Species at Risk Act
Recovery Strategy Series

Report on the Progress of Recovery Strategy Implementation for the Eastern Prickly Pear Cactus (*Opuntia humifusa*) in Canada (2018 – 2022)

Eastern Prickly Pear Cactus

February 2023

Parks Canada Parcs Canada

Canada

Recommended Citation

Parks Canada Agency. 2023. Report on the Progress of Recovery Strategy Implementation for the Eastern Prickly Pear Cactus (*Opuntia humifusa*) in Canada (2018 – 2022). Species at Risk Act Recovery Strategy Report Series. Parks Canada Agency, Ottawa. 9 pp.

For copies of the action plan, or for additional information on species at risk, including Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Status Reports, residence descriptions, recovery strategies, and other related recovery documents, please visit the Species At Risk Public Registry.[1]

Cover illustration: © Parks Canada Agency. Eastern Prickly Pear Cactus at Point Pelee National Park of Canada, photo credit: Jim Flynn.

French title:

Rapport sur les progrès de la mise en œuvre du programme de rétablissement de l'oponce de l'Est (Opuntia humifusa) au Canada (2018-2022)

ISBN: En3-4/84-1-2023E-PDF

Catalogue no. 978-0-660-47577-6

[1] https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html

Introduction

The final *Recovery Strategy for the Eastern Prickly Pear Cactus (Opuntia humifusa)*[2] *in Canada* was posted on the Species at Risk Public Registry on November 30, 2010. The recovery strategy included population and distribution objectives for the species and listed broad strategies and approaches to reduce threats to the species and attain the recovery objectives. The recovery strategy also included the identification of critical habitat for Eastern Prickly Pear Cactus. Under section 46 of the *Species at Risk Act* (SARA), the competent minister must report on the implementation of the recovery strategy, and the progress towards meeting its objectives, within five years after its inclusion on the public registry and in every subsequent five-year period, until the objectives have been achieved or the species' recovery is no longer feasible.

The first implementation report for Eastern Prickly Pear Cactus was published on the Species at Risk Public Registry in 2018 (*Report on the Implementation of the Recovery Strategy for the Eastern Prickly Pear Cactus (Opuntia humifusa) in Canada (2010 – 2017)).* This current document updates the implementation progress for the recovery strategy over the period 2018-2022 and fulfills reporting requirements for recovery strategies, as per Section 46 of SARA.

Eastern Prickly Pear Cactus was included in the *Multi-species action plan for Point Pelee National Park and Niagara National Historic Sites of Canada*, which was published in 2016. Please refer to the *Implementation Report: Multi-species Action Plan for Point Pelee National Park of Canada and Niagara National Historic Sites of Canada (2016-2021),* published in 2022, to obtain information on the implementation of recovery actions for Eastern Prickly Pear Cactus, as well as progress towards meeting the ecological and socio-economic impacts of the action plan, as required under section 55 of SARA.

Progress towards Meeting Population and Distribution Objectives

The *Recovery Strategy for the Eastern Prickly Pear Cactus (*Opuntia humifusa*) in Canada* identified objectives focused on the two known naturally occurring sites in Canada:

1) *to maintain and increase the number of microsites (345) of the Eastern Prickly Pear Cactus in Point Pelee National Park over the next five years, and to increase the total number of microsites by 5% over the next 10 years.*

2) to maintain the population size (five microsites) at Fish Point Provincial Nature Reserve on Pelee Island.

Point Pelee National Park:

The microsite objectives set for the population at Point Pelee National Park have been met. Point Pelee National Park has developed a monitoring program for Eastern Prickly Pear Cactus (hereafter EPPC), using protocols established for measuring both the number of microsites

[2] The species *Opuntia humifusa* recognized as a Schedule 1 species under SARA has now been revised *to Opuntia cespitosa* and native Ontario plants belong to it rather than *O. humifusa* (Majure et al. 2017). This revision is accepted, however in this report all references to the species level of the cactus are to the published recovery strategy of *O. humifusa*, so the nomenclature has not been altered.

(clumps of cactus with less than 1 m separation) as well as pads (or cladodes which are the flat, fleshy pads of the cactus that are covered in spines; hereafter called cladodes). The monitoring program began as a complete park survey in 2005 conducted by the University of Windsor. The survey was followed by development of a stratified sampling design, where a subset of plots is monitored on a 3-year rotating schedule (2015-2017 and 2019-2021). This has resulted in comparable population estimates at the 80% confidence level which has been used to determine the population change since 2005, as well as the change between the two 3-year monitoring periods. Estimates of the number of microsites and cladodes are found in Table 1 and Figure 1.

Table 1. Estimates (± standard error) of the number of microsites and cladodes in the Eastern Prickly Pear Cactus population at Point Pelee National Park.

Monitoring Period	Microsite Population Estimate	Cladode Population Estimate
2005	345	21,600
2015-2017	604 ± 66	90,821 ± 15,743
2019-2021	548 ± 55	99,431 ± 20,546

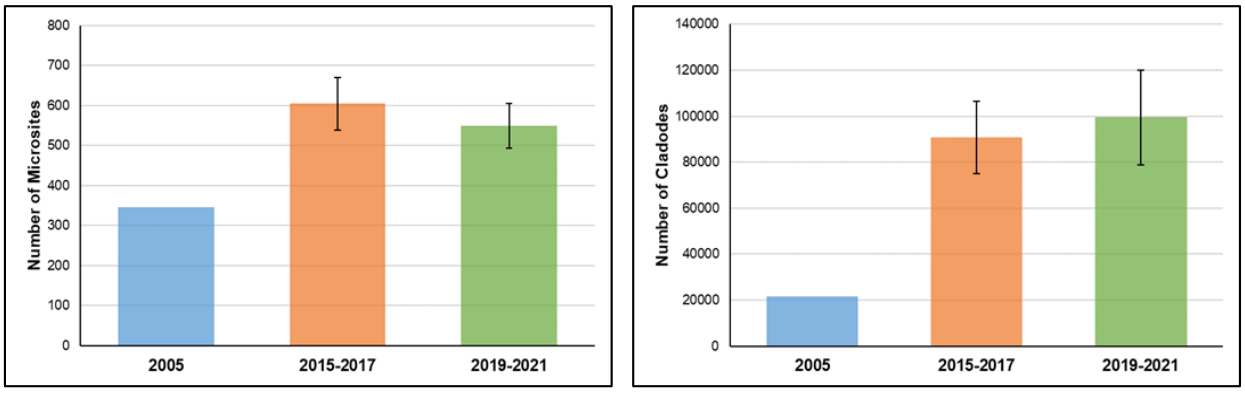

Figure 1: Estimates of the number of microsites (left) and cladodes (right) in the Eastern Prickly Pear Cactus population at Point Pelee National Park. Error bars represent the standard error of the population estimate for the sampling periods of 2015-2017 and 2019-2021.

The EPPC population at Point Pelee National Park appears to have increased significantly between 2005 and 2017, and then experienced a further significant increase in the number of cladodes between the monitoring period of 2015-2017 and 2019-2021 (Table 1; Figure 1). The number of microsites increased by between 42% to 75% (allowing for the margin of error) since 2005, surpassing the objective of increasing by 5% by the year 2020. The small decrease in the number of microsites in the last monitoring period is not statistically significant. However, a plateau or even a decrease in the number of microsites could be the result of microsites growing more cladodes and therefore expanding and merging into each other (thereby eliminating the 1

m separation distance). Further detailed examination of the monitoring data, which include sketches of the individual monitoring plots, may be able to provide insight into the cause of microsite changes. If it is found that increasing cladode numbers could cause a reduction in microsite numbers, then it may be determined that microsite numbers are not an appropriate measurement tool for assessing population recovery.

Fish Point Provincial Nature Reserve:

The objective to maintain population size on Pelee Island has not been met throughout this second reporting period. The Fish Point population has been monitored twice since the last reporting period (2018 and 2022) and has shown a decrease from five to three known microsites. The number of cladodes has also decreased consistently throughout the monitoring period. There was no estimate of population change in the last reporting period (2010-2017), as there was only one complete survey conducted in 2013 that had not yet been repeated. It was reported at that time that five known microsites had been monitored and persisted from 2004 to 2013.

The loss of one microsite in the Fish Point population is thought to be from erosion due to record high lake levels in 2019-2021. Other factors which may have contributed to microsite loss and reduced cladode numbers include habitat succession, human disturbance (trampling) and possible monitoring detection errors.

Implementation of the Recovery Strategy

Supporting the population and distribution objectives are nine broad strategies and approaches to recovery. The broad strategies and approaches rated as urgent and necessary have been largely implemented, while those rated as beneficial for the most part have not, and may be in need of review for relevance. Continued monitoring and habitat management programs are ongoing to help ensure the continuing success of population objectives at Point Pelee National Park and to attempt to stabilize the declining population trend at Fish Point Provincial Nature Reserve.

The following Broad Strategies and Approaches work to support the overarching Recovery Objectives. The level of urgency from the Recovery Strategy is indicated in brackets after the broad strategy title. Not all strategies were advanced due to resourcing and restrictions related to COVID-19.

Broad Strategy 1: Manage critical habitat to maintain suitability (urgent)

Status: ongoing

The activities likely to destroy critical habitat listed in the Recovery Strategy, such as the use of motorized vehicles without following Best Management Practices for this activity, have been effectively managed at Point Pelee National Park.

Parks Canada continues to actively address the restoration of critical habitat for EPPC within Point Pelee National Park (hereafter PPNP). The focus is restoring early successional stages of the Lake Erie Sand Spit Savannah ecosystem to improve the quality and quantity of critical habitat available for EPPC. Since 2010, the savannah restoration program has restored approximately 40 hectares (ha) of degraded red cedar savannah with approximately 17 ha of savannah habitat improved (through initial restoration activities or re-treatment) in or adjacent to

EPPC during the reporting period of 2018 to 2022. A variety of management techniques have been used to substantially improve habitat conditions for EPPC. These include the following: manual cutting of dogwood thickets, removal of invasive alien plants, planting of native savannah species, and the reintroduction of prescribed fire to 5.8 ha of degraded habitat.

Vegetation management activities to remove encroaching woody vegetation were conducted for the remaining microsites at Fish Point Provincial Nature Reserve in summer 2022. Prior to 2022, vegetation management had not been implemented since 2012-2013 at these sites. It is possible that the loss of one microsite and a reduction in pad numbers was due to vegetation succession induced shading, and the 2022 vegetation management activities could reverse this declining trend.

Broad Strategy 2: Identify habitat for restoration (urgent)

Status: complete

This strategy addressed the need to identify appropriate areas for habitat restoration at PPNP. Pre-restoration analyses resulted in the Lake Erie Sand Spit Restoration Strategy (Parks Canada 2012), which identified potential restoration sites. Site selection was based on a preliminary analysis provided in the Red Cedar Savannah Management Plan (Geomatics 1994), which identified remnant savannah habitats with high value for restoration. Parks Canada staff then incorporated additional criteria to the site selection process, including the threat of imminent loss of savannah vegetation types and/or the associated species at risk due to forest succession. During this reporting period, habitat restoration work aimed at increasing the amount of suitable habitat for EPPC took place in all the areas targeted in the Lake Erie Sand Spit Restoration Strategy. Additionally, site maintenance was successfully conducted on all areas cleared more than 5 years ago.

Broad Strategy 3: Monitor populations and habitats (necessary)

Status: ongoing

At PPNP, monitoring of EPPC has continued during the reporting period based on monitoring protocols established by Parks Canada in 2016 (Parks Canada 2016). Data from a rotating panel design is collected over 3 years resulting in a population estimate. Protocols to measure vegetation succession and savannah habitat quantity and quality have been developed and initiated (Parks Canada 2015), through the use of both ground monitoring and aerial photo analysis. Gaps still exist in coverage and repeatability, and these monitoring techniques can be further improved to facilitate evaluation of the effectiveness of habitat management actions being taken to achieve recovery objectives.

In the reporting period, the Fish Point Provincial Nature Reserve (hereafter FPPNR) population was monitored in 2018 and 2022. No formal quantitative monitoring of EPPC habitat occurred in the small areas of these microsites, however visual observations were made by qualified Ontario Parks staff to qualitatively assess habitat and record changes.

Broad Strategy 4: Minimize collection and other human disturbances (necessary)

Status: ongoing

Interpretive signage to deter human disturbance of EPPC is present both at PPNP and FPPNR. No incidents of collection were reported or detected over the last reporting period. However, at

FPPNR, one microsite has been reduced and potentially lost as a result of trampling from visitors seeking an alternate route for a trail that had eroded away during high lake levels. Reduced monitoring, due to a lack of resources as well as COVID-19 travel restrictions (which were exacerbated by the difficulties accessing the location of this population on Pelee Island), prevented early detection and subsequent management actions which could have potentially mitigated these impacts caused by human disturbance.

Broad Strategy 5: Assess feasibility of restoration (beneficial)

Status: not initiated

No research was undertaken during the reporting period to determine whether EPPC patches of unknown origin have been transplanted from or are descended from transplanted individuals from the two (PPNP and FPPNR) native populations. Going forward, this strategy could be completed in partnership with an academic institution.

Broad Strategy 6: Address major knowledge gaps

a) Threat clarification (necessary)

Status: ongoing

The Recovery Strategy recommended an evaluation of threats using a standardized assessment protocol be completed. The Recovery Strategy was published in 2010, before COSEWIC initiated the use of a threat assessment calculator as part of species assessments, which would have fulfilled this knowledge gap. A threat assessment has not been completed for EPPC by COSEWIC, or independent of the COSEWIC process, however, the following research into threats has taken place during the reporting period.

Research conducted in PPNP in 2017 by Dr. Taly Drezner, York University, resulted in a publication focussed on species associations (Drezner 2021). This study concluded that EPPC do not appear to engage in facilitative associations with native species, but may be nursing non-native species. In 2020, Dr. Drezner supervised a research project investigating dispersal of EPPC by animal vectors (unpublished report Huynh 2020). Results of this study provide insight into the potential threats from various animal species depredating cactus, as well as their potential benefit as seed dispersers.

b) Spatial population structure and origin (beneficial)

Status: not initiated

Implementation of the urgent habitat and restoration strategies took precedence over the lower priority strategies. As a result, no research was undertaken on population genetics of EPPC during the reporting period. Over the last decade, significant advances in genetic techniques have been made and, a review of the priority, funding, and feasibility of an academic partner examining EPPC genetic population structure is warranted.

Broad Strategy 7: Protect and restore genetic integrity (beneficial)

Status: not initiated

This strategy was predicated on the completion of EPPC genetic analyses, thus during the reporting period, no projects took place to remove introduced genotypes or to repatriate plant material from transplanted sites to appropriate native populations.

Broad Strategy 8: Establish gene bank (beneficial)

Status: not initiated

To date, no collection protocol or active collection, processing, and storage of EPPC seeds has been developed. A genetic analysis is necessary to guide targeted and strategic seed collection.

Broad Strategy 9: Build community support for recovery (beneficial)

Status: ongoing

Public outreach is an ongoing priority of the savannah restoration program. Various communication initiatives were undertaken in every year of the reporting period. However, in-person interpretation and education programs were not delivered from 2020 to 2022 due to the COVID-19 pandemic. Temporary and permanent exhibits at the PPNP Visitor Centre feature habitat restoration work and communicate key messages for protection and recovery of species at risk, including the EPPC. A family Geocaching program focusing on EPPC was delivered to 74 groups/families in 2018 and 55 groups/families in 2019. YMCA campers were given a guided hike into Cactus Field to discover and learn about species at risk highlighting the EPPC, with approximately 240 campers participating from 2018 to 2019. An educational Geocaching program for high school students (80 students in 2018 and 446 students in 2019) provided an opportunity to monitor and map cactus patches using a GPS device.

During development of the Multi-Species Action Plan for Point Pelee National Park of Canada, Indigenous Partners were engaged through the First Nations Advisory Circle and participation in a site analysis workshop. During the reporting period, active participation by Indigenous Partners in savannah restoration activities was greatly reduced from previous years due to the restrictions associated with the COVID-19 pandemic. However, a new initiative was launched in fall 2021 with members of both Caldwell First Nation and Walpole Island First Nation participating in a Parks Canada Basic Wildland Fire Management course alongside the fire management team of PPNP. Fire management is a fundamental component of species at risk recovery and restoration for many species.

Multi-Species Action Plan for Point Pelee National Park of Canada

In 2016, Parks Canada posted *a Multi-Species Action Plan for Point Pelee National Park of Canada and Niagara National Historic Sites of Canada*. The plan took a holistic approach, incorporating all species at risk in PPNP that required an action plan under s.49 of SARA. Actions that are beneficial to multiple species at risk were identified and prioritized, to maximize the effectiveness of species at risk recovery efforts in the park. This action plan identified a site based population and distribution objective for the Eastern Prickly Pear Cactus for the period of 2016-2021 as follows: "*maintain the current population (number of microsites and cladodes) at PPNP*". Additional details regarding recovery actions can be found in the *Implementation Report: Multi-species Action Plan for Point Pelee National Park of Canada and Niagara National Historic Sites of Canada (2016-2021)*, including three recovery measures focusing on monitoring, restoration of savannah habitat (for multiple species), and relocation of cactus cladodes.

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