much of the expansion of exotic invasive plants and made significant progress in remediation. Thousands of hours of volunteer time, as well as substantial staff time, have been devoted to controlling buckthorn and honeysuckle in particular. Grant funds to supplement volunteer work with qualified contract work has been crucial to the progress made to date.

We will:

- Control priority invasive exotic species (e.g. buckthorn, honeysuckle, barberry, reed canary grass, watercress) using best management practices.
- Eliminate isolated early populations of invasive exotic species (e.g. garlic mustard, spotted knapweed, exotic thistles).
- Increase community support for and participation in volunteer land stewardship.
- Support local restoration contractors. This helps keep costs down and helps ensure viable future land stewardship.

This two-year habitat project is a community and government effort. Major funding and staff support from:

Donated assistance, loans of equipment, grant administration, and countless community and neighborhood volunteer work hours from:

Working shoulder-to-shoulder with two local Door County contractors, hired through a qualified low bid process.

Hikes & Gatherings:

Jodi Milske, DCLT, spoke about the SWG project to a meeting of the Bayshore Property Owners' Association. Several BSPOA members have been actively engaged in the SWG volunteer work.

At least five public outreach hiking events explaining the work under this grant occurred at the Bayshore Blufflands during the grant period: August 4th 2011; June 14th 2012; July 12th 2012; October 25th, 2012 for the Wisconsin Environmental Educators Association (presenting were Bryan Troutman of BSPOA, Terry Cooper of DCLT, Nancy Aten of Landscapes of Place, Dan Collins of Landscapes of Place and Paul Regnier of Door County Nature and Travel); and June 29th, 2013 for the Niagara Escarpment Resource Network and Lakeshore Natural Resources Partnership.

These hikes had *non-overlapping* participants: that is, we engaged a significant number of new people. The SWG activities were described at the events by key experienced volunteers and contractors so that the attendees would understand the nature of the partnership between volunteers, contractors, WDNR and the SWG funders.



Guy Fortin at the DCLT hike
July 2012



Bryan Troutman at the WAAE event October
2012



NERN event poster and email
June 2013



Bob Bultman at NERN event
June 2013

Mailings:

One mailing for a hike event targeting 60 neighbors of the Bayshore Blufflands that are not already active with either the DCLT or the Bayshore Property Owners Association was attempted to broaden participation. No responses were received.

Personal outreach:

Several of the significant land owners (including Beaver, Werkheiser) were informed of the SWG activities through periodic personal phone calls or visits. This extra step was taken as their larger land holdings have some significant hydric and environmental impact on the Bayshore Blufflands. Also included in personal contact were landowners that had tracts adjacent to significant treatment zones.

Facebook:

The Bayshore Blufflands presence on Facebook <http://www.facebook.com/bayshoreblufflands> provides another way to keep stakeholders engaged in the activities. It has received good traffic and offers great photos and updates.

Newsletters:

The SWG activity has been covered in newsletters by the Bayshore Property Owners Association (BSPOA) and the Door County Land Trust.

Of special significance, mini-grant program independently launched and underway by the SWG-supporting BSPOA for adjacent private landowners to get professional assistance to manage exotic invasives.

Project photos:

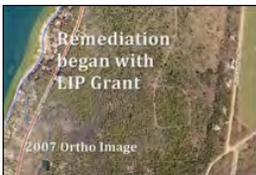
Project photo albums are found at <https://picasaweb.google.com/atencollins> . These albums offer shared images from work days, hikes, flora and fauna. This photo album is an ongoing on-line resource for this project site.

Project related video:



Dan Collins featured in Door County Today TV Show about the Door County Land Trust at Bayshore Blufflands Preserve.

http://www.youtube.com/watch?v=l9qLa4bbmTw&feature=bf_prev&list=PL9C4BE3C4C045B483&f=plpp_video#t=6m30s



Before and after Road Scar Remediation progress video at Bayshore Blufflands Preserve.

<http://www.youtube.com/watch?v=7aq-AgpeeVE>

Project visibility:

Aten/Collins have an accepted symposium and abstract for the Society for Ecological Restoration's World Conference in Madison, WI in October 2013, which discusses the important role of community in large-scale land stewardship activities, and will highlight the SWG work.

ACKNOWLEDGEMENTS:

Partner and Stakeholder activity and assistance vital to the success of this project includes:

- **Wisconsin Department of Natural Resource (WDNR):** Provided guidance, professional consulting services on project and planning, overall program coordination, program funding and administration.
- **US Fish and Wildlife Service (USFWS):** Provided professional services help with project coordination planning and supplemental funding to meet key goals (the SWG funding amount was less than was requested).
- **Door County Land Trust (DCLT):** Provided more than one-hundred twenty hours of project coordination, work-day facilitation, safety policy establishment, safety training, outreach event hosting and coordination, contractor bid coordination, Preserve Stewardship program administration, guidance on technical issues and project logistics
- **Door County Soil and Water Conservation Department (SWCD):** Provided project maps, digital services to customized maps/layers, large format printing, staff access and offers to lend equipment. Large format maps are used at several hikes and gatherings to convey project work progress. SWCD of Door County is a ready partner, knowledgeable on issues relating to conservation. They have sponsored a follow-on Weed Management Grant through the Private Forest Grant Program to support on-going efforts to control exotic invasive plants in the project area.
- **Bay Shore Blufflands Preserve Stewards:** Guy Fortin, Judy Samida, Ron Maloney and Jack Van Lanen -- provided countless hours of exotic invasive removal, trail maintenance, work-day coordination.
- **Bayshore Property Owners Association (BSPOA):** Provided ongoing support with numerous volunteer hours of exotic invasive removal at the Blufflands. The BSPOA have also renewed their 400 hour commitment to the DCLT for volunteer work removing exotic invasive species. They have instituted an invasive species eradication program offering matching fund for use by members, some are in or adjacent to the Bayshore Blufflands SNA. The BSPOA have also hosted and supported hikes in the project area.
- **The Nature Conservancy:** Provided professional consultation on project planning and grant planning.
- **Niagara Escarpment Resource Network (NERN):** Hosted an educational hike event for NERN and Lakeshore Natural Resources Partnership members at the Bayshore Blufflands. Cross posting activities, events and information relating to the project.

Appendix A: Monitoring Data

2011 Aten/ Collins	SWG - Bayshore Blufflands – Woody Invasive Exotics	100 m2 Baseline Quadrats Fall 2011	100 m2 Baseline Quadrats Summer 2013
	These are the baseline surveys for four permanent quadrats, designed to assess efficacy of 2-year control plan.		
	Method: permanent stake at center; visible flagging in nearby tree.		
	Radius rope walked around center, 1/8 circle at a time, one person counts in inner radius, one in outer part of radius.		
	At each 1/8 circle stop, jointly clarified boundary specimens each time by breaking stem, to not double-count.		
	One record-keeper (Aten).		
Site 1	Public area of BB, west of upper meadow, near center N-S, 200' beyond meadow		
	GPS N44deg56.257' W87deg22.710', +/- 31'		
	Aten/Collins survey date	18-Nov-2011	19-Aug-2013
	Buckthorn < 1/2"	0	0
	Buckthorn > 1/2"	0	0
	Honeysuckle < 1/2"	31	15
	Honeysuckle > 1/2"	7	1 ^r
Site 2	Upper area of BB, North of Fortin/Samida		
	GPS N44deg56.604' W87deg22.100' +/- 24'		
	Aten/Collins survey date	18-Nov-2011	19-Aug-2013
	Buckthorn < 1/2"	69	22 plus 13 ^r
	Buckthorn > 1/2"	33	2 plus 11 ^r
	Honeysuckle < 1/2"	37	20
	Honeysuckle > 1/2"	4	0
Site 3	South of Carlsville, below escarpment, e. of s. end of n. most field		
	Aten/Collins survey date	21-Dec-2011	19-Aug-2013
	Site with many small seedlings, altered protocol to 1/4" diameter separation		site does not seem treated
	Buckthorn < 1/4" Note: approximate, as there were many small seedlings	104	70 plus estimated 300 < 3" tall
	Buckthorn > 1/4"	3	3

	Honeysuckle < 1/4"	4	6
	Honeysuckle > 1/4"	4	1 ^r
Site 4	North of Carlsville, off Bayshore Drive, the "hot spot" behind TNC parcels N44deg 57.142' W87.22.432' +/- 21'		
	Aten/Collins	21-Dec-2011	19-Aug-2013
	Site with incredibly dense buckthorn/seedlings; altered protocol to skip those shorter than 12"		site not treated, affirmed prior
	Buckthorn < 1/4"	377	same as 2011
	Buckthorn > 1/4" Note: some were > 8' tall	294	same as 2011
	Honeysuckle < 1/4"	0	
	Honeysuckle > 1/4"	0	

^r = re-sprout count

Assessment of treated site efficacy (sites 1 & 2 only) treated in January 2012 and March 2012 with 30% glyphosate, site 1 treated on or about January 2012, site 2 treated on or about March 2012.

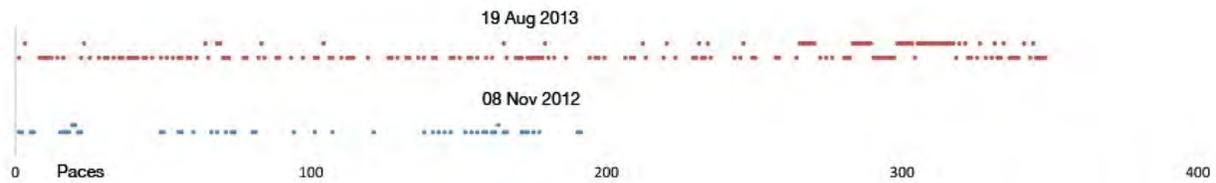
	Pre treat count	Stems treated	% coverage of stems	treated stems minus resprouts	efficacy %
Large stems:	44	42	95%	30	68%
Small stems:	137	80	58%	67	49%

Following page summarizes line transect data. Method: Person 1 keeps and counts uniform pace and records data; person 2 keeps compass line and, using arms' width method, calls out presence of buckthorn and/or honeysuckle at any pace, regardless of size or quantity at that pace.

Line transect 1 crosses the escarpment and talus slope; as data indicates, keeping uniform pace and direction was difficult. Line transect 2 also crosses talus slope but infestations were quite low and crossing angle was wider.

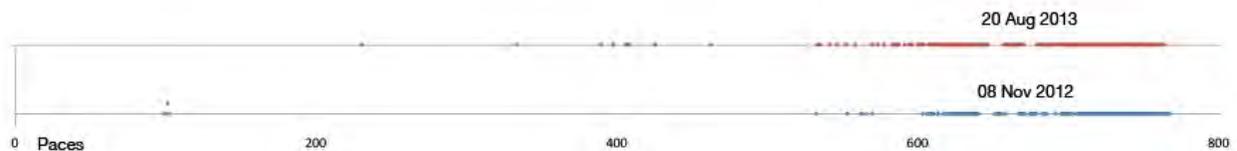
This would have been more useful to assess treatment efficacy if small plants were ignored. Future transects will consider age/size classes or abundance at each pace.

Line Transect 1 (South)	Line Transect 1 re-run
8-Nov-12	19-Aug-13
s. of C'ville Rd. @ Reynolds Rd. across from util pole perm wood stake, @ large birch	s. of C'ville Rd. @ Reynolds Rd. across from util pole perm wood stake, @ large birch
N44 deg 56.996'	N44 deg 56.996'
W87 deg 22.095' +/- 21'	W87 deg 22.095' +/- 21'
	N44 deg 56.511'
	W87 deg 22.383'
25% cover	54% cover
app. 135 deg w of n (225 deg)	app. 135 deg w of n (225 deg)



Line Transect Woody Invasive Presence Scatter Chart,
each dot represents presence of a woody invasive of any size at the pace location along the transect

Transect 2 (North)	Transect 2 re-run
8-Nov-12	20-Aug-13
s. of C'ville Rd. @ bluff ledge Rd.	s. of C'ville Rd. @ bluff ledge Rd.
perm wood stake	perm wood stake
N44 deg 56.992'	N44 deg 56.996'
W87 deg 22.224' +/- 40'	W87 deg 22.095' +/- 21'
approx 48 deg w of north (312 deg)	approx 48 deg w of north (312 deg)
17%	22%
8-Nov-2012 raw data	20-Aug-2013 raw data



Line Transect Woody Invasive Presence Scatter Chart,
each dot represents presence of a woody invasive of any size at the pace location along the transect

Appendix B: Contractor Scope of Services

Methods of Control

All mature (fruiting) plants and all stems greater than 0.5 inch diameter or taller than 20 inches will be treated using cut stump or basal bark treatment. Non-fruiting plants smaller than the size stated above may be treated using hand pulling, or with a foliar herbicide application provided that rare plant species are not present.

Cut-stump Method: Targeted stems, ½ inch in diameter and larger, are cut at a height no greater than 6 inches from the ground or at the snow line if snow is present, and an appropriate chemical at a concentration documented to be effective in controlling the target species is applied directly to the cut stump via a hand spray bottle or sponge applicator, so that the outer cambium layer of the stump is saturated with herbicide. This procedure confines the chemical to the stump and reduces potential for collateral damage on non-target species. Cut-stump treatment method is particularly effective late in the growing season (September – October), but is also effective in the dormant season (November-April). Cut stems will be left where cut.

Foliar Spray Method: For smaller individuals, a foliar spray applied late in the growing season may be used.

Phragmites Zone:

Contractor will treat a patch of *Phragmites australis* approximately 80 x 220 feet in size, using an appropriate and approved herbicide for the conditions, with timing of treatment designed to ensure optimum success. The treatment will occur on two successive years, 2011 and 2012.

For all zones:

- Control methods must minimize collateral damage to non-target species.
- Contractor will guarantee at least 90% effective control of target species in the control area or will retreat the area at no additional cost.
- This work is to be completed and all reports submitted by March 31, 2013.
- Satisfactory completion of the control project will be determined by Door County Land Trust staff based on visual site inspection for compliance with the above criteria.

All regulatory permits and approvals, including water and wetland regulatory permits required by federal, state, and local agencies, are the responsibility of the Contractor and must be completed before work begins.