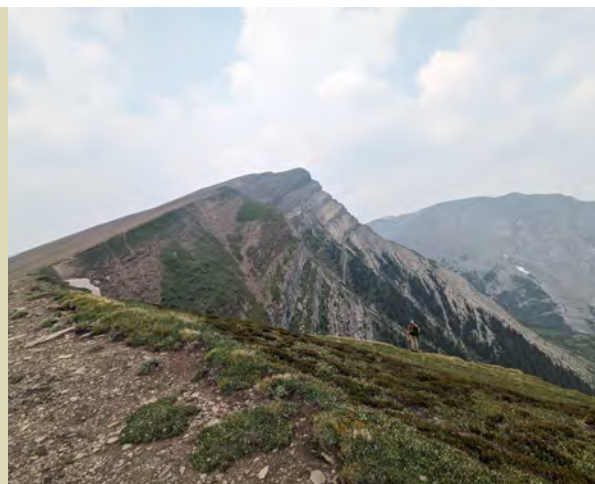


BioBlitz in Alberta's Rocky Mountains:

Biodiversity and Conservation Assessment



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Executive Summary

The Cardinal Divide Conservation Coalition (CDCC) hosted a bioblitz in Whitehorse Wildland Provincial Park including the Cardinal Divide and surrounding region from July 14th to 16th 2023. The Cardinal Divide Conservation Coalition is a group of biologists, botanists, park stewards, and environmental organizations invested in the ecological integrity of the region. It has members from the Alberta Native Plant Council including the Whitehorse Wildland Provincial Park Stewards, PlantWatch Alberta, Alberta Wilderness Association (AWA), and CPAWS Northern Alberta.

Bioblitz's are an engaging way to connect the public to nature while participating in a meaningful activity that contributes to collective scientific knowledge! The objective of the bioblitz was to collect and document as much information on species occurrences throughout the region over the course of the weekend. This information will help inform conservation management of the region in a way that engages the community in experiential learning.

Participants/ Key Findings & Highlights

443

Species Identified in the Area

1838

Recorded Observations

15

Invited Experts

The bioblitz brought together 29 participants from all over the province, including 15 invited experts and 9 public volunteers who joined CPAWS Northern Alberta and AWA staff for the entire weekend or for one day. A few experts decided to make another trip to the area on the August 5th to 7th weekend to record more species observations in an area not accessible in a single day trip, the Cardinal River headwaters region. Altogether, we identified 443 species in the area, including 260 plants, 56 insects,

77 fungi, 33 birds, 10 mammals, and 4 arachnids. All observations were recorded through the iNaturalist application.

Several at-risk species were observed, including Porsild's bryum moss (Threatened under Canada's Species at Risk Act, Endangered under Alberta's Wildlife Act), Barn Swallow (Threatened under Canada's Species at Risk Act), Harlequin Duck (Listed as Special Concern under Alberta's Wildlife Act), and grizzly bear (threatened under Alberta's Wildlife Act, Special Concern under Canada's Species at Risk Act).



Photo by: Amy Tucker

Main Recommendations and Implications

The results of the bioblitz support previous reports of high biodiversity and ecological value of the Cardinal Divide region. The high natural value of the area must be considered in future land-use planning and management decisions for the area. For example, off-highway vehicle use must be kept below ecological thresholds and out of sensitive areas such as the Whitehorse Wildland Provincial Park, alpine and sub-alpine habitats, and key wildlife habitats. Restoration and land management of adjacent industrial features such as coal mines should manage for integrity of native vegetation assemblages in nearby areas, and work to restore ecological function on disturbed sites.

The CDCC would like to acknowledge Alberta Conservation Association who supported this project through a grant. This bioblitz could not have happened without the generous support of experts in species identification who volunteered their time and expertise to collect observations and identify those observations on iNaturalist. We would also like to thank all the volunteers and individuals who showed up to attend the event and contributed their passion for nature.



Photo by: Brett Bolkowy

Introduction

Alberta's foothills and Rocky Mountains are an iconic landscape that provide habitat for many species including species at risk. These high elevation landscapes have caught the awe and wonder of people from around the world for centuries and have been the homelands of Indigenous people for millennia. Today, many of these special landscapes are facing risk of degradation beyond repair from threats such as mining, destructive recreational activities, forest harvest and climate change¹.

The Cardinal Divide and surrounding region hold rich natural history and are recognized for hosting particularly high biodiversity within the Rocky Mountains. South of the town of Hinton, the study area abuts the northeast border of Jasper National Park and contains the hamlet of Cadomin and Whitehorse Wildland Provincial Park. Outside of the Park boundary, the area is composed of public lands and consequently is threatened by many competing land uses that put pressure on the unique ecosystems and biodiversity of the area.

The unique ecology of the Cardinal Divide can be attributed to its distinctive geography and history. The Cardinal Divide itself is the dividing point between the North Saskatchewan and Athabasca River watersheds. The region includes some of the largest extent of alpine habitat in Alberta, and plants so unique that it has caused scientists to hypothesize that parts of it may have remained unglaciated during the Wisconsin Ice Age, acting as a life-boat for plants and animals to survive despite the sheet of ice that covered most of the land^{2,3}. Adding support to this theory is the fact that several of the 250 plant species that have previously been described in the Wildland Park are isolated (disjunct) populations, and at least one disjunct butterfly species has been described in area⁴.

The area is also home to abundant charismatic megafauna. Although chinook winds are not common north of Calgary, the Cardinal Divide and Cadomin areas form a chinook wind corridor that provides a

refuge from cold winter temperatures for overwintering wildlife⁵. Warm chinook winds periodically melt the snow, allowing ungulates to preserve energy that would otherwise be spent digging through snow to expose the plants that they forage upon. For species that typically rely on fat reserves throughout the cold winter months, this advantage can be the difference between life and death. Ungulates of the Cardinal Divide area include some of the largest bighorn sheep in the world⁶, elk, mule deer, white-tailed deer, and moose. The area also hosts a strong population of grizzly bears, which are threatened under Alberta's Wildlife Act, and other sensitive species like bull trout, Harlequin Duck, Northern Harrier, American Kestrel, Brewer's Sparrow, and wolverine. Because of its unique natural history and features that support high biodiversity, the Cardinal Divide is an excellent location for an interesting and informative bioblitz.



Photo by: Tara Russell



Bighorn sheep. Photo by: Devon Earl

Purpose & Objectives of the BioBlitz Event

A bioblitz is a fantastic way to connect experts in botany, field biology, and rocky mountain species identification with eager members of the public, student groups, and nature enthusiasts in an experiential learning event. This event's purpose was to make as many observations as possible of species from all taxonomic groups over one weekend and to provide Albertans with an opportunity to learn about and connect with nature.

Part of the region of interest has recently been submitted for consideration to be designated a Key Biodiversity Area (KBA) due to the presence of Porsild's bryum moss and other unique species – making it a particularly special place to host a bioblitz. The CDCC believes that the region is ecologically important in Alberta beyond what was put forward in the KBA submission. We would like to draw greater attention and appreciation to the special characteristics of the region and add knowledge that could lead to further conservation.

Conservation Challenges

A large part of the region is protected as part of the Whitehorse Wildland Provincial Park, however public lands surrounding the park are subjected to intensive mining, forestry, recreation, and has a history of dense human settlement. These have all influenced a historic decline in mammal populations such as the bighorn sheep and grizzly bears via habitat disturbance and fragmentation⁷. Disturbance, sedimentation and pollution into waterways in the region have negatively impacted the

health of bull trout and Athabasca rainbow trout and brood-rearing habitat of Harlequin Ducks^{8,9}. Off-highway vehicle (OHV) use in high alpine habitats damages the unique and rare plant populations. During our bioblitz, evidence of illegal use of OHVs within the park boundaries was found, along with legal, yet highly damaging impacts of OHV use in other areas.

The region is also heavily impacted by coal mining activities, forestry, and recreational interests. The Cheviot mine site is closed and in the process of being reclaimed. A land management planning process will be initiated by the Alberta Government in the near future. A secondary goal of this bioblitz is to reinvigorate folks with interest in the area and build community among them, ahead of a land use planning process so that the environmental interests are represented and supported by an educated public.



Luscar Mine. Photo by: Amy Tucker

Methodology

A bioblitz is a concentrated effort to document all living species within a designated area over a specific period of time. A permit from the Government of Alberta was acquired for observational data collection for the event. During the bioblitz in Whitehorse Wildland Provincial Park and surrounding Cardinal Divide region, a team of approximately 30 scientists, naturalists, and volunteers worked together to survey and document as many species as possible within the park. This included vascular and non-vascular plants, moss, lichen, invertebrates, birds, fungi, and mammals. Lichen identification was conducted by Diane Haughland, Lichenologist, and permitted through a separate research permit.

The bioblitz began with introductions and briefings, and participants divided themselves into smaller groups to survey different accessible areas in the determined region (Figure 1), and to document the species they observed. Different taxonomic experts divided themselves among the groups.

Observations were made by taking photographs and sound recordings on mobile phones. The data, including GPS locations of observations, were recorded using the iNaturalist application in the pre-set up [iNaturalist Project](#).

All observations recorded in the iNaturalist App during the pre-determined time, and within the geographical boundary, were added to the bioblitz data. A second [iNaturalist Project](#) was created to include the observations recorded by several experts who embarked upon a trip to the Cardinal River headwaters following the bioblitz event.

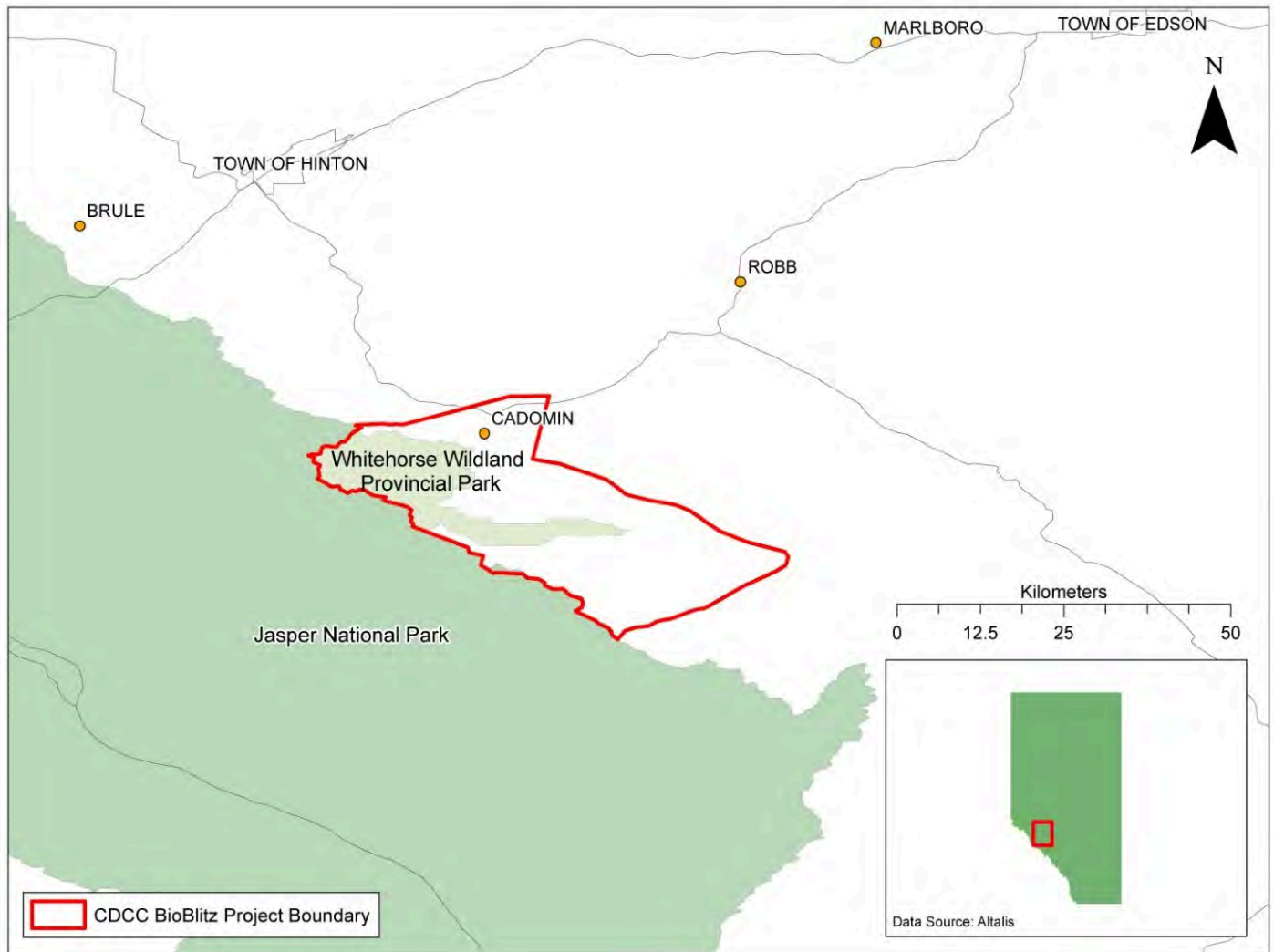


Figure 1. Bioblitz project boundary within the Cardinal Divide area, as well as in and around the hamlet of Cadomin.

Digital Platform

The primary platform used by attendees to make observations throughout the bioblitz was iNaturalist. Through this platform, pictures and/or audio files could be added to each preliminary observation, and identifications could be later added or confirmed by experts. All observations made in the Cardinal Divide region throughout the weekend were added into bioblitz iNaturalist project and are publicly available. Although there is limited internet connection in the region, iNaturalist allows observations to be collected offline and then uploaded to the project once connection is restored. Observations made by attendees can be confirmed by taxa experts to ensure the accuracy of

species identifications. Observations that have agreed-upon identifications within the iNaturalist community are considered “research grade”, whereas those that require further confirmation are listed as “needs ID”. iNaturalist is a widely used species identification platform, and therefore allowed for quite seamless entry of observations and a familiar platform for many attendees.



Photo by: Amy Tucker

Results and Discussion

Species Inventory

In total, 1,838 observations of 443 species were recorded as part of the bioblitz (Appendix I). The observations were concentrated in and around Whitehorse Wildland Provincial Park (Figure 2).

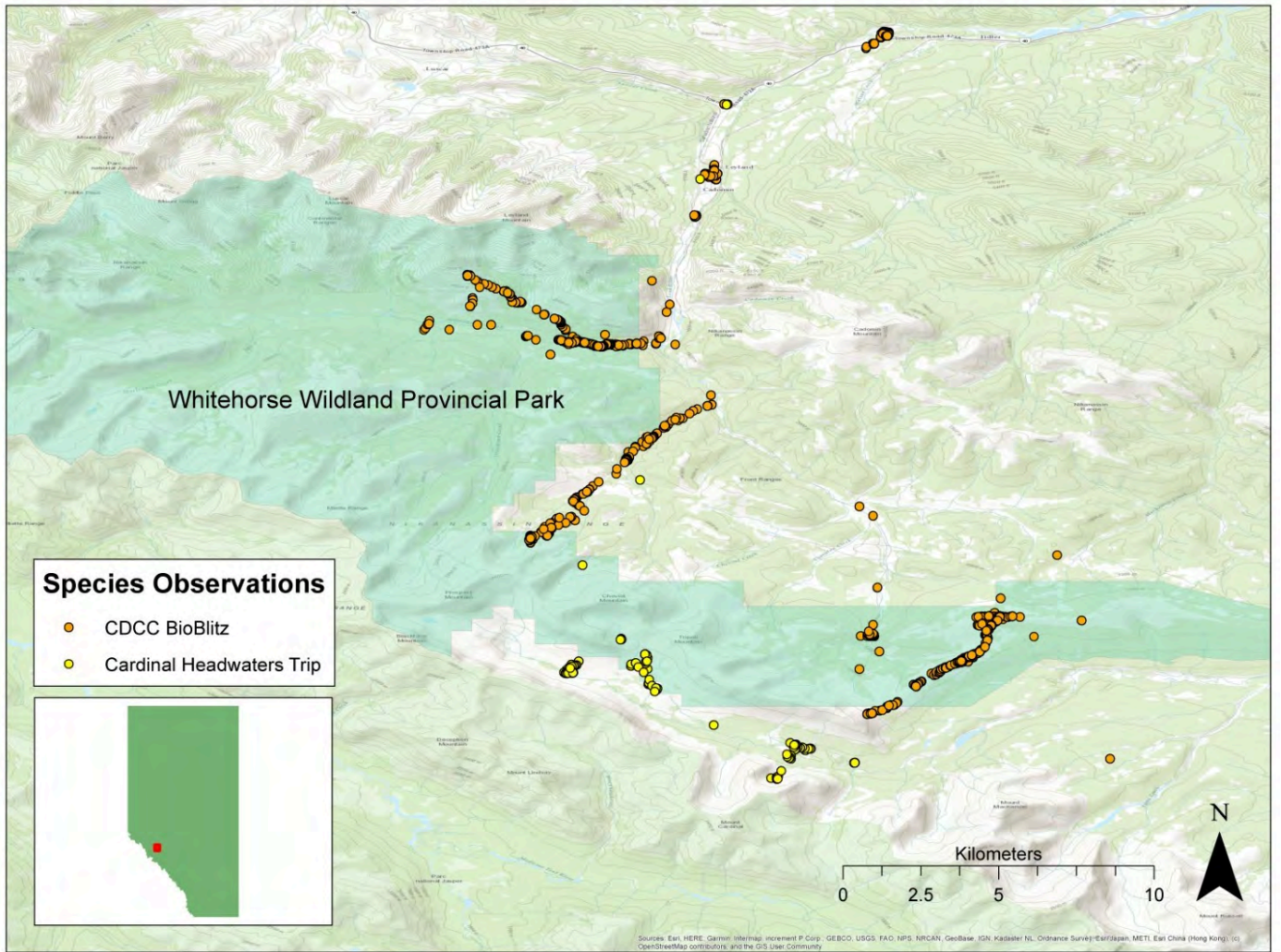


Figure 2. Locations of all species observations recorded during the Cardinal Divide Conservation Coalition (CDCC) BioBlitz and the Cardinal Headwaters trip.

The taxonomic group with the largest number of identified species was plants (including vascular plants and mosses), followed by fungi (including lichen), insects, and birds respectively (Figure 3). This includes the observations collected during the bioblitz weekend and the Cardinal Headwaters trip.

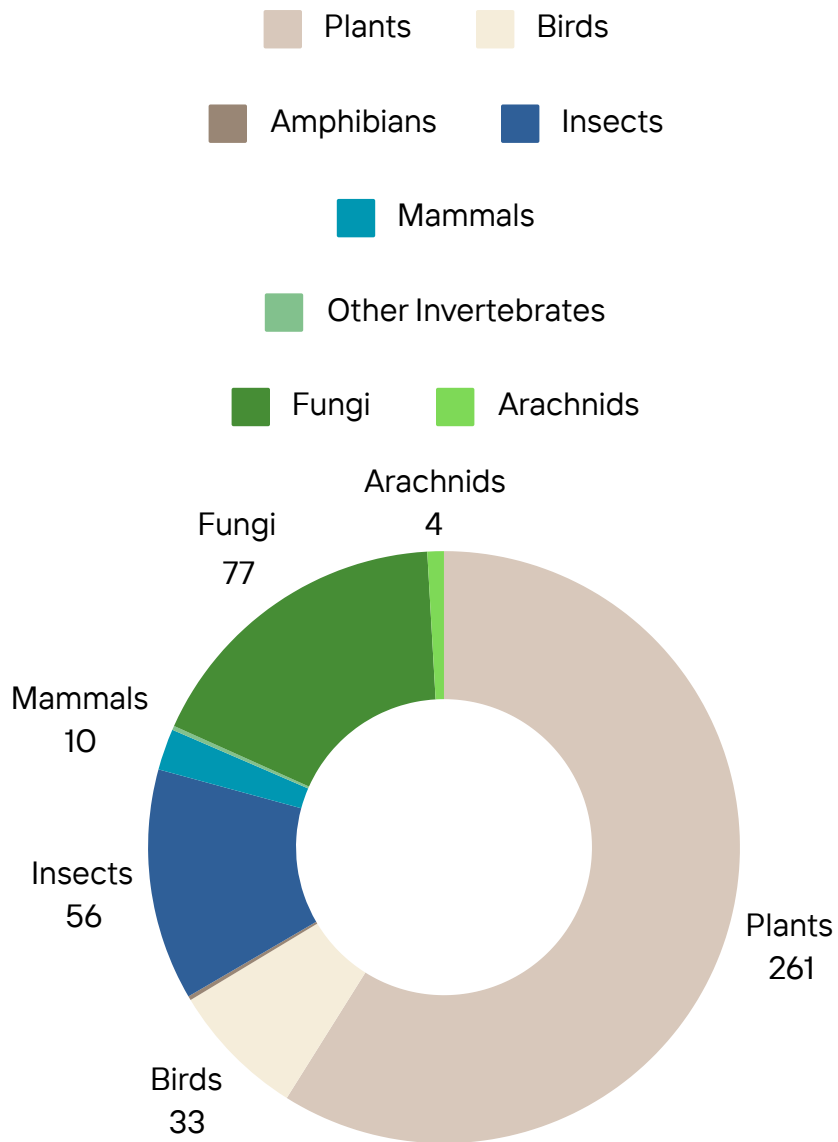
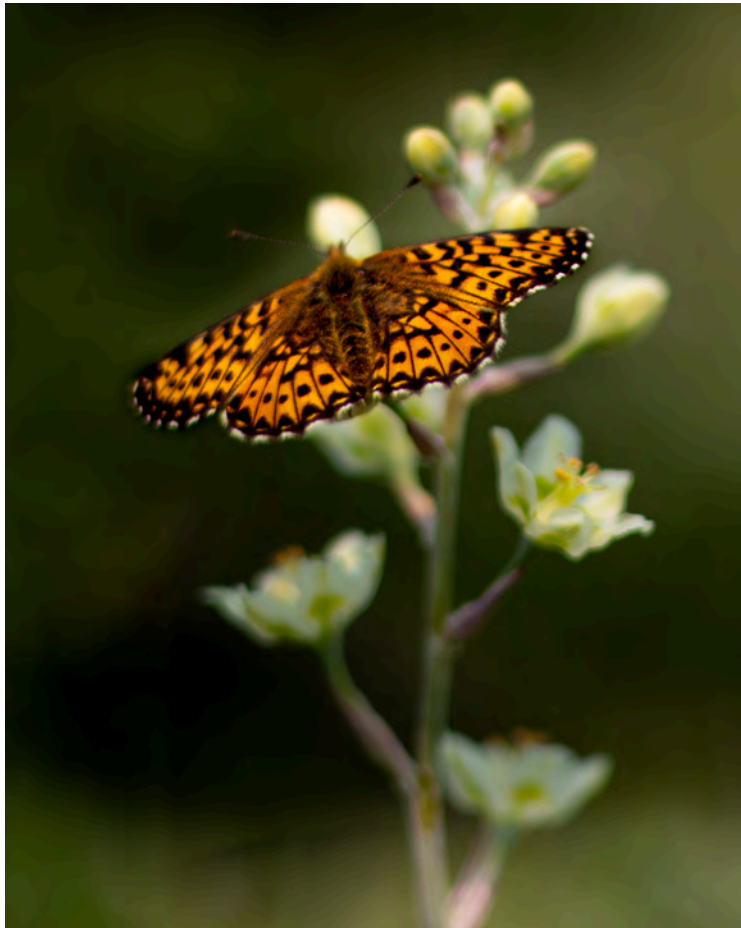


Figure 2. Taxonomic groups of the 443 species observed during the Cardinal Divide Conservation Coalition (CDCC) BioBlitz and the Cardinal Headwaters trip.

The species that were observed the most frequently were shrubby cinquefoil (*Dasiphora fruticosa*; 25 observations), northern goldenrod (*Solidago multiradiata*; 19 observations), alpine bistort (*Bistorta vivipara*; 19 observations), prickly saxifrage (*Saxifraga tricuspidata*; 18 observations), and mormon fritillary (*Argynnis mormonia*; 18 observations).



Shrubby cinquefoil. Photo by: Tara Russell



Mormon Fritillary. Photo by: Amy Tucker



White death-camas. Photo By: Jocelyn Portillo

Species of Conservation Concern

Several species of conservation concern were recorded during the bioblitz. These are species that are listed as at-risk in federal and/or provincial legislation:

Porsild's bryum moss

(Threatened under Canada's Species at Risk Act, Endangered under Alberta's Wildlife Act, globally imperiled). The Whitehorse Wildland Provincial Park is a candidate for a National Key Biodiversity Area (KBA) in part because the area is home to 65 percent of Canada's population of Porsild's bryum. KBA's don't have legal protected area status, but are recognized as important for species or biodiversity.

Barn Swallow

(Threatened under Canada's Species at Risk Act)

Harlequin Duck

(Listed as Special Concern under Alberta's Wildlife Act)

Grizzly bear

(Threatened under Alberta's Wildlife Act, Special Concern under Canada's Species at Risk Act)



Porsild's bryum moss. Photos by: Devon Earl

The majority of species-at-risk sightings occurred outside the boundaries of Whitehorse Wildland Provincial Park, which highlights the importance of the surrounding areas for conservation of these species.

Public Outreach

The bioblitz brought together 29 participants from all over the province, including 15 invited experts and 9 public volunteers who joined CPAWS Northern Alberta and AWA staff for the entire weekend or for one day. On the second day of the bioblitz, members of the public were invited to join in. All attendees were provided with a species list along with a “spot the species” worksheet with a few very recognizable species for those being introduced to species identification. Outreach materials also included a visual guide to using the iNaturalist app with instructions on how to upload photos or audio as well as how to submit a preliminary species identification alongside their observation, that was later confirmed by experts. Other materials included a “fun fact” sheet with interesting facts about the Cardinal Divide region as well as its ecological importance. Several experts volunteered their time to share knowledge on specific taxa. This included two plant identification walks led by Kristen Anderson, Whitehorse Wildland Provincial Park steward. The Whitehorse Wildland Provincial Park is one of four areas stewarded by the Alberta Native Plant Council. Beth MacCallum led a Butterfly (and other invertebrates) walk. These guided walks gave attendees the opportunity to learn up close identification and interesting facts about certain species in the region. The butterfly walk provided attendees with an opportunity to learn netting techniques for quick species identification and to have the expert provide physical attributes of different butterfly families that leads to much easier and efficient identification of butterfly species.

Many experts who attended this bioblitz had been visiting Cadomin and the Cardinal Divide region and studying the region’s ecological richness for decades. Attendees were thus provided with the rich history of the region while understanding and experiencing first-hand the irreplaceable biodiversity and ecosystems that demand continued protection and preservation.





Photos by: Elise Gagnon

Public Awareness and Advocacy

People are more likely to protect areas that they are familiar with and feel connected to. The bioblitz provided an invaluable opportunity to discuss conservation of the Cardinal Divide with members of the public, and the event brought several people to the Cardinal Divide who had never visited the area previously. Those who had visited before were able to deepen their knowledge of the area, and of the flora and fauna that call it home through discussions among experts, conversations with CDCC members, and guided walks. Given that we are amid a global biodiversity crisis, it is more important than ever to provide opportunities for people to connect with natural spaces and build the knowledge and interest to get involved in conservation initiatives.

We hope that this bioblitz will spark an interest in nature conservation in the area or feed that interest in individuals who are already passionate about wilderness and wildlife. In particular, we hope that it will add to the tools and knowledge available for people to advocate for responsible management of the Cardinal Divide. This advocacy could include getting involved in government-led land use planning processes such as the upcoming planning for the Cheviot Mine area. We hope that the individuals who were involved in the bioblitz will act as nature advocates and stewards of the area and all of Alberta's irreplaceable wilderness.



Photo by: Brett Bolkowy

Discussion and Conservation Recommendations

Given the high ecological value of the area, we have identified the following key conservation concerns that must be considered and addressed:

1**Unsustainable off-highway vehicle (OHV) use:**

The Cardinal Divide area is popular for motorized recreationists, and there is pressure from motorized recreation groups and individuals to increase trail density and allow more access for this type of land use into the wilderness. In certain areas, OHV use has degraded the vegetation and led to scarring which is extremely difficult to reverse. During the Bioblitz, participants observed evidence of illegal OHV activity within the Whitehorse Wildland Provincial Park boundary, which calls for increased education of OHV users and increased enforcement by conservation officers in the form of fines for users who break the rules thus endangering the ecological integrity and natural value of the area.

2**Potential loss of wildlife habitat:**

Large wildlife such as grizzly bears and bighorn sheep were observed during the bioblitz and are known to call this area home. These and other large mammals have experienced a drastic reduction in their available habitat largely due to human development and footprint. Since mining activities have already altered habitat in the region and harmed the ecological integrity of the area it is vitally important that special attention is paid to reclamation and future impacts of human access in the Cheviot Mine lease area. Mining activities limit human access and are predictable to wildlife, and as much of the disturbed area has been reclaimed as wildlife habitat, wildlife have begun to use this landscape¹⁰. This area is undergoing reclamation that must focus on creating wildlife habitat and supporting these populations. During the planning process to re-open this area after reclamation, the management intent of the region must reflect its importance to wildlife populations that have come to rely on areas with reduced human access. Any human access, especially motorized access, must not reduce the ability of wildlife to thrive in the Cardinal Divide. This means keeping motorized trails out of prime wildlife habitat.

Conclusion

The bioblitz was a successful, well-organized event that enabled many participants to see this special region with new detail-oriented eyes. It was also effective in collecting images, videos, and data that has already enabled participating organizations to increase our public awareness about the area. With 443 species observed overall, the bioblitz confirms the Cardinal Divide's legacy as a highly biodiverse area, and its importance in the conservation of Alberta and Canada's natural history. The information and images from the event have been used to create social media posts, newsletters, and a blog post. This report will also continue to be an asset in supporting greater conservation for the area. Possible future bioblitz's could add to the documentation of species in the Cardinal Divide and could be a way to assess species trends over time.

Acknowledgments

We would like to sincerely thank all participants for their time and effort in making this event a success. The invited experts, volunteers, and CDCC members generously gave their time and expertise over two days in the region, and after the event in identifying species through iNaturalist.

A full list of contributors are available on the CDCC BioBlitz iNaturalist project page (<https://inaturalist.ca/projects/cardinal-divide-conservation-coalition-bioblitz-2023>) and the Cardinal

Headwaters trip iNaturalist project page (<https://inaturalist.ca/projects/cardinal-headwaters-trip>)

We would also like to extend a huge thank you to those that provided financial support for the event:



Alberta Conservation Association
Alberta Ecotrust Foundation
CPAWS Northern Alberta Members
Alberta Wilderness Association Members

Of course, this event would not have been possible without the time and expertise of the Cardinal Divide Conservation Coalition Members: Kristen Andersen, Beth MacCallum, and Elisabeth Beaubien.



Alberta Wilderness
Association



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Association

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Appendix I: BioBlitz Observations

Table AI: Species observations gathered in iNaturalist during the CDCC BioBlitz (July 14 - 16 2023), and the Cardinal Headwaters trip (August 5- 7 2023) can be viewed on iNaturalist.

<https://inaturalist.ca/projects/cardinal-divide-conservation-coalition-bioblitz-2023>

<https://inaturalist.ca/projects/cardinal-headwaters-trip>