

# Report on the Progress of Recovery Strategy and Action Plan Implementation for the Bolander's Quillwort (*Isoetes bolanderi*) in Canada (2018 – 2022)

## Bolander's Quillwort



October 2024



Parks Canada  
Parcs Canada

Canada

## Recommended Citation

*Parks Canada. 2024. Report on the Progress of Recovery Strategy and Action Plan Implementation for the Bolander's Quillwort (Isoetes bolanderi) in Canada (2018 – 2022). Species at Risk Act Recovery Strategy Report Series. Parks Canada, Ottawa. 6 pp.*

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

**Cover illustration:** Bollander's quillwort habitat (Parks Canada) and individual Bolander's Quillwort plants (Cyndi Smith) (Inset).

Également disponible en français sous le titre :

« Rapport sur les progrès de la mise en œuvre du programme de rétablissement et du plan d'action portant sur l'isoète de Bolander (*Isoetes bolanderi*) au Canada (2018-2022) »

© His Majesty the King in Right of Canada, represented by the Minister of Environment and Climate Change, 2024. All rights reserved.

ISBN: En3-4/97-2024E-PDF

Catalogue No: 978-0-660-73711-9

Content (excluding the cover photos) may be used without permission, with appropriate credit to the source.

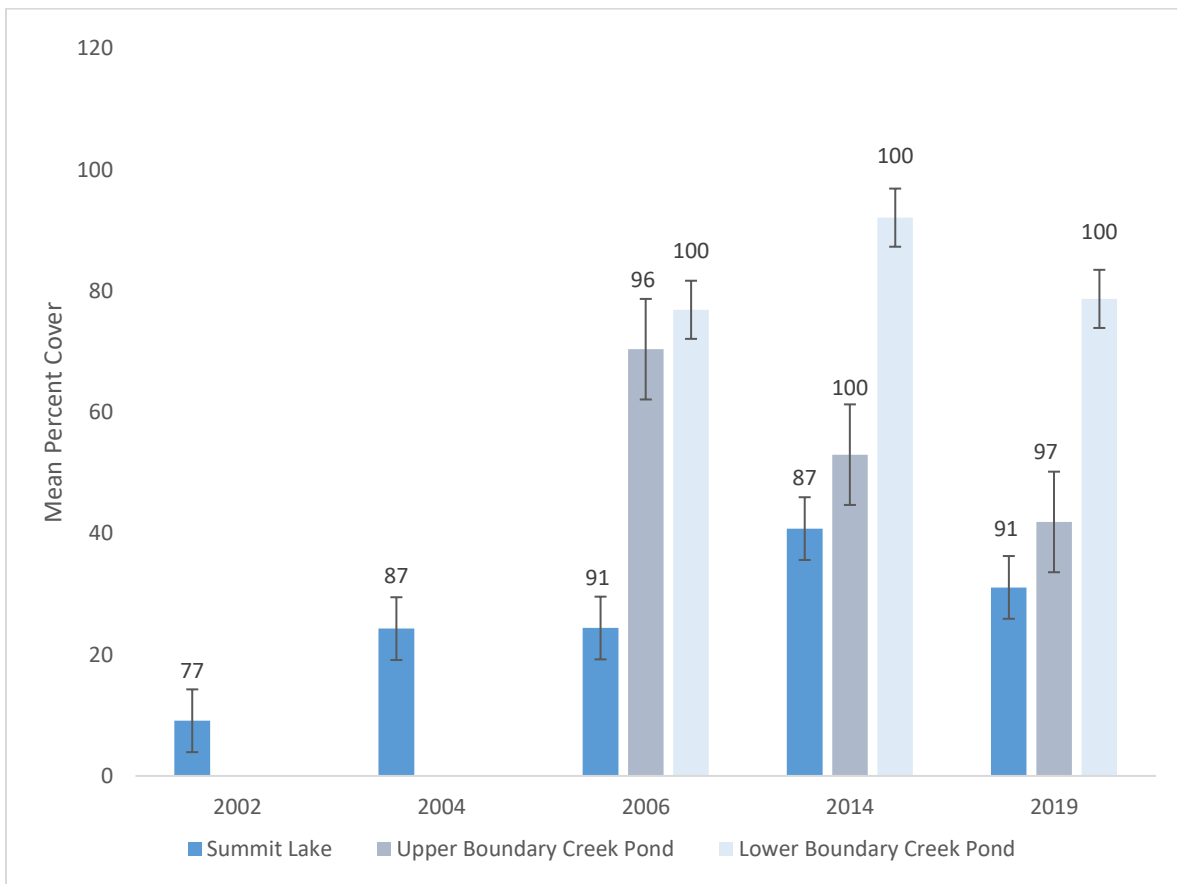
## Introduction

The final *Recovery Strategy and Action Plan for Bolander's Quillwort (Isoetes bolanderi) in Canada* was posted on the species at Risk Public Registry on February 7, 2011. The recovery strategy and action plan included a population and distribution objective for the species, a description of activities required to meet the population and distribution objective, and timelines for implementation. Under section 46 and 55 of the *Species at Risk Act (SARA)*, the competent minister must report on implementation of the recovery strategy and action plan, progress towards meeting its objectives, and its ecological and socioeconomic impacts within five years after it is included in the public registry. Implementation of the recovery strategy is reported on in every subsequent five-year period, until objectives have been achieved or the species' recovery is no longer feasible. This document fulfills Section 46 of the SARA and Section 55 (ecological and socio-economic impacts) is reported on in the *Implementation Report: Multi-species Action Plan for Waterton Lakes National Park and Bar U Ranch National Historic Site (2018– 2022; Parks Canada 2023)*. This current document updates progress for the Recovery Strategy and Action Plan for the Bolander's Quillwort (*Isoetes bolanderi*) in Canada for the period of 2018-2022. Additional details regarding recovery actions can also be found in the *Implementation Report: Multi-species Action Plan for Waterton Lakes National Park and Bar U Ranch National Historic Site (2018– 2022; Parks Canada 2023)*.

## Implementation of the Recovery Strategy and Action Plan and Progress towards Meeting its Objectives

The Recovery Strategy and Action Plan for Bolander's Quillwort (*Isoetes bolanderi*) in Canada included a population and distribution objective "...to maintain the three self-sustaining populations (Summit Lake, Upper and Lower Boundary Creek Ponds) and, if feasible, to restore the extirpated population (Carthew Pond)." The objective has been met for the three existing populations. Additional work to determine the appropriateness of restoring the Carthew Pond population is still required. Additional research and monitoring programs will continue to inform management of the species into the future.

The Kenow Wildfire of 2017 resulted in potential ecological changes to Bolander's quillwort critical habitat at Summit Lake. However, surveys conducted in 2019 indicate that the three self-sustaining populations continue to be present, and numbers appear stable (Figure 1). Population trend analysis in conjunction with water temperature, habitat variables, and atmospheric data is currently underway and will be completed in 2024.



**Figure 1. Population changes for Bolander’s Quillwort at the three known locations in Waterton Lakes National Park. The bars represent the mean percent cover of the quillwort with 95% confidence intervals. The numbers above the bars indicate the percentage of sampled locations with Bolander’s Quillwort present.**

Waterton Lakes National Park (WLNP) is the only known location where Bolander’s quillwort occurs in Canada. Recovery measures identified in the multi-species action plan are high priority recovery actions that WLNP is committed to implementing. Progress made on the implementation of recovery actions for Bolander’s quillwort can be found in the *Implementation Report: Multi-species Action Plan for Waterton Lakes National Park and Bar U Ranch National Historic Site (2018–2022; Parks Canada 2023)*.

The following Recovery Objectives/Actions work to support the overarching Recovery Goal.

**Recovery Objective One: Mitigate threats to populations through protection mechanisms and communication and outreach initiatives, to maintain population levels within the natural range of variability**

Various strategies have been implemented to manage visitor and park activity within and near Bolander's quillwort critical habitat at Summit Lake. In terms of Bolander quillwort populations, this lake is primarily impacted by human disturbance whereas the other lakes are much more remote.

In 2007, a reduction of disturbance to the Summit Lake population by visitors and domestic animals (dogs and horses) was achieved by the restructuring of the Carthew – Alderson trail through the use of physical barriers such as logs and stonework as visual cues that better delineate where visitors can approach the lake, limited to only one access point. Some of these physical barriers were damaged by the Kenow wildfire, which heavily impacted the forest around Summit Lake in 2017. Intermittent monitoring of the site indicates a potential need to update these structures to direct foot

traffic to the concentrated point and to reduce the watering of horses at the edge of the lake, which appears to be increasing. Structures have not been updated to date and given the relatively small affected area and stable Summit Lake population, the need for this will be re-assessed in 2024 after which a final decision will be made on structure improvements.

Education is a fundamental aspect of protection. Improved and consistent messaging regarding the fragility of this sensitive plant species at the Summit Lake location has been noted as an important mitigation tool. Visitor information signage has been designed, although it has not been manufactured or installed and has been rescheduled for 2024. Complete elimination of human disturbance however, is likely not feasible given that the Carthew-Alderson trail is routed near Summit Lake.

The restrictions on Parks Canada's Fire Management program's ability to use the lakes containing Bolander's Quillwort as a water source for use on wildfires or prescribed fires has been met positively. Implementation of this restriction has occurred during past prescribed fire programs for Whitebark Pine (*Pinus albicaulis*) habitat restoration near Summit Lake and during the 2017 Kenow wildfire.

During the implementation reporting period, multiple communication approaches have been developed and delivered through cross-platform communication efforts aimed at raising awareness of Waterton's species at risk (SAR). Species specific knowledge gaps were targeted in addition to general SAR education. The target was to develop and deliver at least five unique communications products annually, over five years. This objective was fully achieved through a multi-departmental approach, including Visitor Experience and External Relations.

Communications products included interpretive programs, volunteer events, presentations, social media releases, web pages, signage, and media articles focused on species at risk and associated conservation and restoration efforts taking place in WLNP and Bar U Ranch National Historic Site (BURNHS). For example, 18,440 park visitors attended a variety of interpretation programs throughout 2019-2023 (2020 with zero attendance due to COVID restrictions), focused on species at risk and associated conservation and restoration efforts.

### **Recovery Objective Two: Determine feasibility of re-establishing the historically-known Carthew Pond population and implement if appropriate**

Assessment of the feasibility of restoring Bolander's Quillwort to the Carthew Ponds is on hold until a core sample from the lake can be collected and analysed to confirm the historic presence of the species at this site. Some questions remain as to whether this site was correctly identified in the historic records, so it is essential to confirm historic presence before restoration attempts are undertaken.

Core sampling may be combined with eDNA sampling techniques to detect historic presence of amphibian species in these same ponds and additional high elevation ponds in WLNP.

### **Recovery Objective Three: Monitor populations as per established protocol to establish firm understanding of population trends and short-term fluctuations.**

To date, monitoring efforts have focused on determining changes in the population of Bolander's Quillwort at the three known locations (see Figure 1). Sampling occurs at 5-year intervals with the next survey to be completed in 2024. Population data collected includes cover estimates within 0.1m<sup>2</sup> quadrats distributed throughout the ponds to a maximum depth of ~1.2 metres (limited depth for surveyor safety considerations). Cover is converted to a density estimate for each lake acknowledging the assumption that density is consistent throughout the lake even beyond the 1.2m depth limit of the surveys.

Habitat variables (e.g. water level, sediment cover and depth, sedge (*Carex* spp) cover, and substrate type (organic or mineral)) have been surveyed at all three locations over a minimum of three surveys. Additionally, water temperature is being measured at Summit Lake and Upper Boundary Creek Pond using temperature data loggers recording water temperature on an hourly basis across all seasons for multiple years.

All collected data will be analysed with additional data in 2024 to better describe habitat characteristics and population trends over time for the Waterton Lakes populations and to look at possible effects of the 2017 Kenow wildfire on the Summit Lake population.

#### **Recovery Objective Four: Conduct surveys of suitable habitat to detect additional populations**

The last field investigations for potential additional Bolander's Quillwort sites within WLNP occurred between 2000 and 2006. Thirty sites were surveyed which resulted in the discovery of two additional Bolander quillwort populations at Upper and Lower Boundary Creek Ponds. No additional surveys are warranted as all potential sites were surveyed in the 2000-2006 period. We will explore the option of sediment cores and eDNA to detect historic presence of Bolander's Quillwort in these ponds as possible in conjunction with surveys for other species of interest (e.g. salamanders).

#### **Multi-Species Action Plan**

In 2017, Parks Canada posted the *Multi-species Action Plan for Waterton Lakes National Park and Bar U Ranch National Historic Site*. The plan took a holistic approach, incorporating all species at risk that required an action plan (s.49 of SARA), plus additional species of conservation concern. Actions were collated and prioritized to focus recovery efforts and maximize benefits to the species. Detailed results from the actions identified in the *Recovery Strategy and Action Plan for Bolander's Quillwort (Isoetes bolanderi) in Canada* including research, monitoring and mitigations are discussed in the *Implementation Report: Multi-species Action Plan for Waterton Lakes National Park and Bar U Ranch National Historic Site of Canada (2017 – 2022)*. (Parks Canada 2023)

#### **Literature Associated with Recovery Strategy and Action Plan for the Bolander's Quillwort (*Isoetes bolanderi*) in Canada Since the Last Implementation Report.**

Parks Canada. Unpublished data – Bolander's Quillwort population survey and habitat data. 2002-2019.