

## Wagner Natural Area Eco-island Restoration Project

In 2018 the Edmonton Native Plant Society was approached by Hanneke Brooymans of Alberta Environment and Parks to apply for a creative sentencing grant to undertake a project that involved the creation of native plant beds by planting with local native plant species.

The project eventually decided upon was the establishment of two eco-islands, small areas of planted natural vegetation, in two old fields in Wagner Natural Area (WNA) near Spruce Grove<sup>i</sup>. Eco-islands are a type of restoration practice in which small areas of native vegetation are planted within disturbed ecosystems with the prospect that this vegetation will serve as a nucleus for spread to cover and restore a much larger area with natural plant communities. This concept of spread has not yet been tested locally, largely because of the large time-frame involved, but two other eco-islands had previously been successfully planted in WNA in 2013, indicating that establishment of the islands themselves is feasible. Eco-islands have the advantage over full-field restorations in that they can be carried out with limited funds, although the desired result is delayed over a longer period.

The fields in WNA chosen for the project were Osborne Field in the southeast end of the Natural Area and Villeneuve Field in the northeast. Osborne Field had previously been cultivated, but then abandoned, with the result that it is currently a field of timothy, thistle and dandelions; Villeneuve Field has been a pasture field for more than half a century, of predominantly Kentucky bluegrass, smooth brome and alfalfa. It is desirable that provincial Natural Areas should consist predominantly of natural vegetation. Of the two eco-islands that had previously been constructed in Osborne Field, one (Osborne eco-island # 2), in which the non-native ground cover was removed by herbiciding followed by cultivation, has proved particularly successful, with good growth of planted aspen and other native trees, shrubs and herbaceous plants. It was agreed that this could serve as a model for the creation of two further eco-islands. The Edmonton Native Plant Society (ENPS) would be the applicant, and would work cooperatively with Wagner Natural Area Society (WNAS), who are stewards of WNA under the Provincial Government's Stewards Program, and hold a recreational lease to the site. Discussions to this effect took place in January, 2019. The contractor who had been involved in the creation of Osborne eco-island # 2, Eckehart Marenholtz, of Chickadee Farm Herbs Ltd., agreed to undertake the contract for the project if the application was successful.

In preparation for applying for the grant, scoping for locations for the eco-islands in Osborne and Villeneuve Fields began on May 23, 2019 with representatives of the ENPS and the WNAS, and the contractor, taking part. Once site locations of the approximately 60-metre square plots had been determined (by further visits in June, 2019), the process of obtaining approval from the Lands Division of Alberta Environment and Parks to authorize an alteration to the land base was begun. This required completing a Temporary Field Authorization application.

A grant for \$30,000 was awarded to the ENPS on July 15, 2019, by Court order.

Cultivation of the eco-island sites in Osborne Field and Villeneuve Field took place in early fall 2019, by the contractor, using mechanical equipment but no herbicide. The bare ground was allowed to lie fallow during the winter. Cultivation was repeated in the spring of 2020. However, the Villeneuve site proved to very wet, with hand-digging required to obtain bare soil, and too wet to plant with aspens. Hence, in order to achieve two eco-islands, the decision was made to create a second eco-island in Osborne Field (no. 4). This was a slightly more mesic site than Osborne no. 3 and there was time only for one

cultivation of no. 4 prior to planting. Eco-island Osborne no. 3 was planted on June 12, 2020, by the contractor, with some supplemental planting of herbaceous material by ENPS, and Osborne no. 4 was planted on June 19, with hemp mats to provide a mulching function installed at the same time. Native woody stock – trees and shrubs – came from a nursery in Bonnyville and from an unknown provenance in central Alberta, while the herbaceous material had a more immediately local origin and was largely grown by ENPS from wild-harvested seeds. Herbaceous species chosen were early successional species that would establish quickly, such as goldenrods and asters, as well as rhizomatous ground covers such as Canada anemone. Villeneuve eco-island was deemed dry enough to plant by the contractor on August 11, following further cultivation. Here the stock planted was suitable for moister sites such as river alder and red-osier dogwood. This resulted in the construction of three eco-islands rather than the two of the original objective.

Hemp-fibre mats, squares with a slit to go around the stem like a collar, were placed around all the woody transplants, and staked to hold them in place. The periphery of the transplanted area also received a hemp mat border as a buffer against invasion of non-native plants from the field. All eco-islands were fenced with wire mesh fencing (2-3 metre high) to protect the tender transplants from herbivory by deer and moose. Some of this fencing was repurposed fence from Osborne eco-island no. 2, created in 2013. The extent of any further herbivory damage to Osborne no. 2 (after 7 years) could thus be monitored, in order to determine the amount of time the fencing needs to be in place around the new eco-islands.

Transplant survival has been good (> 90%), with only a small number of trees and shrubs having to be replaced. Growth of weeds from the seed bank, particularly common dandelion, Canada thistle, timothy and Canada bluegrass, was likewise good, and weeding by pulling and digging was begun within weeks of planting. (2020 was a year of high precipitation.) Weed growth was particularly bad in Osborne no. 4, which hadn't received a second cultivation, and the decision was made to mulch both Osborne sites as a weed control measure. Lawn clippings dumped in a roadside ditch by acreage landowners provided an immediate source. Since Villeneuve had been cultivated and planted later than the other two sites, weeds were at an earlier stage or remained ungerminated so achieving clean ground proved much easier at this site. Further, its wetter soil featured in the decision not to mulch it. The Osborne eco-islands were thoroughly weeded by hand pulling before the lawn mulch was placed.

Overwintering survival during 2020-2021 was good at all sites, and initial on-the-ground work in 2021 consisted mainly of weed removal, carried out both by the contractor's team and paid workers and volunteers. (Board members of the two societies, ENPS and WNAS, could not be paid personally, so the value of their labour accrued to their respective societies.) The lawn mulch proved inadequate to contain weeds so by August, 2021, it was decided to apply wood chip mulch, obtained free from ChipDrop, and in greater depths, to both Osborne eco-islands. Again, the mulch was applied after thorough hand-weeding of both sites. Villeneuve was again not mulched, for the same reasons. Despite deteriorating relatively quickly over the winter, the collar mats proved somewhat useful in allowing the tree and shrub transplants a competition-free period for initial establishment. However, the peripheral bands of hemp mat proved easily penetrable by the major perennial weeds such as timothy, Canada bluegrass, Canada thistle and dandelion and so did not succeed in providing a buffer zone for the islands. Weeds grew readily in the bare ground between the transplant mats, indicating that weed control is an issue in restorations carried out in agricultural fields.

Transplant survival during the winter of 2021-2022 was again good. Weed control continued during 2022. Again, by mid-summer it was clear that the wood chip mulch had proved inadequate to retard weeds and that further weed removal would be necessary and ongoing. There is a persistent weed seed bank in this old cultivated field, and high spring precipitation in 2022 promoted rampant weed growth. It is interesting to note that weed growth was observably more luxuriant in Osborne no. 4, which had not received a second cultivation, than in nearby Osborne no. 3. Comparison with Osborne eco-island no. 2, created in 2013, is also of interest. Here the planting stock was similar to that used in the project islands in Osborne, with aspen and balsam poplars, a small amount of birch and white spruce, and native shrubs such as red-osier dogwood, buckbrush, snowberry, willows, rose and Canada buffaloberry. However, the site, following clearing to bare ground, was also planted with native herbaceous material and now has an understory of herbs, such as late goldenrod, Canada anemone, great northern aster and wild strawberry. These do not approximate a reference woodland community in Wagner NA, but are at least native. This island was cultivated only once, following application of herbicide to kill existing vegetation, and regular weeding, using both herbicide and hand pulling, was continued for at least 3-4 years, with sporadic control thereafter. The practical value of herbicide in allowing establishment of native vegetation in a surrounding environment where the vegetation is non-native and invasive seems clear. (In Osborne eco-island no. 1, which was planted with native shrubs without clearance of non-native ground cover, growth of the shrubs has been slower and the ground cover remains non-native.)

Ongoing maintenance of all three project eco-islands will consist of monitoring, weed control, and possibly replacement or further in-fill planting if necessary. The Osborne eco-islands are easy to access for interpretation and demonstration purposes; Villeneuve eco-island is a little more difficult to access off busy Highway 16. A biological survey of the islands may be undertaken in 2023.

Both the ENPS and WNAS are grateful for the opportunity to promote restoration in Wagner Natural Area. An extensive project of bio-control Canada thistle was also initiated in Osborne and Villeneuve Fields this year, as well as use of herbicides to control other noxious weeds such as common tansy and orange and meadow hawkweed. The eco-islands will be included in a management review of the Natural Area in the future.

Submitted by Patsy Cotterill  
ENPS Project Lead

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<sup>i</sup> Wagner Natural Area was set aside as a provincial protected area in 1976 in recognition of its rich calcareous fens, although it included some upland areas that were used for pasture (Villeneuve Field) or logged. It was expanded over the years and now includes more old fields to the south, including Osborne Field.

## CREATIVE SENTENCING TERM AND FINAL REPORT

Please fill in all project expenditures in the appropriate section below.

### PROJECT TITLE

Wagner Natural Area Eco-islands

Project leader name and title:	Patsy Cotterill
Name of organization:	Edmonton Native Plant Society (ENPS)
Contact info:	nutmeg@telus.net (Patsy); edmontonnativeplantsociety@gmail.com

### WORK TERM PROGRESS DESCRIPTION

Time period: November 1, 2021- July 7, 2022

With the three eco-islands established, further work was confined to weed control in the month of June. Weed control in the Villeneuve eco-island was done both by volunteer and by labour funded by the Edmonton Native Plant Society. With Creative Sentencing funds running low, monitoring and administrative work were done pro bono, as was some work involving residual fencing. Future weed control and monitoring will also be carried out by volunteers, organized by the Edmonton Native Plant Society and the Wagner Natural Area Society. The application of mulch has worked well to dampen weed growth in the Osborne eco-islands but encroachment of timothy from the field at the periphery remains a problem. Survival of planted trees, shrubs and herbs has been excellent, maintained by high moisture levels this spring. Work will continue on these eco-islands on a volunteer basis. Survival will continue to be monitored, and weeds controlled. The fencing will be maintained until the trees and shrubs are large and robust enough to withstand browsing by deer and moose, after which it will be removed and re-purposed. Outreach events will be organized to explain to an interested public the concept of eco-island restoration and how such islands of native vegetation are established. These three additional islands continue an initiative started by the Wagner Natural Area Society in 2013 with the ultimate objective being for these eco-islands to serve as nuclei for full-field restorations. The grant has allowed the Edmonton Native Plant Society to offer their labour and administrative resources as well as their knowledge of and experience with plants and planting skills to enhance the wildness and resilience of this important local Natural Area. The further experience gained from the project may be applied to future opportunities to promote natural succession in Wagner's old fields.

Wagner Natural Area Eco-islands Project

**A. Labour costs**

**Human resources: Wages and salaries**

Position	Total hours on project	Rate/hour	Total project amount
Field assistant 1 (adult rate)	4.5	\$30.00	\$ 135.00
Field assistant 2 (adult rate)	3	\$30.00	\$ 90.00
Travel expenses -field assistant (1)	40 km	\$0.5/km	\$ 20.00
Travel expenses -field assistant (2)	42 km x 3 trips	\$0.5/km	\$ 63.00
Administrative costs (report writing) including volunteer input			\$8.76
<b>SUBTOTAL LABOUR COSTS =</b>			<b>\$ 316.76</b>

**B. Material Project Costs**

Type	Description	Total cost
Capital Expenditures / Equipment Purchase		
Site Supplies & Materials		
Rentals (equipment, vehicle, helicopter)		
Rentals (equipment, vehicle, helicopter)		
Rentals (equipment, vehicle, helicopter)		
Other: GST at 5%		
<b>SUBTOTAL MATERIAL COSTS =</b>		<b>\$ -</b>

**C: Overhead/Administration**

Category	Description	Total project cost
Office space, utilities, etc.		
Office supplies		
Printing/photocopying		
Administration fee		
Sub-contractor admin fee (if not included in labour cost)		

Wagner Natural Area Eco-islands Project

Other		\$	-
<b>SUBTOTAL OVERHEAD COSTS =</b>		\$	-

**D. Project Expenditure Summary**

*Please insert the subtotals from above:*

	Total Project Amount
<b>Labour Costs</b>	\$316.76
<b>Material Costs</b>	\$0.00
<b>Overhead Costs</b>	\$0.00
<b>Total Spent in final term</b>	\$316.76

<b>Original CS fund amount</b>	\$ 30,000.00
<b>Amount spent Oct 2019 to June 2020</b>	\$ (13,948.76)
<b>Interest earned on account up to June 2020</b>	\$ 270.30
<b>Amount spent July-October 2020</b>	\$ (9,184.25)
<b>Interest earned this term</b>	\$ 5.07
<b>Amount spent Nov 2020-July 2021</b>	\$ (3,574.96)
<b>Interest earned on account</b>	\$ 1.48
<b>Amount spent July 15, 2021-October 31, 2021</b>	\$ (3,252.12)
<b>Interest earned on account</b>	\$ -
<b>Amount spent November 1, 2021 - July 7, 2022</b>	\$ (316.76)
<b>Interest earned on account</b>	\$ -
<b>CS fund remaining</b>	\$ (0.00)