Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp Plant Biodiversity Project

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ABSTRACT

Kenora Chiefs Advisory (KCA) provides social, health, and educational services to the associated First Nations communities that improve their expertise and well-being. As a project of KCA, the Ogimaawabiitong Kenora Chiefs Advisory Youth and Family Wellness Camp opened in July 2021. In addition to serving as a cultural hub for the surrounding communities, this 326-acre site in Kenora, Ontario, is home to a variety of local plant species of Northwestern Ontario. Understanding the potential of the Camp's vegetation to provide future educational and recreational opportunities for youths and Elders, the Ogimaawabiitong KCA Youth and Family Wellness Camp Plant Biodiversity Project was started as a knowledge-sharing initiative in collaboration with the Camp. The main objective of this project was to survey and list the plant diversity of the KCA Youth and Family Wellness Camp. To accomplish this objective of listing the observed plant biodiversity, deliverables were developed that included a list of all the observed plants at the selected stands and patches, including their GPS coordinate points, a summary report of the habitat, common characteristics, indigenous and modern uses of the observed plants, a map of the selected patches and a booklet that summarized all these information. As this project was intended for learning purposes, the deliverables have provided KCA staff with resources to develop other products and services relevant to the programming they deliver at the Camp. The strategy of inquiry applied to this project was a qualitative strategy named ethnography, and the methodologies to produce the deliverables were observation and document review/analysis. This practicum document contains the deliverables and a critical reflection on the project, explaining what I learned from implementing it. An appendix containing the Integrated Project Plan, which served as a guide for project execution, is also included.

ACKNOWLEDGEMENTS

I would like to begin by conveying my gratitude to the Natural Resource Institute for enabling me to pursue my dream of becoming a plant scientist. I am grateful to the department for the chances I've had and the possibilities it has opened for me in the future.

Second, I want to thank Dr. Iain Davidson-Hunt, my advisor for being the finest mentor I could have asked for, being my outstanding source of emotional support when I was living away from home and family in Canada, and for giving me access to an abundance of information about Canadian plants. I truly value all your assistance and encouragement during my adjustment period. Dr. Hunt's support and commitment to excellence helped me to finish my master's practicum. I sincerely appreciate your patience and advice throughout the process; without you, I could not have completed it.

A special thank you to Melissa Payne, Ogimaawabiitong Kenora Chiefs Advisory Youth & Family Wellness Camp, my project partner, for agreeing to collaborate and consistently giving me the resources, I needed to finish the project. Your interest in the project and your confidence in my ability to complete it make me very appreciative. Thank you for your support and feedback. I genuinely believe the deliverables will be helpful to the Ogimaawabiitong KCA Youth & Family Wellness Camp.

Next, I would like to thank Sheldon McLeod and Ryan Haines for their dedication to serving on my committee. I will always be grateful for their time to meet, talk about this project, and provide insightful input. Your enthusiasm and unwavering encouragement have inspired me to keep improving my deliverables.

Finally, but just as importantly, I want to express my gratitude to my family for their support and belief in me over the three years it took me to finish the program. My partner deserves special thanks for his continuous love and inspiration. Whether I needed a friend to lean on, reassuring words, or giving me the environment to concentrate on my studies, he was always there. I will always be thankful for every little thing that added up to a significant impact.

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CHAPTER 1: INTRODUCTION

Kenora Chiefs Advisory (KCA) provides social, health, and educational services to the associated First Nations communities that improve their expertise and well-being. As a project of KCA, the Ogimaawabiitong Kenora Chiefs Advisory Youth and Family Wellness Camp opened in July 2021 and, over time, gained popularity among guests by offering communal activities like gardening, beach days, fall harvesting, Right to Play programming, and much more on their property. In addition to serving as a cultural hub for the surrounding communities, this 326-acre site in Kenora, Ontario, is home to a wide variety of local plant species from Northwestern Ontario. Understanding the potential of the Camp's vegetation to provide future educational and recreational opportunities for youths and Elders, the Ogimaawabiitong KCA Youth and Family Wellness Camp Plant Biodiversity Project was started as a knowledge-sharing initiative in collaboration with the Camp.

This project aimed to list the plant variety of the Camp property, which has a varied terrain comprising various wetlands and ridges and slopes of mixed wood, hayed fields, and coniferous forests. Compiling ethnobotanical knowledge by identifying the native plant groups and collecting their functional roles is the key to preserving ecosystem health. Since KCA works to provide programs and services to First Nations in the areas of health, education, and social services in a holistic, conventional manner to ensure the continuation of the Anishinaabe way of life, the knowledge collected through this project aspired to provide resources to help staff develop further educational products and services that inform Camp users and visitors about the vegetation that is currently in the area.

To accomplish this objective of documenting the observed plant biodiversity, deliverables were developed that included a list of all the observed plants at the selected stands and patches, including their GPS coordinate points. After consulting with the KCA Camp management, the stands and patches were chosen to ensure the sites had favorable future potential and were conveniently accessible to Camp guests. With approval from the KCA Camp administration, two plant identification apps were also selected and used to identify the species of plants being spotted at the time. All the designated locations were visited in the summer of 2022, and the names of the observed plants were recorded using plant identification apps. Images of the plants were taken to use them for other deliverables and to cross-check the identification with other online sources later. To enable anybody to find the plant on the land in the future, a handheld GPS device was taken to each stand and patch to record the GPS coordinate points of the plants. In addition, a summary report on the plants observed was prepared. It contained an overview of the plant stand or patch, information on the distribution of the plants across Ontario, the stand's ecological features and history, a few common characteristics to help identify the plant without plant identification apps, and their indigenous and modern uses. A map that displayed all the chosen plant stands, and patches were also made, utilizing the list of plants with GPS coordinate points as a reference. Finally, a booklet summarizing the plant biodiversity information from the KCA Youth and Family Wellness Camp was created, and the map was attached for the convenience of the booklet's users.

Melissa Payne, a qualified dietician at Ogimaawabiitong Kenora Chiefs Advisory and the project spokesperson for the Ogimaawabiitong KCA Youth and Family Wellness Camp, was the project partner for the Plant Biodiversity project. The first step was to meet Melissa and Serena Kenny, the KCA Youth and Family Wellness Camp's operations manager, to go over the project's future that my supervisor and I had planned. We had meetings throughout the project concept and planning phase, during which I developed a project plan that would be feasible for me as a graduate student and would also give them useful information. Melissa and Serena put effort into answering my emails, clarifying any doubts I had, or offering comments on the project deliverables. Their primary responsibility was to acquaint me with the KCA Youth and Family Wellness Campsites and offer recommendations on the extent of this undertaking. I needed to gather the information for my plant survey at the Camp, create the deliverables, and revise them considering their input.

The project proposal and charter were reviewed at an official meeting, which served as the first chance to reflect on the project's first year. The summary report and the map, which comprised the second and third deliverables, were also forwarded to the project partner and the committee members for input and revisions. We got together again after the initial meeting to discuss and review the draft booklet that would be the project's fourth and last deliverable. It also contained an overview of the KCA Youth and Family Wellness Camp's overall plant biodiversity. To make the booklet appropriate for use by the KCA Youth and Family Wellness Camp staff and guests. Melissa, along with my committee members Sheldon and Ryan, commented on the booklet's layout and texts. These comments included adding crucial definitions to terms used in plant science to describe the traits and varieties of plants, as well as selecting appropriate plant image sizes to recognize the plants. As a result, I produced the main deliverable that would be helpful as educational material for the KCA Youth Camp staff and the visitors.

I completed a background information report to help guide the creation and execution of the Ogimaawabiitong KCA Youth and Family Wellness Camp Plant Biodiversity project to understand better the Camp's plant biodiversity and how to summarize it. Through this research, I learned about the ecology of Northwestern Ontario's boreal forests and the features of Kenora, Ontario's vegetation. I also learned how to use environmental interpretation for education and leisure. I came to see how the KCA Youth and Family Wellness Camp Plant Biodiversity might enhance this Camp's potential as a fantastic location for the community members to engage in environmental interpretation after reading literature sources that discuss indigenous environmental interpretation. I had to learn how to use a handheld GPS device in addition to researching plant identification apps that would yield the most accurate results to correctly identify the plants of the chosen stands and patches of the Camp. I had to study and learn about the common traits of the plants, their distribution, and their commercial or industrial applications from books and research papers that would enhance their presence in the Camp to prepare the summary report of the plants I had observed. I then conducted interviews and hired a GIS specialist. We met several times to confirm the precise GPS coordinates for the stands and patches to create the map of the plant biodiversity of the Camp. I had to learn how to convert UTM data to latitude and longitude points for this procedure and then find those locations on Google Earth. Lastly, I worked on the layout of my booklet to arrange the photographs and

writing in a manner that would be easy to read and distribute for the KCA Youth and Family Wellness Camp.

The most important lesson I took away from organizing and carrying out a project of this kind was to provide deliverables that the project partners could utilize going forward, such as undertaking parallel projects that would further inform them about the nutritional information of the vegetation. Effective planning and communication with my project partners proved to be the most beneficial to me. Through planning, I was able to anticipate certain project risks, like the inability to find and hire a GIS expert and mitigate their potential to have a detrimental effect on the project. Regular communication with my project partners allowed me to stay updated on the project's progress and enabled me to spot problems as they emerged and adjust as necessary.

The list of plants is the first deliverable you will come across in the following pages. It comprises all plant survey data collected during the first year of this project and is the starting point for learning what's out there on the KCA Camp property. This deliverable is followed by the summary report, which offers the most information regarding the vegetation characteristics of the Camp. The map that resulted from the GPS coordinate points—which served as the guide to finding the plant stands and patches on the Camp, is the third deliverable attached after the summary report. Subsequently, you will find the PDF booklet summarizing all the information on the first three deliverables.

The Critical Reflection I wrote on the project and my experience managing the project will be available for you to read following the deliverables. My usage of the Integrated Project Plan is discussed in the Critical Reflection and is included in the appendices.

CHAPTER 2: DELIVERABLE 1; LIST OF PLANTS

This list is the first deliverable of the “Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp Plant Biodiversity Project.” Deliverable 1 was developed based on the plant survey that was done in the Summer of 2022 at the Camp property. It provides the partner with a detail list of plant species surveyed and the GPS location of each plant.

Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp Plant Biodiversity Project

Deliverable 1: List of Plants

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Nawrin Tania (Project Manager), University of Manitoba
in partnership with:

Iain Davidson Hunt (Advisor), Natural Resources Institute
Melissa Payne (Partner), KCA Youth & Family Wellness Camp

BIRCH STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0402862 UTM 5518774
Common Yarrow	*Achillea millefolium*	15 U 0402862 UTM 5518774
Timothy Grass	*Phleum pratense*	15 U 0402862 UTM 5518774
Reed Canary Grass	*Phalaris arundinacea*	15 U 0402862 UTM 5518774

BIRCH & TREMBLING ASPEN STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0402827 UTM 5518718
Trembling Aspen	*Populus tremuloides*	15 U 0402827 UTM 5518718
Large-leaved Aster	*Eurybia macrophylla*	15 U 0402827 UTM 5518718
Western Serviceberry	*Amelanchier alnifolia*	15 U 0402827 UTM 5518718

BIRCH & POPLAR STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch (Diameter 18.5 inches/58 mm)	*Betula papyrifera*	15 U 0402830 UTM 5518738

Balsam Poplar	*Populus balsamifera*	15 U 0402830 UTM 5518738
Beaked hazelnut	*Corylus cornuta*	15 U 0402830 UTM 5518738
Box Elder	*Acer negundo*	15 U 0402830 UTM 5518738

BIRCH STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0402809 UTM 5518694
Lobster Mushroom	*Hypomyces lactifluorum*	15 U 0402805 UTM 5518686
Wild Sarsaparilla	*Aralia nudicaulis*	15 U 0402805 UTM 5518686
Beaked Hazelnut	*Corylus cornuta*	15 U 0402805 UTM 5518686
Mountain Maple	*Acer spicatum*	15 U 0402805 UTM 5518686

BIRCH STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0402851 UTM 5519035
Red osier dogwood	*Cornus sericea*	15 U 0402851 UTM 5519035
Mountain Maple	*Acer spicatum*	15 U 0402851 UTM 5519035
Beaked Hazelnut	*Corylus cornuta*	15 U 0402851 UTM 5519035

BIRCH STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0402861 UTM 5519044
Bur Oak	*Quercus macrocarpa*	15 U 0402861 UTM 5519044
Spreading Dogbane	*Apocynum androsaemifolium*	15 U 0402861 UTM 5519044
Downy Arrowwood	*Viburnum rafinesqueanum*	15 U 0402861 UTM 5519044
Glaucous Honeysuckle	*Lonicera dioica*	15 U 0402861 UTM 5519044

BIRCH STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0402878 UTM 5519099
Balsam Poplar	*Populus balsamifera*	15 U 0402871 UTM 5519091
Glaucous Honeysuckle	*Lonicera dioica*	15 U 0402871 UTM 5519091
Oval leaved Dogwood	*Cornus alternifolia*	15 U 0402871 UTM 5519091
Alfalfa	*Medicago sativa*	15 U 0402861 UTM 5519069
Canada Goldenrod	*Solidago canadensis*	15 U 0402861 UTM 5519069
Mountain Maple	*Acer spicatum*	15 U 0402861 UTM 5519069

BIRCH STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0403056 UTM 5519176
Canada Dogwood	*Cornus canadensis*	15 U 0403056 UTM 5519176
Large-leaved Aster	*Eurybia macrophylla*	15 U 0403056 UTM 5519176
Canadian Anemone	*Anemonidium canadense*	15 U 0403056 UTM 5519176
King Bolete Mushroom	*Boletus edulis*	15 U 0403056 UTM 5519176

BIRCH & POPLAR STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0403073 UTM 5518856
Balsam Poplar	*Populus balsamifera*	15 U 0403073 UTM 5518856
Spreading Dogbane	*Apocynum androsaemifolium*	15 U 0403073 UTM 5518856

BIRCH STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0403082 UTM 5518812
Spreading Dogbane	*Apocynum androsaemifolium*	15 U 0403082 UTM 5518812
Large-leaved Aster	*Eurybia macrophylla*	15 U 0403082 UTM 5518812

Glaucous Honeysuckle	*Lonicera dioica*	15 U 0403082 UTM 5518812
Fire/Pin Cherry	*Prunus pensylvanica*	15 U 0403082 UTM 5518812

BIRCH STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0402685 UTM 5518399
Mountain Maple	*Acer spicatum*	15 U 0402685 UTM 5518399
Chokecherry	Prunus virginiana	15 U 0402685 UTM 5518399

BIRCH STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0402640 UTM 5518384
American Hazelnut	Corylus americana	15 U 0402640 UTM 5518384
Red osier dogwood	*Cornus sericea*	15 U 0402640 UTM 5518384
Mountain Maple	*Acer spicatum*	15 U 0402640 UTM 5518384

BIRCH STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0402822 UTM 5518426
Balsam Poplar	*Populus balsamifera*	15 U 0402822 UTM 5518426
White Pine	*Pinus strobus*	15 U 0402822 UTM 5518426
Beaked Hazelnut	*Corylus cornuta*	15 U 0402822 UTM 5518426

Maryland Sanicle	*Sanicula marilandica*	15 U 0402822 UTM 5518426

BIRCH STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0402706 UTM 5518162
Balsam Poplar	*Populus balsamifera*	15 U 0402706 UTM 5518162
Box Elder	*Acer negundo*	15 U 0402706 UTM 5518162
Tansy	*Tanacetum vulgare*	15 U 0402706 UTM 5518162

BIRCH STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0402635 UTM 5517938
Common Juniper	*Juniperus communis*	15 U 0402635 UTM 5517938
White Spruce	*Picea glauca*	15 U 0402635 UTM 5517938

BIRCH STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0402556 UTM 5517874
Glaucous Honeysuckle	*Lonicera dioica*	15 U 0402556 UTM 5517874

BIRCH STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0402994 UTM 5519089
Prickly Rose	*Rosa acicularis*	15 U 0402994 UTM 5519089

BIRCH STAND

Common English Name	Scientific Name	GPS Coordinate point
Paper Birch/White Birch	*Betula papyrifera*	15 U 0403102 UTM 5518742

TREMBLING ASPEN STAND

Common English Name	Scientific Name	GPS Coordinate point
Trembling Aspen	*Populus tremuloides*	15 U 0402841 UTM 5518752
Norway Spruce	*Picea abies*	15 U 0402841 UTM 5518752
Balsam Poplar	*Populus balsamifera*	15 U 0402835 UTM 5518757
Round-leaved Dogwood	*Cornus rugosa*	15 U 0402835 UTM 5518757

BALSAM POPLAR STAND

Common English Name	Scientific Name	GPS Coordinate point
Balsam Poplar	*Populus balsamifera*	15 U 0402814 UTM 5518708
White Spruce	*Picea glauca*	15 U 0402814 UTM 5518708
Black Spruce	*Picea mariana*	15 U 0402814 UTM 5518708
Chokecherry	Prunus virginiana	15 U 0402814 UTM 5518708
Beaked Hazelnut	*Corylus cornuta*	15 U 0402814 UTM 5518708

Large-leaved Aster	*Eurybia macrophylla*	15 U 0402814 UTM 5518708

CHOKECHERRY PATCH

Common English Name	Scientific Name	GPS Coordinate point
Chokecherry	*Prunus virginiana*	15 U 0402801 UTM 5518662
Prickly Rose	*Rosa acicularis*	15 U 0402801 UTM 5518662
Large-leaved Aster	*Eurybia macrophylla*	15 U 0402801 UTM 5518662
Virginia Strawberry	*Fragaria Strawberry*	15 U 0402801 UTM 5518662
Canada Goldenrod	*Solidago canadensis*	15 U 0402801 UTM 5518662
Maryland Sanicle	*Sanicula marilandica*	15 U 0402801 UTM 5518662

MOUNTAIN MAPLE PATCH

Common English Name	Scientific Name	GPS Coordinate point
Mountain Maple	*Acer spicatum*	15 U 0402780 UTM 5518671
Beaked Hazelnut	*Corylus cornuta*	15 U 0402780 UTM 5518671
Canada Mayflower	*Maianthemum canadense*	15 U 0402780 UTM 5518671
Prickly Gooseberry	*Ribes cynosbati*	15 U 0402780 UTM 5518671

TREMBLING ASPEN STAND

Common English Name	Scientific Name	GPS Coordinate point
Trembling Aspen	*Populus tremuloides*	15 U 0402775 UTM 5518635
Horseweed	*Erigeron canadensis*	15 U 0402775 UTM 5518635
Downy Arrowwood	*Viburnum rafinesqueanum*	15 U 0402775 UTM 5518635

BALSAM POPLAR & FIR STAND

Common English Name	Scientific Name	GPS Coordinate point
Balsam Poplar	*Populus balsamifera*	15 U 0402757 UTM 5518694
Balsam Fir	*Abies balsamea*	15 U 0402757 UTM 5518694
Beaked Hazelnut	*Corylus cornuta*	15 U 0402757 UTM 5518694
Western Bracken Fern	*Pteridium aquilinum*	15 U 0402757 UTM 5518694

POPLAR STAND

Common English Name	Scientific Name	GPS Coordinate point
Balsam Poplar	*Populus balsamifera*	15 U 0402818 UTM 5518771
Paper Birch/White Birch	*Betula papyrifera*	15 U 0402818 UTM 5518771
Bur Oak	*Quercus macrocarpa*	15 U 0402818 UTM 5518771
Large-leaved Aster	*Eurybia macrophylla*	15 U 0402818 UTM 5518771
Beaked Hazelnut	*Corylus cornuta*	15 U 0402818 UTM 5518771
American Vetch	*Vicia americana*	15 U 0402818 UTM 5518771
Veiny Pea	*Lathyrus venosus*	15 U 0402818 UTM 5518771

RASPBERRY & BANEBERRY PATCH

Common English Name	Scientific Name	GPS Coordinate point
Red Raspberry	Rubus idaeus	15 U 0402837 UTM 5518774
Red Baneberry	Actaea rubra	15 U 0402837 UTM 5518774

RASPBERRY PATCH

Common English Name	Scientific Name	GPS Coordinate point
Red Raspberry	*Rubus idaeus*	15 U 0402801 UTM 5518952
Perennial Sow Thistle	*Sonchus arvensis*	15 U 0402801 UTM 5518952
Prickly Rose	*Rosa acicularis*	15 U 0402801 UTM 5518952

POPLAR STAND

Common English Name	Scientific Name	GPS Coordinate point
Balsam Poplar	*Populus balsamifera*	15 U 0402806 UTM 5518961
Box Elder	Acer negundo	15 U 0402806 UTM 5518961
Prickly Rose	*Rosa acicularis*	15 U 0402806 UTM 5518961

MUSHROOM PATCH

Common English Name	Scientific Name	GPS Coordinate point
Amanita Mushroom	*Amanita muscaria*	15 U 0402820 UTM 5518997
White Spruce	*Picea glauca*	15 U 0402820 UTM 5518997
Balsam Fir	*Abies balsamea*	15 U 0402820 UTM 5518997
Chokecherry	*Prunus virginiana*	15 U 0402820 UTM 5518997
Perennial Sow Thistle	*Sonchus arvensis*	15 U 0402820 UTM 5518997

SASKATOON BERRY PATCH

Common English Name	Scientific Name	GPS Coordinate point
Saskatoon Berry	*Amelanchier alnifolia*	15 U 0402828 UTM5519007
Large leaved Aster	*Eurybia macrophylla*	15 U 0402828 UTM5519007

Chokecherry	*Prunus virginiana*	15 U 0402828 UTM5519007
Box Elder	*Acer negundo*	15 U 0402828 UTM5519007

BLACK HAWTHORN PATCH

Common English Name	Scientific Name	GPS Coordinate point
Black Hawthorn	*Crataegus douglasii*	15 U 0402879 UTM 5519100

OAK STAND

Common English Name	Scientific Name	GPS Coordinate point
Bur Oak	*Quercus macrocarpa*	15 U 0402893 UTM 5519070
Beaked Hazelnut	*Corylus cornuta*	15 U 0402892 UTM 5519081
Saskatoon Berry	*Amelanchier alnifolia*	15 U 0402892 UTM 5519081

OAK STAND

Common English Name	Scientific Name	GPS Coordinate point
Bur Oak	*Quercus macrocarpa*	15 U 0402971 UTM 5519080
Balsam Poplar	*Populus balsamifera*	15 U 0402971 UTM 5519080
White Spruce	*Picea glauca*	15 U 0402971 UTM 5519080

LILAC PATCH

Common English Name	Scientific Name	GPS Coordinate point
Common Lilac	*Syringa vulgaris*	15 U 0403012 UTM 5519091
Black Ash	*Fraxinus nigra*	15 U 0403012 UTM 5519091
Saskatoon Berry	*Amelanchier alnifolia*	15 U 0403012 UTM 5519091

GREEN, BLACK ASH & PLUM STAND

Common English Name	Scientific Name	GPS Coordinate point
Green Ash	*Fraxinus pennsylvanica*	15 U 0403022 UTM 5519083
Black Ash	*Fraxinus nigra*	15 U 0403022 UTM 5519083
American Plum	*Prunus americana*	15 U 0403020 UTM 5519095

OAK STAND

Common English Name	Scientific Name	GPS Coordinate point
Bur Oak	*Quercus macrocarpa*	15 U 0403023 UTM 5519126
Green Ash	*Fraxinus pennsylvanica*	15 U 0403023 UTM 5519126
Saskatoon Berry	*Amelanchier alnifolia*	15 U 0403021 UTM 5519137
Chokecherry	*Prunus virginiana*	15 U 0403021 UTM 5519137
Woodland Strawberry	*Fragaria vesca*	15 U 0403021 UTM 5519137
Maryland Sanicle	*Sanicula marilandica*	15 U 0403021 UTM 5519137
Smooth Blue Aster	*Symphyotrichum laeve*	15 U 0403021 UTM 5519137
Red Osier Dogwood	*Cornus sericea*	15 U 0403021 UTM 5519137

TREMBLING ASPEN STAND

Common English Name	Scientific Name	GPS Coordinate point
Trembling Aspen	*Populus tremuloides*	15 U 0403039 UTM 5519157
American Plum	*Prunus americana*	15 U 0403039 UTM 5519157
Bebb's Willow	*Salix bebbiana*	15 U 0403039 UTM 5519157
Large leaved Aster	*Eurybia macrophylla*	15 U 0403039 UTM 5519157
Tall hairy Agrimony	*Agrimonia gryposepala*	15 U 0403039 UTM 5519157

Spreading Dogbane	*Apocynum androsaemifolium*	15 U 0403039 UTM 5519157
Maryland Sanicle	*Sanicula marilandica*	15 U 0403039 UTM 5519157

WHITE SPRUCE STAND

Common English Name	Scientific Name	GPS Coordinate point
White Spruce	*Picea glauca*	15 U 0403056 UTM 5519172
Balsam Poplar	*Populus balsamifera*	15 U 0403056 UTM 5519172
Bur Oak	*Quercus macrocarpa*	15 U 0403056 UTM 5519172

STRAWBERRY PATCH

Common English Name	Scientific Name	GPS Coordinate point
Virginia Strawberry	*Fragaria virginiana*	15 U 0403055 UTM 5519187
Red Baneberry	*Actaea rubra*	15 U 0403055 UTM 5519187
Fire Cherry	*Prunus pennsylvanica*	15 U 0403055 UTM 5519187
Golden Chanterelle Mushroom	*Cantharellus cibarius*	15 U 0403055 UTM 5519187
Paper Birch/White Birch	*Betula papyrifera*	15 U 0403055 UTM 5519187

OAK STAND

Common English Name	Scientific Name	GPS Coordinate point
Bur Oak	*Quercus macrocarpa*	15 U 0403063 UTM 5519243
Balsam Poplar	*Populus balsamifera*	15 U 0403063 UTM 5519243
Paper Birch	*Betula papyrifera*	15 U 0403063 UTM 5519243
Canadian Buffaloberry	*Shepherdia canadensis*	15 U 0403063 UTM 5519243
Gilled Mushroom	*Infundibulicybe gibba*	15 U 0403063 UTM 5519243

Prairie Rose	*Rosa arkansana*	15 U 0403063 UTM 5519243
Downy Arrowwood	*Viburnum rafinesqueanum*	15 U 0403063 UTM 5519243
Prickly Gooseberry	*Ribes cynosbati*	15 U 0403063 UTM 5519243

BLUEBERRY & CHOKECHERRY PATCH

Common English Name	Scientific Name	GPS Coordinate point
Velvetleaf Blueberry	*Vaccinium myrtilloides*	15 U 0403081 UTM 5519263
Chokecherry	*Prunus virginiana*	15 U 0403081 UTM 5519263
Jack Pine	*Pinus banksiana*	15 U 0403077 UTM 5519254
Red Pine	*Pinus resinosa*	15 U 0403077 UTM 5519254
Staghorn Sumac	*Rhus typhina*	15 U 0403081 UTM 5519263

RED PINE STAND

Common English Name	Scientific Name	GPS Coordinate point
Red Pine	*Pinus resinosa*	15 U 0403021 UTM 5519277
Bur Oak	*Quercus macrocarpa*	15 U 0403021 UTM 5519277
Paper Birch	*Betula papyrifera*	15 U 0403021 UTM 5519277
White Spruce	*Picea glauca*	15 U 0403017 UTM 5519240
Prairie Rose	*Rosa arkansana*	15 U 0403014 UTM 5519202

POPLAR STAND

Common English Name	Scientific Name	GPS Coordinate point
Balsam Poplar	*Populus balsamifera*	15 U 0403033 UTM 5518902
Mountain Maple	*Acer spicatum*	15 U 0403033 UTM 5518902

TREMBLING ASPEN & POPLAR STAND

Common English Name	Scientific Name	GPS Coordinate point
Trembling Aspen	*Populus tremuloides*	15 U 0403093 UTM 5518902
Balsam Poplar	*Populus balsamifera*	15 U 0403093 UTM 5518902
Chokecherry	*Prunus virginiana*	15 U 0403093 UTM 5518902
Pearly Everlasting	Anaphalis margaritacea	15 U 0403093 UTM 5518902

SASKATOON BERRY PATCH

Common English Name	Scientific Name	GPS Coordinate point
Saskatoon Berry	*Amelanchier alnifolia*	15 U 0403063 UTM 5518789
Trembling Aspen	*Populus tremuloides*	15 U 0403072 UTM 5518772
Veiny Pea	*Lathyrus venosus*	15 U 0403063 UTM 5518789
Bebb's Willow	*Salix bebbiana*	15 U 0403063 UTM 5518789
Downy Arrowwood	*Viburnum rafinesquianum*	15 U 0403072 UTM 5518772
Beaked Hazelnut	*Corylus cornuta*	15 U 0403072 UTM 5518772

POPLAR STAND

Common English Name	Scientific Name	GPS Coordinate point
Balsam Poplar	*Populus balsamifera*	15 U 0403092 UTM 5518721
Beaked Hazelnut	*Corylus cornuta*	15 U 0403092 UTM 5518721

DOGWOOD & CHOKECHERRY PATCH

Common English Name	Scientific Name	GPS Coordinate point
Red Osier Dogwood	Cornus sericea	15 U 0403065 UTM 5518670
Chokecherry	Prunus virginiana	15 U 0403065 UTM 5518670

GREEN ASH STAND

Common English Name	Scientific Name	GPS Coordinate point
Green Ash	*Fraxinus pennsylvanica*	15 U 0403015 UTM 5518639
Box Elder	*Acer negundo*	15 U 0403015 UTM 5518639
Mountain Maple	*Acer spicatum*	15 U 0403015 UTM 5518639
Red Osier Dogwood	*Cornus sericea*	15 U 0403015 UTM 5518639

TREMBLING ASPEN & POPLAR STAND

Common English Name	Scientific Name	GPS Coordinate point
Trembling Aspen	*Populus tremuloides*	15 U 0402765 UTM 5518554
Balsam Poplar	*Populus balsamifera*	15 U 0402765 UTM 5518554
White Wood Aster	*Eurybia divaricata*	15 U 0402765 UTM 5518554
Virginia Strawberry	*Fragaria virginiana*	15 U 0402765 UTM 5518554
Canadian Bunchberry	*Cornus canadensis*	15 U 0402765 UTM 5518554
Veiny Pea	*Lathyrus venosus*	15 U 0402765 UTM 5518554

JUNIPER & SPRUCE STAND

Common English Name	Scientific Name	GPS Coordinate point
Canadian Juniper	*Juniperus communis depressa*	15 U 0402738 UTM 5518492
White Spruce	*Picea glauca*	15 U 0402741 UTM 5518494

Spreading Dogbane	*Apocynum androsaemifolium*	15 U 0402738 UTM 5518492

CHOKECHERRY PATCH

Common English Name	Scientific Name	GPS Coordinate point
Chokecherry	*Prunus virginiana*	15 U 0402693 UTM 5518402
Smooth Blue Aster	*Symphyotrichum laeve*	15 U 0402693 UTM 5518402

BLACK SPRUCE STAND

Common English Name	Scientific Name	GPS Coordinate point
Black Spruce	*Picea mariana*	15 U 0402626 UTM 5518361

BALSAM FIR STAND

Common English Name	Scientific Name	GPS Coordinate point
Balsam Fir	*Abies balsamea*	15 U 0402599 UTM 5518293

FIREWEED & RASPBERRY PATCH

Common English Name	Scientific Name	GPS Coordinate point
Fireweed	Chamaenerion angustifolium	15 U 0402823 UTM 5518434
Red Raspberry	Rubus idaeus	15 U 0402825 UTM 5518442

BALSAM FIR & TREMBLING ASPEN STAND

Common English Name	Scientific Name	GPS Coordinate point
Balsam Fir	*Abies balsamea*	15 U 0402696 UTM 5518192
Trembling Aspen	*Populus tremuloides*	15 U 0402696 UTM 5518192
Beaked Hazelnut	Corylus cornuta	15 U 0402696 UTM 5518185
Bracken fern	*Pteridium aquilinum*	15 U 0402696

		UTM 5518185

WHITE SPRUCE STAND

Common English Name	Scientific Name	GPS Coordinate point
White Spruce	Picea glauca	15 U 0402677 UTM 5518135

RASPBEERY & BOX ELDER PATCH

Common English Name	Scientific Name	GPS Coordinate point
Red Raspberry	*Rubus idaeus*	15 U 0402673 UTM 5518130
Box Elder	*Acer negundo*	15 U 0402673 UTM 5518130
White Birch	*Betula papyrifera*	15 U 0402673 UTM 5518130

JUNIPER PATCH

Common English Name	Scientific Name	GPS Coordinate point
Canadian Juniper	*Juniperus communis depressa*	15 U 0402675 UTM 5518113
Amanita Mushroom	*Amanita muscaria*	15 U 0402675 UTM 5518113
Woodland Strawberry	*Fragaria vesca*	15 U 0402675 UTM 5518113
Pearly Everlasting	Anaphalis margaritacea	15 U 0402675 UTM 5518113

TREMBLING ASPEN & POPLAR STAND

Common English Name	Scientific Name	GPS Coordinate point
Trembling Aspen	*Populus tremuloides*	15 U 0402674 UTM 5518099
Balsam Poplar	*Populus balsamifera*	15 U 0402674 UTM 5518099

*** Poison Ivy (*Toxicodendron radicans*): Latitude 49.816662°, Longitude -94.3491462°, Altitude 319.2532857 m

BALSAM FIR & BUNCHBERRY STAND

Common English Name	Scientific Name	GPS Coordinate point
Balsam Fir	*Abies balsamea*	15 U 0402631 UTM 5518015
Canadian Bunchberry	*Cornus canadensis*	15 U 040 2625 UTM 5518007

TREMBLING ASPEN & POPLAR STAND

Common English Name	Scientific Name	GPS Coordinate point
Trembling Aspen	*Populus tremuloides*	15 U 0402628 UTM 5517981
Balsam Poplar	*Populus balsamifera*	15 U 0402628 UTM 5517981

BOX ELDER & WHITE SPRUCE STAND

Common English Name	Scientific Name	GPS Coordinate point
Box Elder	*Acer negundo*	15 U 0402576 UTM 5517939
White Spruce	Picea glauca	15 U 0402576 UTM 5517939

TREMBLING ASPEN STAND

Common English Name	Scientific Name	GPS Coordinate point
Trembling Aspen	*Populus tremuloides*	15 U 0402564 UTM 5517889
Chokecherry	*Prunus virginiana*	15 U 0402564 UTM 5517889
Fire/Pin Cherry	*Prunus pensylvanica*	15 U 0402564 UTM 5517889
Limber Honeysuckle	*Lonicera dioica*	15 U 0402560 UTM 5517877

BIRCH & HONEYSUCKLE STAND

Common English Name	Scientific Name	GPS Coordinate point
White Birch	*Betula papyrifera*	15 U 0402556 UTM 5517876
Limber Honeysuckle	*Lonicera dioica*	15 U 0402556 UTM 5517876

CHAPTER 3: DELIVERABLE 2; SUMMARY REPORT

This report is the second deliverable of the "Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp Plant Biodiversity Project." Deliverable 2 was developed through literature review of the dominant plant species from the list of plants (Deliverable 1). It includes the uses of the observed plants and the ecological features or ecological history of the selected patches of plants.

Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp Plant Biodiversity Project

Deliverable 2: Uses of the observed plants and the ecological association of the selected patches
Summarized Report

This project is partially funded by: University of Manitoba Graduate Entrance Scholarship (Tania); Graduate Enhancement of Tri-Council Stipends (Tania); and, the Social Science and Humanities Research Council, Project #435-2020-0923 (Davidson-Hunt, PI)

Nawrin Tania (Project Manager), University of Manitoba
in partnership with:

Iain Davidson Hunt (Advisor), Natural Resources Institute
Melissa Payne (Partner), KCA Youth & Family Wellness Camp

SUMMARY REPORT

Background:

This project at the Ogimaawabiitong Kenora Chief Advisory (KCA) Youth and Family Wellness Camp focuses on summarizing the plant biodiversity. As such, this project includes research and documentation of the common plant species in some KCA Youth and Family Wellness Campsite regions.

In this report, I have prepared an overview of plants found in specified vegetation patches found on the property of the KCA Youth and Family Wellness Camp. I hope that this can serve as educational resources for the KCA employees, enabling them to share their understanding of plant biodiversity with others. The vegetation summary of this summary report could assist the staff in creating products and services that inform Camp users and visitors about the local flora. The information gathered for this summary report will be utilized to create a PDF booklet accompanied by a PDF map.

This report is the second deliverable of the "Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp Plant Biodiversity Project." It includes the uses of the observed plants and the ecological features or ecological history of the selected patches of plants. Two plant identification apps are used to identify all plants: Picture This and Seek by iNaturalist. All images of this summary report were taken by Nawrin Tania at the KCA Youth & Family Wellness Camp during the summer of 2022. Same images with higher resolution are attached in the plant biodiversity booklet for identification purpose, which is the fourth deliverable.

A total of 80 species of plants are observed throughout the selected patches. Information regarding the most common plants among those is listed below in this summary report. The PDF map, which is the third deliverable, shows the location of these tree stands and plant patches on the property of the KCA Youth and Family Wellness Camp.

BIRCH STAND OVERVIEW

Paper birch or white birch is the most common species observed at KCA Youth & Family Wellness Camp. Birch stands are found in fourteen different locations in the selected areas of the Camp. Birches ranging from (0.1-0.2) meters in diameter, with a few around 0.5 meters, grew in clayey/loamy soil. Birch stands are primarily situated in mixed wood forest areas with sloping sites in the property. Various plant species, including other deciduous poplar trees, are seen as understory species of the birch stands. Birch and poplar occurred mixed together in two locations and the birch stands show signs of past fire disturbances. Signs of wildlife use were observed for example, around birch stands near the pond, red-winged blackbirds and red-eyed vireos were seen flying around which may have used the birch stands for cover and food sources.

Image: From left: 1) Birch patch 2) Paper birch/White birch.

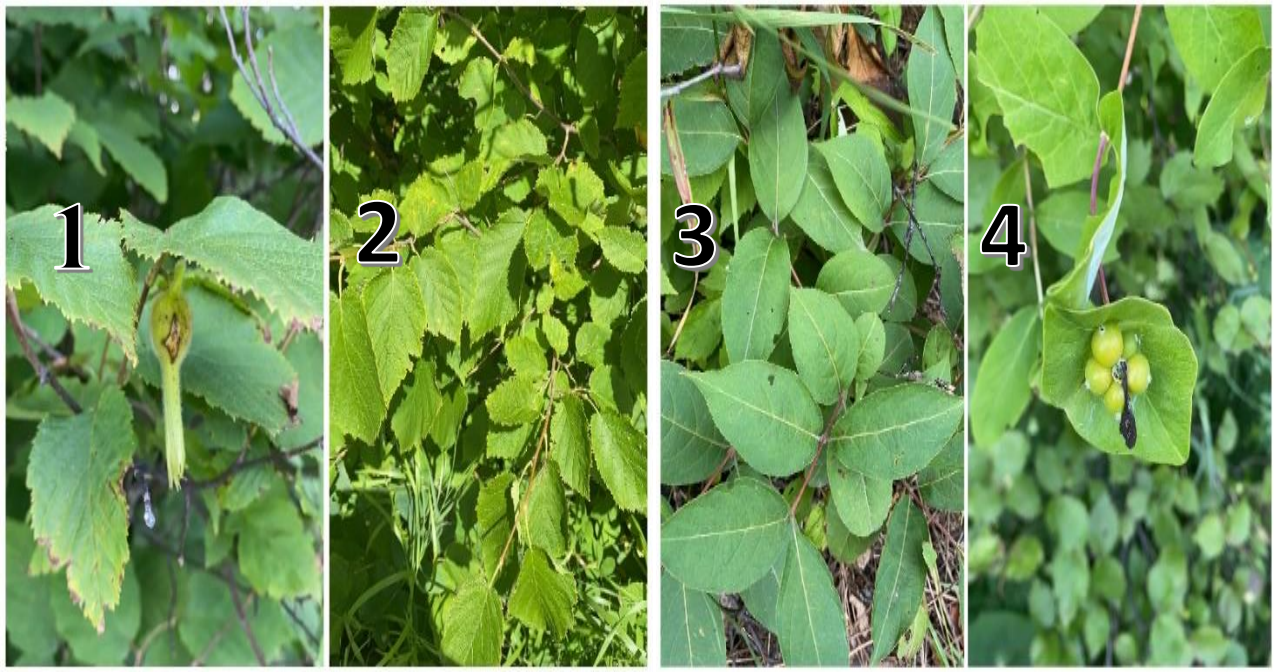

Image: From left, 1st row: Beaked hazelnut (1,2); Honeysuckle (3,4); 2nd row: 1) Reed canary grass 2) King bolete mushroom 3) Spreading dogbane 4) Alfalfa 5) Common yarrow; 3rd row: 1) Canadian anemone 2) Lobster mushroom 3) Common tansy 4) Wild sarsaparilla 5) Canada goldenrod.

Common characteristics	Paper Birch/White Birch is a deciduous tree rarely over 9 to 11 meters but can grow higher than that in Ontario (17,18). It has fuzzy twigs, white bark, and egg-shaped leaves with hair tufts in the vein axils (1,2).

Habitat/Ecological history	Common across the boreal forest, mountains, and openings along rivers in Canada and the northern United States (1). Birch may be found all the way up to the tree line in Canada's wooded areas (3). It may be found to grow with other species, such as other birches, pines, spruces, poplars, maples, and balsam firs on a broad range of soil types (3). The medium-sized shade-intolerant white birch tree may be observed in a range of soil and water conditions (4). Being a pioneer plant that depends on fire and is frequently found in uninterrupted stands in burnt and disturbed regions; it is usually found with aspen (4).
Indigenous uses	Birch is significant for Anishinaabe people having been used for millennia (22). Birchbark is harvested in late June and July since that is when it peels the easiest (5). According to historians, birch has over 21 different traditional uses (4). Indigenous groups in central and northern Canada harvested and utilized the sap (2). The Tanaina people of Alaska have used fresh birch sap as a spring tonic and medicine; the Nlaka'pamux people of British Columbia have used it as a cold remedy (2).
Modern potential	Birchwood is valued and is widely known throughout the northern hemisphere (1). Well-made birch bark baskets and bark-biting art have a large tourist and gallery market. Birch essential oil is used for aromatherapy (1). Birch treetops for natural-looking semi-artificial trees have a market among interior design companies (1). Birch branches make attractive furniture, bird cages, baskets, and wreaths with properly maintained leafy branches. Birch bark in the shape of flat sheets, strips, or leaves, as well as hollowed birch logs, are also in high demand for use in floral arrangements, accent pieces for decor, lamp bases, bird feeders, flowerpots, and candles (1). The antiviral properties of betulin against the AIDS virus and the anticancer properties of betulinic acid against melanoma and malignant brain tumors all point to the enormous potential of birch bark as a source of substantial pharmaceuticals (1).
Understory species	Common understory species found in the birch stands are various types of grasses and herbs. In the birch stands on this property, yarrow was found near the end of one stand around the pond, along with timothy grass, reed canary grass, alfalfa, goldenrod, tansy, Canadian anemone, wild sarsaparilla, spreading dogbane, and few species of mushroom in rare instances (King bolete mushroom, lobster mushroom) throughout the stands. The other observed common understory species are the northern bush honeysuckle, glaucous honeysuckle, and beaked hazelnut.

	Northern bush honeysuckle is up to 1 m tall, low, erect, or an arching shrub (6). Sometimes discovered in stony or arid woods and clearings from middle Saskatchewan east to the Maritimes and south across the eastern USA (1). Common in Northwestern Ontario and persistent as it is found in a variety of fresh/dry upland forest habitats as well as woods' margins, clearings, and rocky outcrops and slopes (6). The “Flambeau Ojibwe” are recorded to blend the root with other plants, such as Ground Pine, for their most cherished urinary remedy (5). It is possible that a few of the indigenous practices included the cooled decoction or infusion of root or stem as a wash for sore eyes or to promote breastfeeding (1). One option for growing this attractive shrub is for decoration (1). It is also has been used as a diuretic and an anti-itching medication by Europeans as herbal remedies (5). **The smooth honeysuckle (Glaucous honeysuckle)** is a small shrub that usually looks like a vine and can go as long as 3 to 3.7 meters (7). It may be found in oak, pine forests, rocky slopes, shorelines, and fencerows (7) It is the primary nectar source for hummingbirds. The Chippewa have used the honeysuckle stems as a diuretic (7). **Beaked hazelnut** is a shrub up to 3 m high that grows along the edges of riverbanks, in highland clearings and borders of northern hardwood woods, and dune thickets (4,6). Distribution of the beaked hazelnut spans the whole North America (2). Beaked hazelnuts can be consumed fresh, mildly toasted, or mashed into food (6). Indigenous people in North America have used nut oil to cook with and as a toothache remedy (6).

TREMBLING ASPEN STAND OVERVIEW

After birch, trembling aspen is the second most common species observed and present at almost all the selected sites of the KCA Youth and Wellness Camp. Birch stands are found in four different locations in the selected areas of the Camp and trembling aspen mixed with birch trees is found in one location. Balsam poplar is seen frequently grown around the trembling aspen stands in the selected areas. Trembling aspen is shade-intolerant like other aspens and is an incredible species for fast growth (7).

Image: Trembling aspen

Common characteristics	Broad-leaved, medium- to large-sized hardwood, reaching heights of up to 12-24 meters (on average) (6,17). Egg-shaped to round, alternate leaves; flowers grow on catkins (6). Very intolerant of shade (4). It often reproduces in clones, becoming up to 21 meters tall from root suckers (7).
Habitat/Ecological history	One of the species with the most significant geographic distribution in North America is found throughout Canada's wooded regions (3). It may be found on a variety of soil types and favors protected locations. It was typically discovered in pre-settlement sites in open, lowland areas like the borders of marshes and streams, wet-mesic, rich regions, and less frequently on withered, granular soils (4). Trembling aspen frequently follows fires on fertile terrain and is found with red maple, balsam poplar, large tooth aspen, white birch, pines, and oaks depending upon the location (7).
Indigenous uses	Records show that Indigenous peoples from across the continent have used *Populus tremuloides* as a medicinal herb (4). The species' crushed leaves, stems, roots, and bark were particularly notable for being used as a poultice for stings and minor wounds (4). This species is thought to enhance digestion by increasing bile production (4). The tree's inner bark was dried and milled into a fine flour to make bread by various communities in addition to its medical purposes (4). Trembling aspen has also been used as a

	food plant by these people. During food shortages, as an alternative, the inner bark has been consumed raw or has been used as flour or strips in a stew to help thicken the broth (4).
Modern potential	Trembling aspen is a significant commercial timber species used to make sawn lumber, chipboard, and pulpwood (6). Today, *P. tremuloides* generates a few items, including furniture, pallets, and tongue depressors, thanks to its lightweight, decay-resistant wood (4). Most trembling aspens harvested for logging are used to make pulp goods like books and newspapers (USDA 2018). Additionally, this species is a preferred option for landscaping because of its smooth, light bark, golden-yellow fall leaves, and capacity for visual screening (4). Useable protein is abundant in aspen leaves (6). They are now being studied as a supplement to the human diet and a meal for animals (6). It may be eaten in the spring when it tastes almost like honeydew melon by removing the outer bark and peeling the inner bark and cambium with a knife (1). Fish and pork can be smoked using dry or rotten wood (1). Long ago, salt was made from the ashes of aspen trees (1). In addition to providing shelter for several birds and small mammals, *P. tremuloides* provides food for wildlife, such as moose, black bears, deer, and ruffed grouse (15). They eat the plant's fallen bark, buds, and leaves. (15).

BALSAM POPLAR STAND OVERVIEW

Balsam poplar is another common plant species observed at the selected sites. Balsam poplar stands are found in five different locations at the Camp. It is a tough, quickly growing tree that typically lives only a few decades, while some trees might survive for 200 years (15). Several species of aster, downy arrowwood, western bracken fern have mostly dominated balsam poplar stands as understory species. Woodpecker nests were observed in some of the broken poplars which indicates sign of wildlife use.

Image: From left: 1) Balsam poplar 2) Poplar stand

Image: From left, 1) Large leaved aster 2) Western bracken fern 3) Smooth blue aster 4) Blue wood aster 5) Downy arrowwood.

Common characteristics	Medium- to large-sized, broad-leaved hardwood, 15 to 18 meters high on average (6,17). Fragrant buds; alternate egg-shaped to lance-shaped leaves (6). Balsam poplar trees develop clonal patches from their widely dispersed root systems (7). Female flowers are greenish, whereas male blossoms are crimson. The common name comes from the female catkins' ability to form tiny

	capsules after pollination, which release seeds bound to cottony fibers (21). The small seeds are made to float on this fiber so they may travel in the wind (21). Older trees have brittle branches more prone to breaking, female trees create a lot of debris from the wasted catkins, and reasonably quick root suckers can cause undesired colonization of lawns, sidewalks, and roads (8).
Habitat/Ecological history	The most northern American hardwood is the balsam poplar (15). It spreads across the continent on upland and floodplain locations, although it develops most effectively in riverine floodplains. Along with conifers, black ash, red maple and trembling aspen, depending upon the location, it is found in lowland areas that are chilly and damp (7).
Indigenous uses	Indigenous people in the Americas have long known that a few compounds from poplar winter buds have medicinal potential (8). For instance, a balm of Gilead (salve or ointment) has been used to ease congestion by heating the winter buds in oil (8). The Balsam Poplar buds have been cooked by the “Pillager Ojibwe” in lard or bear fat, and the cooled result has been used for cuts, bruises, and other injuries as a salve (5). Additionally, they have massaged it into their noses, allowing the balsamic scents to flow through their respiratory systems and clear any congestion brought on by a cold, catarrh, or bronchitis (5). Scientific research backs up some traditional applications, but its use in commercial products has been limited (1). The cambium has been used as a food source for hunger and may have been consumed by hunters throughout the summer (1).
Modern potential	There are several possible uses for balsam poplar hybrids. Including being used for windbreaks and shelterwood, the tree's buds and other sections contain volatile chemicals that give out a scent. These substances have been discovered and may possess advantageous biological and aesthetic qualities (8). Balsam poplar, however, exhibits several unfavorable characteristics in urban settings (8). Natural stands are often neglected, but as hardwood consumption rises, so does their use (8). Even though wood may have been used to make a wide range of goods, species of aspen are favored. However, balsam poplar may make wafer boards with outstanding

	mechanical properties (8). When alternative species are not accessible in northern regions, balsam poplar is utilized for milling house logs and structural timber (8). Treetops for creating natural-looking semi-artificial trees are in high demand among interior design companies (1). Branch utilization includes furniture decoration, bird cages, baskets, wreaths, and exceptionally maintained leafy branches (1). Animal feed supplements may be made from the leaves and tiny woody components (8)
Understory species	One of the most prevalent plants in aspen/birch forests is **large-leaved aster (7)**. It features heart-shaped basal leaves in thick patches (6,7). The Anishinaabe utilized the whole plant as a hunting charm and a solution of the root to treat headaches (7). Generally, **western bracken ferns** are found in sunny areas (6). It may grow up to 1 m tall and has a branching rhizome with solitary leaves. This fern's rhizome has historically been cooked and consumed in North America (6). However, a carcinogenic ingredient has been identified from the plant by current study, and eating is advised to avoid it (6). A toxin found in mature leaves may gravely harm horses and cattle (6). **The blue wood aster's** smooth, branching stem can grow up to 1.5 meter tall from a small rhizome (7). The many blue or purple blooms bloom in groups on spreading branches from August through October (7). It grows in clearings, thickets, and woodlands (7). Indigenous Peoples in North America have traditionally used the plant's root to smoke and manufacture incense to entice deer during hunting seasons (7). The shrub known as **downy arrowwood** may reach a height of 1.5 meters (7). It grows well on calcareous soil and is found in open woodlands, rocky woods, and dry thickets (7). The bark was traditionally one of the ingredients of "kinnikinnik" used by Indigenous Peoples in North America (7).

OAK STAND OVERVIEW

Two oak stands are observed throughout the selected areas. It is also seen grown mixed with other trees. Oak trees exhibit various life history characteristics that reflect how they evolved in this area with frequent wildfires (16). Oaks may also be found in woods protected from fire and savannas that burn yearly (16). As a result, it is assumed that the corky and thick bark and deep roots are adaptations to get scarce nutrients or withstand environmental stress (18). Oak's valuable features can vary fire behavior by impacting fuels and their combustion, affecting fire regimes (16).

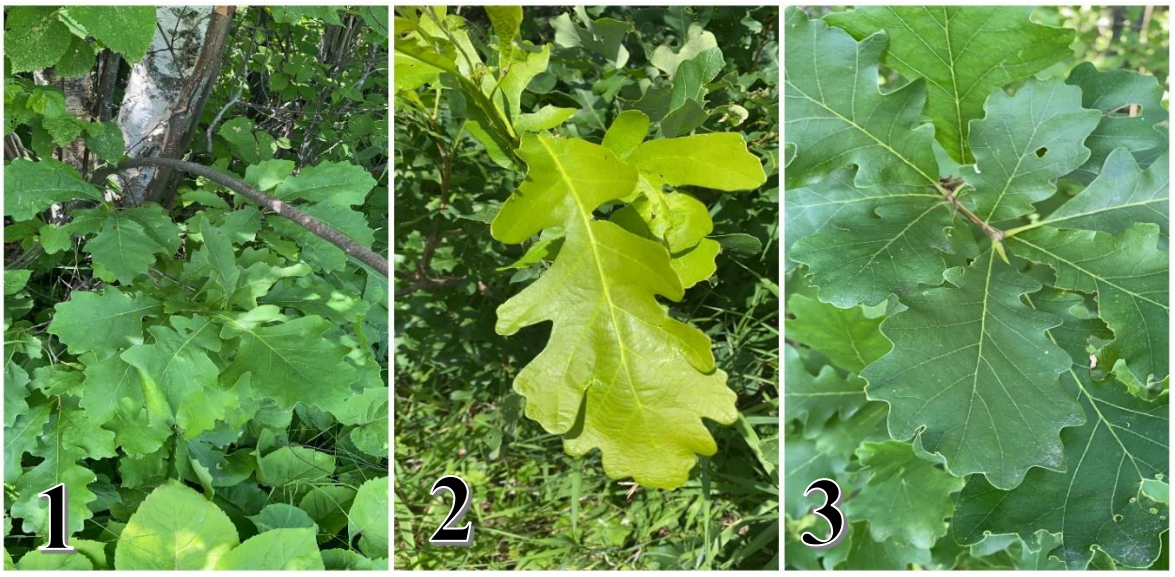

Image: Bur oak (1,2,3)

Common characteristics	Bur oak is a large tree with spreading branches that reach 12 to 13 meters tall (7,17). It bears large leaves with a shiny green exterior (18). Having deep furrows, the bark is thick and dark brown (18). The fruit is an acorn, and the cap has a fringed rim that extends halfway down the nut (7).
Habitat/Ecological history	It is the most prevalent native white oak (3). It grows best in deep, fertile bottomlands; it is also found in highland limestone soils and, at the northern limits of its distribution, on shallow soils over granitic bedrock, sometimes in mixtures with other species (3). It is tolerant of shade and dryness and its thick bark makes it fire-resistant, which explains why it may be found in grasslands (3).

Indigenous uses	The edible acorns were frequently the primary food source among the Indigenous people of North America (7). A decoction of the interior bark has been utilized as a medicine for heart and lung problems as well as cramps. Previously, the bark has been applied as an astringent for binding an injured foot or leg (7).
Modern potential	Oak trees provide many benefits for animals and humans (9). The acorns are loved by wildlife, notably deer, squirrels, and birds, who may also eat the leaves. Furniture, flooring, waterproof containers, and other items are made from wood and utilized by humans (9).

BALSAM FIR STAND OVERVIEW

Balsam fir stands are observed at two locations of the selected areas including around the wetland areas. Bunchberry is seen growing around the balsam fir trees as an understory species and occurring together in a mixed stand.

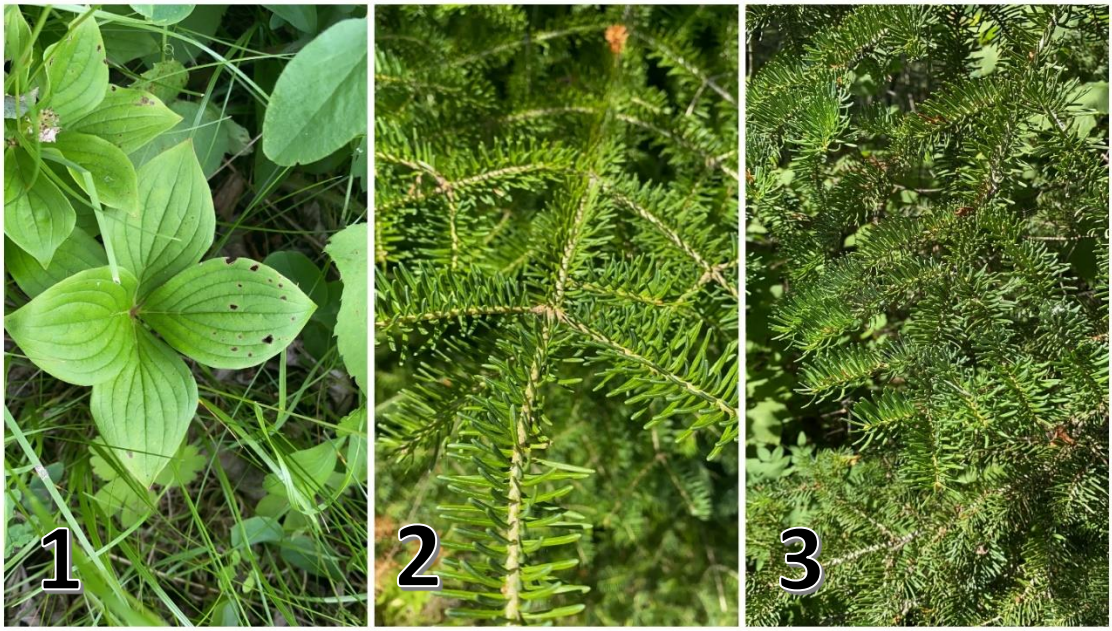

Image: From left: 1) Canadian bunchberry (2,3) Balsam fir

Common characteristics	Balsam fir is a medium-sized, slender, symmetrical evergreen tree of 15 to 18 meters in height (6,7,17). Balsam fir has smooth grey bark covered with pitch blisters (1). Its regular crown eventually tapers to a spire-like apex, making it a unique tree of the northern woods of central and eastern Canada (3).

Habitat/Ecological history	Balsam fir is widespread in damp forests across the boreal forest, from Alberta east to Newfoundland and south to central USA (1). It is observed in pure stands or grows with trembling aspen, white birch, and spruces (3). It is tolerant to a variety of soils and temperatures. It is a slow-growing, transient tree that may be found in cedar swamps, bogs, coniferous and mixed woodlands (7).
Indigenous uses	This tree was used in traditional medicine to cure many conditions, including headaches, rheumatic joints, colds, coughs, ulcers, and sore eyes. Balsam fir was also employed in the sweat bath ritual as a wash and hair treatment (1). The Montagnais of Quebec have used grated balsam fir inner bark as food (2). In addition to using the bark infusion to cure colds and coughs, the Woods Cree of Saskatchewan also used pitch mixed with grease as an ointment to heal wounds, scabies, boils, and other skin issues (1).
Modern potential	There is a high demand for balsam fir boughs, wood, resin, and bark for essential oil extraction, even though there is no contemporary commercial medicinal use (1). In addition to serving as an aromatic and antibacterial component in soaps, cosmetics, flavorings, floor polishes, and disinfectants, it is utilized to create an "absolute" for fragrances (1). Balsam fir wood is mainly used for pulp since it is too delicate and fragile to form decent timber (1). The resin, also known as Canada balsam, has been utilized as a source of turpentine and as an adhesive for microscope slides and optical lenses. Christmas trees made of balsam fir are also cultivated (1).
Understory species	Canadian bunchberry or dogwood bunchberry was observed as an understory species in the balsam fir stand. It is a low, erect perennial that grows 0.1 to 0.2 meters tall from a rhizome that spreads widely and frequently forms large patches (6). It can be found on the fringes of bogs and swamps, beneath conifers, in mixed woodlands, or under conifers (7). Despite being bland and unappealing to humans, berries are an essential food source for animals (6). However, they provide a tasty pudding when cooked with whey. This species is one of several being researched for natural chemicals that may be used as chemotherapeutic agents in the treatment of cancer (6). The roots have been used to make a mild tea that has been used to alleviate newborn colic (6).

RASPBERRY & BANEBERRY PATCH OVERVIEW

Raspberry and baneberry patches are observed in three locations at the selected areas of the KCA Youth & Family Wellness Camp, occurring mixed together or forming separate patches. Although often they are observed as an understory species of other tree stands. Raspberry is a varied species with various morphologies, but it often resembles garden raspberries in that it is an upright, deciduous shrub (2).

Image: From left: 1) Red baneberry 2) Wild red raspberry

Common characteristics	**Raspberry** plants frequently have long stems typically covered in many bristles and/or hooked prickles (2). The leaves are 3 to 5 divided, with 2 or 4 tiny lateral leaflets and a big, pointed terminal leaflet (2). The fruits are red and raspberry-like, although often smaller. The blooms are white (pink in one form), individually or in loose clusters (2). The tall perennial **baneberry** has broad compound leaves and a terminal spike of tiny white blooms that develop into vivid red berries (1).
Habitat/Ecological history	**Raspberry** is found throughout the majority of Canada, from the interior of British Columbia to the Maritime Provinces and Newfoundland; in the north to Alaska, the Yukon, and the Northwest Territories; in the south to California, Tennessee, and

	North Carolina, extending into northern Mexico; also occurs in Eurasia (2). It is prevalent in Northwestern Ontario (6). Scattered within forest settings on a variety of soil, sites, and stand conditions while in open spaces and disturbed terrain can be abundant (6). Throughout North America, **baneberries** may be found in abundance in lush, shaded forests and beside stream borders (6). Common in Northwest Ontario. Predominantly in fresh/moist, frequently calcareous, fine-grained mineral soils in hardwood and mixed wood forest settings (6).
Indigenous uses	**Raspberries** are often quite tasty despite being smaller than those of cultivated kinds (descended from this species) (2). They were a significant and well-liked food among Indigenous Peoples in Canada (2). An infusion of the root bark has been used as an eye wash, while a decoction of the root has been used to cure diarrhea, measles, and stomachache (7). The luscious, delicious berries were served as a food source and a flavoring for medication (7). **Red baneberry** is known to be toxic (1). However, the roots have been combined with 20 other plants to make a decoction to cure nasal bleeding, excessive menstrual flow, childbirth pain, and wounds (1). The use of this species requires highly specialized training and should not be utilized without the guidance of a person knowledgeable of its use.
Modern potential	The commercial potential of **raspberries** is well known, and there may also be a market for the leaves for herbal medicine (1). Red dye may be made from the berries by boiling them (1). **Baneberry** has no immediate commercial use due to its toxic properties and highly specialized use in low concentrations (1).

WHITE SPRUCE & BOX ELDER STAND OVERVIEW

White spruce stands are observed in two locations and white spruce mixed with box elder is seen to grown in one location of the selected stands. Catbird sound was heard around the spruce stands which suggests wildlife use of the stands.

Image: From left: 1) White spruce (2,3) Box elder.

Common characteristics	**White spruce**, an evergreen conifer, can be up to 28 meters in height, with an average size of 15 meters (6). White spruces are tall, erect forest trees with thin, compact crowns and branches that frequently reach the ground (2). The bark is rough and somewhat grey (2). Ash like in appearance; **box elder** is the only maple in North America with compound leaves (3 to 7 leaflets per leaf) (7). Young box elder twigs range in color from purple to green and have a distinctive white wax covering on their surface (7). This tree may reach heights of 15-22 meters but is generally smaller and occasionally has a diameter of 1 meter (7,17). Despite its short lifespan, the tree can sprout new branches if the main stem is destroyed (7).

Habitat/Ecological history	**White spruce** is widespread throughout northern North America (10). The provincial tree of Manitoba is the white spruce (3). Primarily found in fresh/moist mixed woods, understory occurrence can occur in a variety of soil, site, and stand conditions (6). Rarely appearing in pure stands in the overstory, balsam fir, trembling aspen, and black spruce are among its frequent neighbors (6). It is very significant for animals and soil quality due to its vast geographic distribution and abundance (10). **Box elder**, a tree commonly found along fencerows, railways, and the boundaries of old fields, is a river bottom tree that is also an aggressive invader of disturbed regions (7).
Indigenous uses	Indigenous peoples in North America have used **white spruce** for food, housing, medicine, fire, and other purposes (10). Its roots were initially utilized by the indigenous people of eastern North America to weave sheets of birch bark together and its resin as a seam sealer (6). The dried leaves (needles) have been employed as an inhalant and fumigator, and a compound decoction of the twigs has been historically used as an herbal steam for rheumatism by the "Anishinaabe" (7). Spruce roots were also employed in various manners of binding. Spruce pitch can be consumed as a treat, cambium scraped from the tree as a last resort meal and the wood burnt to smoke meat (7). Historically, **box elder's** inner bark was employed as an emetic (7).
Modern potential	**White spruce** is mainly used for pulpwood and timber (10). Additionally, it is utilized for paddles, musical instruments, and house logs. The white spruce is an excellent decorative and shade tree frequently used as a Christmas tree in various regions (10). Snowshoe hares feed on spruce bark, twigs, and needles and can find shelter on white branches during winter (14). Manitoba maple can be tapped to produce maple syrup (18).

BLACK SPRUCE & CANADIAN JUNIPER STAND OVERVIEW

Black spruce stand is observed to grow near the pond at the KCA Youth and Family Wellness Camp property. Canadian juniper is seen to grow around black spruce trees in this location. It is also seen to grow in two other locations of the selected areas on the property.

Image: Canadian juniper.

Common characteristics	**Black spruce** can be a small or medium-sized tree (average height 11-12 meters) with a thin, conical crown typically stunted or appears as a tall, vegetated pole in wetlands with inadequate drainage (4,6,17). Long-lived, relatively slow-growing, moderately shade-tolerant plant (4). **Canadian Juniper is** a low, spreading, or erect shrub that seldom reaches a height of 1.5 meters. Evergreen leaves with needles (3,11).
Habitat/Ecological history	**Black spruce** is widespread throughout N.W Ontario and Canada while being the provincial tree of Newfoundland (6,10). It occurs in various soil/site conditions, from dry/fresh, highland mineral soils to moist, organic lowlands; it is frequent in the overstory and the understory (6). In the overstory, establishing pure stands or mixed associations with white spruce, jack pine, balsam fir, trembling aspen, and white birch (6). **Canadian Juniper is** a natural shrub found throughout Canada and the Northern Hemisphere (3). It is especially abundant around Lake Superior and the in the west of Ontario-Manitoba border (11).

Indigenous uses	The roots of **black spruce** have been used to stitch boats by the "Flambeau and Couderay Ojibwe", while the resin has been extracted from cracks in the bark and used with tallow to produce pitch for sealing canoes (5). Black spruce wood may have been used to make snowshoe frames and the spruce boughs to make carpets (1). A spruce tree's trunk was once used to create dolls for young girls. The roots have been used to develop dried mats, berry storage baskets and fishnets (1). One of the primary fuel sources for many northern villages was black spruce (1). Small branches near the tree's base coated with lichens were a valuable supply of kindling for creating fires (1). Following indigenous use, spruce gum was chewed to increase endurance when jogging; it could benefit the heart and prevent shortness of breath (1). When the spruce gum is white, it may have been applied to cuts to cure infections or stop them from spreading (1).

BLACK ASH, GREEN ASH, & PLUM STAND OVERVIEW

Mostly green ashes are found among ashes in total three locations and the green ashes are (0.5-0.6) meters in diameter. Although black ash has been listed as an endangered species in eastern and southern Ontario, we only found a few black ash trees on the property. Notable wildlife use of the stands includes beaver and deer trails observed around the plum trees.

Image: From left, (1,2) Green ash; 3) Black ash; (4,5) American plum.

Common characteristics	**Black ash** is a broad-leaved, medium-sized hardwood typically 17 meters tall (6). Although black ash trees are generally small, they can occasionally reach heights up to 24 meters (7). It frequently has a leaning or "crooked" appearance (7). The typical **green ash** tree matures to a height of 18 meters and a diameter of 0.3 to 0.6 meters (7). Green ash features opposing compound leaves, much like other ashes do (7). Unnoticeable blooms of green ash occur in the springtime before the leaves appear (7). **American plum** is a shrub or small tree that may grow up to 7.7 meters tall and produces thickets (7). The opposite leaves are oblong, have a long, pointed tip and coarse teeth. The bark is smooth and thin. Loose, spherical cluster of white flowers blooms on the plant (7).
Habitat/Ecological history	**Black ash** occurs often in northern marshy forests from eastern Manitoba to the Atlantic provinces (3). The lone native ash to Newfoundland, where it grows as a little, uncommon tree (3). Although it occasionally grows in pure stands, it often coexists alongside species, including black spruce, balsam fir and red maple (3). **Green ash** trees are typical of areas that are briefly flooded in the spring (7). Due to its shade intolerance, green ash is an early successional, quickly growing, but short-lived tree (7). **American plum:** A species of central North America found in the extreme southeast of Saskatchewan, southern Ontario, and south Manitoba (3). The American plum may be found on open, disturbed, dry slopes, old fields, fencerows, roadside edges, and damp wooded areas (7).

Indigenous uses	**Black ash** has many traditional uses from snowshoes, to lodges, to cradle boards (23). According to pioneer mythology, Ashwood was traditionally used to make cradles for babies as a snake-repelling charm (6). Conventional medicine applies Inner bark infusion to painful eyes (7). The inner bark of **green ash** was a traditional element in a compound tonic used by the Anishinaabe for unidentified purposes (7). **American plum:** Traditional medicinal practices included a compound poultice made from the inner bark or a decoction of the bark as a wound disinfectant and a compound decoction of the roots for worms (7).
Modern potential	**Black ash's** wood is very ring-porous, making it the perfect material for basketry splints, barrel hoops, snowshoe frames, canoe ribs, and woven chair seats (10). Each growth ring features a unique region for spring development that is porous and an area for summer growth that is thick and may be twisted permanently into a basket splint (10). If it is moistened and pounded, it splits into thin sheets. It is used mainly for furniture and interior finishes and is deeper in color with more grain (10). **American plum**- Outside of its natural habitat, it is planted in Canada as an ornamental and for its fruit (3).

RED OSIER DOGWOOD & CHOKECHERRY PATCH OVERVIEW

Red osier dogwood and chokecherry patches have been observed in two locations including near the beach area. Red-osier dogwood, technically a dogwood and not a willow, is frequently called "red willow"(4). Cattails are also seen growing around the beach area as understory species.

Image: From left, 1st row: (1,2) Common chokecherry; 2nd row: (1,2) Red osier dogwood.

Common characteristics	**Red osier dogwood** is an upright or loosely spreading shrub that seldom grows higher than 2 meters, sometimes producing dense thickets, stems, and branches that can be purple to brilliant crimson (6). It has clusters of white, berry-like fruits (6). **Chokecherry** is an upright, woody, deciduous shrub or small tree that forms thickets (10). It seldom rises higher than 9 meters. The leaves are shiny and dark green on top and lighter underneath (10).
Habitat/Ecological history	**Red osier dogwood** is found in Canada, from British Columbia to Newfoundland (2). It can develop thickets in low, damp environments like streambanks, lakeshores, floodplains, and roadside ditches (4). **Chokecherry** can be found throughout Canada and is native to North America (10).

Indigenous uses	Indigenous people of North America have smoked the inner bark of **red osier dogwood** and used that in tobacco blends in holy pipe ceremonies, according to some ethnobotanical texts (10). The sacred red osier dogwood stems have also been used to create dreamcatchers, a recorded practice of the Potawatomi. While some tribes utilized the branches to make arrows, stakes, and other tools, others consumed the white, sour berries (10). Red osier dogwood bark has also been used as a dye by the “Anishinaabe” and the “Chippewa” (10). To create the crimson, light red, black, and ecru or "khaki" colored pigments, minerals or more plants have been infused with the innermost bark (10). The inner bark of **chokecherries** has historically been used as a decoction to cure stomach cramps, a compound infusion to treat lung hemorrhages, a disinfecting wash, and a cathartic blood cleanser for scrofula (7). The inner bark has been also used as a decoction and infusion for sore throats and lung issues, and the bark has been used as a wash to strengthen and encourage hair growth (7).
Modern potential	Particularly in the Northeast, **dogwood's** juicy fruits are especially beneficial to animals (10). Animals eat fruits, leaves, and twigs (10). Birds, including the game birds game consume fruits and buds (10). Songbirds have a great place to nest among the bushes. Black bears, beavers, mountain beavers are among the mammals that consume fruit and foliage (10). Deer, elk, mountain goats, and moose forage among the branches and vegetation (10). To enhance the landscape and attract birds, red osier dogwood is frequently planted as an ornamental (10). It is also commonly used as a secondary plant in windbreaks and landscaping (10). **Chokecherries** are primarily used to produce delicious preserves, juice, jelly, and syrup (10). Historically it was a crucial fruit tree for commerce and native to North America (10,20). Chokecherry was brought to England in 1629 and has been grown as an ornamental plant ever since (10). It was initially produced as an orchard crop in North America around 1724. Chokecherry is a common ornamental in several areas of the United States (10). Shelterbelt plantings, windbreak plantings, plantings for wildlife, and mass plantings for erosion

	control are all examples of conservation purposes (10). The seeds are poisonous because hydrocyanic acid is produced in the leaves, stems, and seeds especially so when the seed is cracked open when consumed (10). If sold commercially, the almond-like nuts undergo a process to render the deadly glycosides inactive. Eating the seeds of these plants has been linked to cases of disease and fatalities (10).
Understory species	Cattails are found in marshes, lakeshores, ponds, and ditches by roadways in shallow water (4). The green flower spikes and juicy young shoots are delicious, while the cattle may be fed the pollen and seeds which contain high amount of oil (25). The rootstock is a rich source of carbohydrates. Indigenous people of North America have used rough, sharp leaves to produce mats, purses, baskets, and clothes. Leaves and stems can be used to make fabric and paper (25). In the past, bedding was filled with cotton fluff connected to fruits. Wildlife can also find food and refuge from cattails (25).

RED PINE & JACK PINE STAND OVERVIEW

This type of stand is found in one location of the property. The red pine and jack pine occurred mixed together or formed separate patches within the stand. Prickly roses are seen growing around the pines as an understory species.

Image: Prickly rose.

Common characteristics	**Red pine is a tall tre**e that may grow up to 36 meters tall but, on average is 7 meters tall (6,17). **Jackpine is t**he most common pine in Canada that grows in northern woodlands (3). Jack pine is often less than 18 meters tall and has a scraggly appearance (7).
Habitat/Ecological history	**Red pine:** An eastern pine that may be found from Newfoundland to southeast Manitoba (3). It is also a widespread tree found in eastern Canadian forest plantations, homogeneous in growth and shape, with limited genetic diversity (3). It coexists with jack pine, oaks, and aspens and thrives on acidic, sandy, well-drained soil. Red pine spreads quickly, is intolerant of shade, and frequently requires fire to colonize a new region (7). Most natural stands develop following a forest fire; the fire thins down the overstory and develops a seedbed by eliminating humus (3). The fire also minimizes competition from other trees and shrubs and cone-destroying insects and other plants and shrubs (3). **Jack pine** is prevalent in Northwest Ontario (6). It frequently grows among oaks, red pine, and big-toothed aspens in dry, sandy, acidic soil (7). It can also occasionally be found in bogs with leatherleaf. Jack pines have a rapid growth rate, a brief lifespan, and a low shade tolerance (7). Common in the overstory while, scarce in the understory of old woods. Either in mono-specific stands or with black spruce in the overstory, often forming an even-aged, post-fire forest (6). Less frequent in mixed woods with other species, such as trembling aspen (6).
Indigenous uses	In northern North America, both indigenous peoples and European settlers produced tar from the roots of **red pine** for use as a construction and boat sealant and for medicinal purposes (6). The bark and cones have been employed in undefined ways in traditional medicine; the powdered dried leaves (needles) have been used as a reviver and inhalant, and clumps of needles have been formed into figures as toys for children (7). Indigenous peoples in North America have utilized **jack pine** roots as sewing sinews (6). Pine pitch has been previously used on cedar branches to make torches (6). Jack Pine has been used as an anticonvulsant and a reviver for fainting and fits (7).

Modern uses	Red pine is used commercially due to its straight-grained, reasonably hard red pine wood (10). It is planted mainly to provide wood for poles, timber, pulpwood, and fuel. Red pine is also used for landscaping and to provide animal habitat due to its vivid bark (10). For several bird and animal species, red pine serves as cover. The seed is consumed by songbirds, deer, and small animals (10). Red pine is employed in agroforestry as shelterbelts and windbreaks. They are cultivated and maintained to safeguard animals, improve agricultural output, and prevent soil erosion (10). Windbreaks can lessen the impact of winter storms on towns that experience harsh winters and the expenditures associated with cooling and heating homes in the summer and winter, respectively (10). **Jack pine is** a priceless commercial species that is utilized for pulpwood, railroad ties, lumber, and lumber (6).
Understory species	**Prickly roses** were observed as understory species around red pine stands. It is an erect deciduous shrub growing up to 1 meter tall (2). Thick layers of bristly, sharp prickles cover the stems (2). They have five pink petals, a yellow center, and many anthers, making them incredibly appealing. The fruits, or hips, are rounded to slightly pear-shaped, crimson to purple, and still have greenish sepals at the tips (2). They can be found in open woodlands, thickets, and rocky slopes from British Columbia's interior to Quebec, up north to Alaska, the Yukon, and the southern Northwest Territories (2). Like other rose species, the Anishinaabe have used an infusion of the prickly wild rose's root as an eyewash and have consumed the buds and rose hips (7). Rose petals are an ingredient in salads or consumed as a snack. The fruit makes excellent jelly and is rich in vitamin C. Rosehip tea has a pleasant, mild flavor (6).

VELVETLEAF BLUEBERRY PATCH OVERVIEW

Velvetleaf blueberry patch is observed in one location near the lake area. Chokecherry and staghorn sumac are also seen grown around blueberry patches.

Image: 1) Velvetleaf blueberry 2) Staghorn sumac.

Common characteristics	A short, deciduous shrub with lower leaf surfaces coated in thick, velvety hairs and a tendency to develop in dense patches (2). The thin, smooth-edged, oblong to elliptic leaves. Tiny and greenish white with pink undertones, the flowers are produced in small clusters at the tips of the branches and bloom before the leaves have fully opened (2). The medium-sized, clustered blueberries have a pale, waxy sheen and are pleasant and juicy (2).
Habitat/Ecological history	It is a transcontinental plant found, from British Columbia to Newfoundland, north to the southern Northwest Territories, and south in the United States to Montana, Iowa, and Virginia (2). It can occur in peat bogs, wet, shady forests, clearings, and rocky outcrops (2).

Indigenous uses	Since they can withstand fire well, blueberry patches have historically been recorded to be burned by the “Odawa” (4). By controlled burning, invasive pests and illnesses are lessened and controlled, the amount of collected detritus on the forest floor is reduced, and the soil is replenished with vital nutrients (4). The “Flambeau and Pillager Ojibwe” are noted to harvest numerous blueberries for personal use and sale (5). In fact, most Indigenous Peoples including the “Anishinaabe, Potawatomi, Algonquin, Abenaki, Cree, Chipewyan, northern Dene, and various groups in British Columbia, particularly the Halkomelem of the Fraser Valley”, harvested the berries in large quantities and consumed them fresh or dried as they grow where they live (2).
Modern potential	Although it would be challenging for northern areas to compete with the existing market and supply lines for blueberry fruit, locally, there may be room for value-added food or beverage goods (1). Major pharmaceutical corporations are already actively looking into its possibilities in medicine despite insufficient proof supporting its effectiveness (1).
Understory species	Staghorn sumac is found in exposed, disturbed places like roadsides, hillsides, clearings, and forest margins (4). Antler-like, fuzzy branches give rise to the popular name "staghorn sumac" for this species (4). The “Pillager Ojibwe” used the root as a medication to halt bleeding (5). For usage in the winter, they also preserved the dried seed heads (5). Dried leaves were used for smoking, and the fruit and leaves were cooked down to create ink (24). Moreover, warts were treated using the sap. Because of its gorgeous autumn foliage and clusters of delicious fruit, staghorn sumac is frequently planted as an ornamental. Staghorn sumac thickets offer food and cover to a variety of birds and animals, including grouse, pheasants, deer, and moose (24).

MOUNTAIN MAPLE PATCH OVERVIEW

Mountain maples are observed as an understory species around many trees stands. Particularly in one location it is seen to grow as its own patch.

Image: Mountain maple (1,2).

Common characteristics	Mountain maple is a little tree or shrub between 3 and 5 meters high (7,11).
Habitat/Ecological history	**Mountain maple:** A typical understory tree found in eastern Canada's woodlands. It thrives on wet soils with good drainage found along streams, in ravines, and on damp rocky slopes. Prevalent, frequently forming thickets, on freshly cleared northern forest terrain. Tolerant of shade, seldom surviving in the open (3).
Indigenous uses	More frequently than any other type of leaf, the three-lobed Mountain Maple leaf is said to be a favorite among Anishinaabe women as a design for beading (5). This species' pith has a long history of usage as an eye wash (7).
Modern potential	Mountain maple is often used as an ornamental tree (3). Moose and deer enjoy eating leaves and tender stems (3). Consequently, the tree is sometimes called "moosewood" or "moose maple". Birds eat the buds in winter, while beavers and porcupines consume the bark. It can tolerate extensive browsing and will continue to grow (3).

SASKATOON BERRY PATCH

Saskatoon berry is observed as an understory species around many trees stands. Particularly in two locations it is seen to grow as its own patch.

Image: Saskatoon berry.

Common characteristics	A tall shrub with brown branches, no thorns, and simple alternating, oval leaves with teeth at the apex. Early blooming white flowers spray at the terminals of the branches and have tasty purple fruit (berry-like pomes) (1).
Habitat/Ecological history	West of Manitoba, saskatoon berry is the most widespread native variety of serviceberry (3). It occurs from British Columbia to western Quebec and the midwestern and western USA on rocky hills, streams, and forest margins (1,3).
Indigenous uses	Saskatoon berries, a type of serviceberries, are significant fruit for Indigenous People of North America (2). Fresh fruits were consumed with or without oil. They were frequently combined with other, less tasty berries as a sweetener (2). The Blackfoot and other Plains people developed pemmican, a well-known,

	calorie-dense diet for hunters and travelers, from saskatoon berries (2). To produce a blue dye, the berries can be boiled. The root and stem decoction were consumed to cure lung infections, coughs, chest discomfort, diarrhea, fever, the flu, or colds (1). In this area, the species of service berry does not produce the same quality of fruit which is why its use as a food is less than found in other locations.
Modern potential	The market for Saskatoon berries is well-established when grown in area that produce abundant and full berries (1).

BLACK HAWTHORN PATCH OVERVIEW

Black hawthorn is observed as an understory species around many trees. Particularly in one location it is seen to grow as its own patch.

Image: Black hawthorn (1,2).

Common characteristics	Up to 11 m tall, large, deciduous shrub or small tree with greyish bark and short, sharp thorns (2,3). The leaves are approximately oval or wedge-shaped, glossy, dark green, and coarsely serrated across the top (2). The fruits, which grow in drooping bunches

	and are purplish black with 3 to 5 huge nutlets inside each, are borne in flat-topped clusters with white flowers (2).
Habitat/Ecological history	They are found in open, well-drained woodlands and rocky slopes from British Columbia and Alberta through southwest Saskatchewan (perhaps also Manitoba), central Ontario, north to southern Alaska, and south to California and northern Michigan (2).
Indigenous uses	Hawthorn fruits can be eaten; however, most are bland, dry, and "seedy" (2). Some Indigenous Peoples in western Canada consumed the berries of the black hawthorn (2).
Modern potential	Today, the fruits mainly make jam and jelly (2).

STRAWBERRY PATCH

Strawberry patch is observed in one location near the lake area.

Image: Virginia strawberry

Common characteristics	Herbaceous perennials with three-parted, coarsely serrated leaves, white flowers with five petals, and delicious, juicy red fruits that are well-known to virtually everyone for their scent and delicate flavor (2). They spread by creeping stolon or runners (2).
Habitat/Ecological history	From British Columbia to the Maritimes and Newfoundland, they flourish in open woodlands and meadows throughout Canada. Alaska and Yukon are further north, where the blue leaf strawberry may be found (2).
Indigenous uses	Almost all Indigenous Peoples in Canada, particularly the younger generations, preferred fresh strawberries, and on occasion, significant quantities were gathered and dried to store for the winter (2). Tea made from the common wild strawberry's root is beneficial for stomachaches, especially in infants (5)
Modern potential	Wild strawberries may be eaten and are scrumptious (4)

AMANITA & CHANTERELLE MUSHROOM PATCH

Amanita mushroom, poisonous for human consumption, was observed in one of the patches, and an animal trail was marked alongside. Some other unidentified mushrooms were noted but not identified to species. However, they were not the most common edible mushrooms found in the region.

Image: From left: 1) Amanita mushroom 2) Chanterelle mushroom 3) Unknown.

Common characteristics	**Amanita is** a huge, watery-capped mushroom that can range in color from light yellow to orange in the northwest boreal forest (1). The gills and a white spore deposit are other distinguishing characteristics (1). A few less frequent types of **chanterelles** can be found in both white and black forms, and their colors can range from bright yellow to deep crimson (13). Depending on the kind and age, chanterelle crowns can grow up to 0.03 to 0.13 meters. False gills, which resemble short waves imprinted on the mushroom's surface, are on the underside of all chanterelle caps (13).
Habitat/Ecological history	In coniferous and deciduous open woodlands in the northern hemisphere, amanita mushroom is prevalent and extensively spread (1). Chanterelles do not grow on living or dead wood; instead, they do so from the earth (13). They frequently have a high rate of growth. They are found in mixed hardwood woodlands but have also been occasionally discovered amid mature pines, cedars, and other conifers, low rivers, and stream banks (13).
Indigenous uses	Amanita mushroom is poisonous, so it was not consumed but was boiled with other plants to produce eye drops (1).
Modern potential	Chanterelle mushroom is edible but not cultivated.

Bearberry, Virginia creeper and Poison ivy are also observed in the selected areas as understory species. **Poison ivy**, which can be allergenic to humans, is observed in one patch on the island area of the property.

In sandy soils, **bearberry** functions as a vital area stabilizer in addition to being a decorative plant (10). The evergreen nature and dense, prostrate vegetative mat of bearberry make it a highly sought-after ground cover (10). It yields fruit that a few species of game animals and songbirds consume. Occasionally, deer may casually peruse the vegetation (10).

Virginia creeper can be a helpful groundcover for erosion management and watershed protection, especially in shady locations, despite having a very open canopy structure due to its

vigorous growth and aboveground roots and sprouting behaviors. It can withstand salt and shade equally well. The Virginia creeper offers cover for several small creatures and birds. The primary eaters of the fruit are songbirds, but small animals, deer, and gamebirds will also consume them. There are occasions when deer and cattle would graze the leaves. Growing Virginia creeper as an ornamental is common due to its lovely leaves. The bark has been employed as a tonic, expectorant, and dropsy cure in homeopathic remedies.

Image: Bearberry.

Image: Virginia creeper.

References

1. Marles RJ, Clavelle C, Monteleone L, Tays N, Burns D. Aboriginal plant use in Canada's northwest boreal forest. UBC Press (University of British Columbia); 2000.
2. Kuhnlein H, Turner N. Traditional plant foods of Canadian indigenous peoples: nutrition, botany and use. Routledge; 2020 Oct 28.
3. Farrar JL. Trees of the northern United States and Canada. Iowa State University Press; 1995.
4. Pilette J, Alliance CR. Little Traverse Bay Bands of Odawa Indians Native Plants Initiative. Report from Little Traverse Bay Bands of Odawa Indians, Environmental Services Department for Conservation Resource Alliance. 2009 Oct 19.
5. Smith HH. Ethnobotany of the Ojibwe Indians. Good Press; 2021 May 19.
6. Baldwin KA, Sims RA. Field guide to the common forest plants in northwestern Ontario. Thunder Bay: Ontario Ministry of Natural Resources, Northwest Science & Technology; 1997.
7. Meeker JE, Elias JE, Heim JA. Plants used by the Great Lakes Ojibwa. Great Lakes Indian Fish &; 1993.
8. Zasada JC, Phipps HM. Populus balsamifera L. Balsam poplar. Silvics of North America. 1990;2:518-29.
9. Stoner N. Bur Oak. University of Nebraska-Lincoln. https://hles.unl.edu/bur-oak
10. Plants Database. United States Department of Agriculture. Natural Resources Conservation Service. https://plants.usda.gov/home
11. Soper JH, Heimburger ML. shrubs of Ontario. ROM; 1982.
12. Dodds, Jill S. 2022. *Pinus resinosa* Rare Plant Profile. New Jersey Department of Environmental Protection, State Parks, Forests & Historic Sites, State Forest Fire Service & Forestry, Office of Natural Lands Management, New Jersey Natural Heritage Program, Trenton, NJ. 17 pp.
13. HOW TO FIND, IDENTIFY, AND PREPARE CHANTERELLE MUSHROOMS**.** REALTREE. TIMBER 2 TABLE ARTICLES. https://realtree.com/timber-2-table-articles/how-to-find-identify-and-prepare-chanterelle-mushrooms
14. Pennsylvania Game Commission. https://www.pgc.pa.gov/Education/WildlifeNotesIndex/Pages/SnowshoeHare.aspx
15. https://plants.usda.gov/home/factSheetPlantGuideSearchResults?resultId=ed2efc37-8b4d-478d-bcb5-e7201c99ef57

16. Varner JM, Kane JM, Hiers JK, Kreye JK, Veldman JW. Suites of fire-adapted traits of oaks in the southeastern USA: multiple strategies for persistence. Fire Ecology. 2016 Aug;12:48-64.

17. Morton BR, Lewis RG. Native trees of Canada. Ottawa [Ont.]: Department of the Interior; 1921.

18. Ministry of Natural Resources and Forestry. Government of Ontario. https://www.ontario.ca/page/ministry-natural-resources-and-forestry

19. Red Pine - Pinus resinosa. The Arboretum. University of Guelph. https://arboretum.uoguelph.ca/thingstosee/trees/redpine#:~:text=Red%20pine%20is%20Ontario's%20only,reddish%20tinge%20with%20broad%20scales.

20. Agriculture. Chokecherry Production in Manitoba. https://www.gov.mb.ca/agriculture/crops/crop-management/fruit-crops/print,chokecherry-production.html#:~:text=It%20is%20native%20to%20North,and%20from%20B.C.%20to%20Newfoundland.

21. Gardening at USask. College of Agriculture and Bioresources. University of Saskatchewan https://gardening.usask.ca/articles-and-lists/articles-disorders/disorder-poplar-fuzz.php#:~:text=The%20male%20flowers%20are%20reddish,can%20spread%20in%20the%20wind.

22. Wiigwaasabak: The Tree of Life. CBC SHORT DOCS. https://www.cbc.ca/shortdocs/shorts/wiigwaasabak-the-tree-of-life#:~:text=For%20Anishinaabe%20people%2C%20the%20birch,the%20land%20and%20her%20community.

23. Turner NJ, Ari Y, Berkes F, Davidson-Hunt I, Ertug ZF, Miller A. Cultural management of living trees: an international perspective. Journal of Ethnobiology. 2009 Sep;29(2):237-70.

24. Staghorn sumac. The Arboretum. University of Guelph. https://arboretum.uoguelph.ca/thingstosee/trees/staghornsumac#:~:text=Staghorn%20Sumac%20is%20often%20planted,leaves%20were%20used%20for%20smoking.

25. The Canadian Encyclopedia. https://www.thecanadianencyclopedia.ca/en/article/cattail

CHAPTER 4: DELIVERABLE 3; MAP OF THE PLANT BIODIVERSITY

This map is the third deliverable of the “Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp Plant Biodiversity Project.” Deliverable 3 was developed from the GPS coordinate points of the dominant plant species from the list of plants (Deliverable 1). This map shows the location of the tree stands and the plant patches on the property of the KCA Youth and Family Wellness Camp.

Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp Plant Biodiversity Project

Deliverable 3: Map of the Plant Biodiversity

This project is partially funded by: University of Manitoba Graduate Entrance Scholarship (Tania); Graduate Enhancement of Tri-Council Stipends (Tania); and, the Social Science and Humanities Research Council, Project #435-2020-0923 (Davidson-Hunt, PI)

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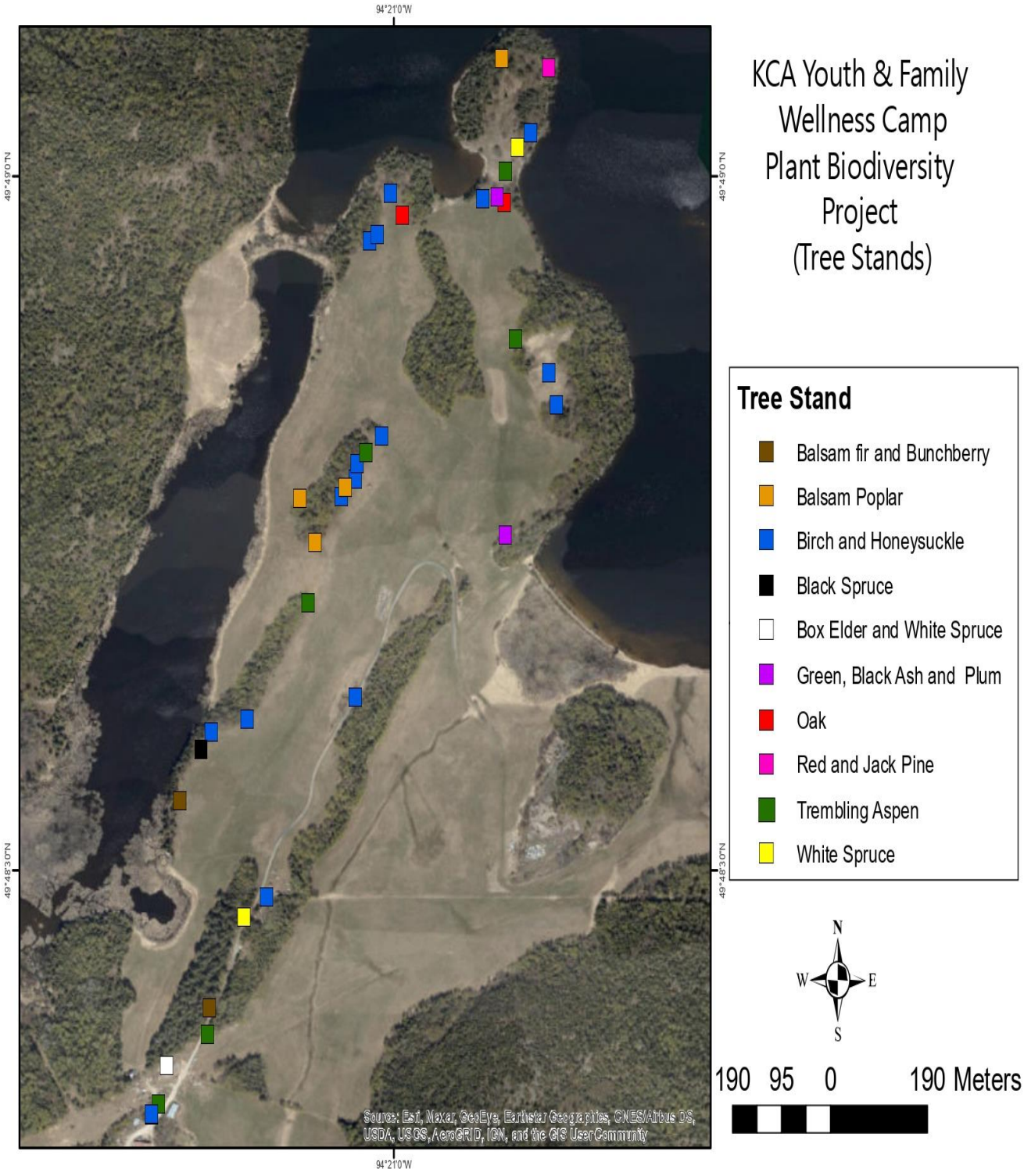
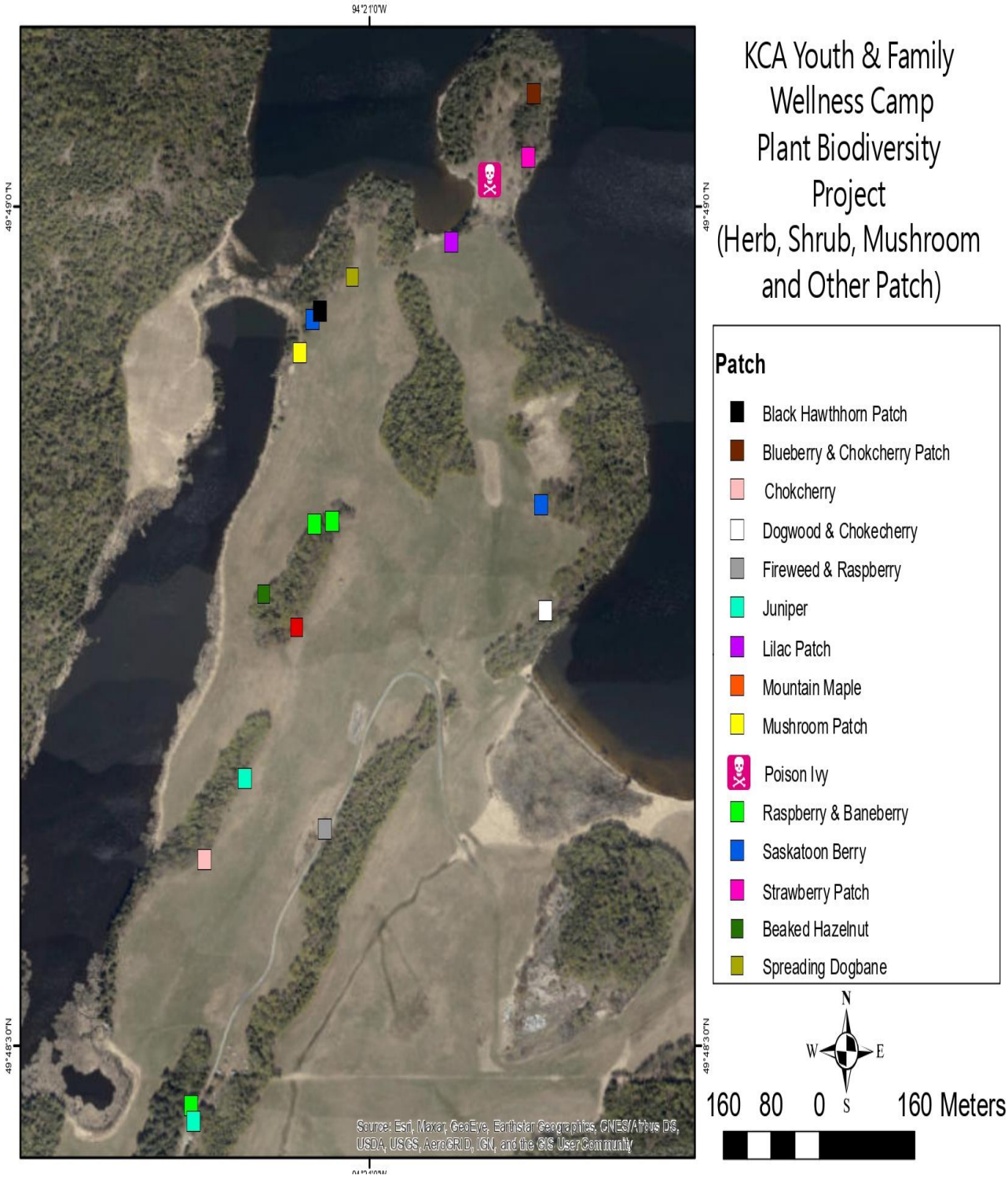
in partnership with:

Iain Davidson Hunt (Advisor), Natural Resources Institute
Melissa Payne (Partner), KCA Youth & Family Wellness Camp


94°21'0"W
49°49'0"N
49°48'30"N
KCA Youth & Family Wellness Camp Plant Biodiversity Project (Tree Stands)
Tree Stand
Balsam fir and Bunchberry
Balsam Poplar
Birch and Honeysuckle
Black Spruce
Box Elder and White Spruce
Green, Black Ash and Plum
Oak
Red and Jack Pine
Trembling Aspen
White Spruce
N
W
E
S
190 95 0 190 Meters
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


94°2'1"0"W
49°49'0"N
49°48'3"0"N
KCA Youth & Family Wellness Camp Plant Biodiversity Project (Herb, Shrub, Mushroom and Other Patch)
Patch
Black Hawthhorn Patch
Blueberry & Chokcherry Patch
Chokcherry
Dogwood & Chokecherry
Fireweed & Raspberry
Juniper
Lilac Patch
Mountain Maple
Mushroom Patch
Poison Ivy
Raspberry & Baneberry
Saskatoon Berry
Strawberry Patch
Beaked Hazelnut
Spreading Dogbane
N
W
E
S
160 80 0 160 Meters
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

CHAPTER 5: DELIVERABLE 4; PLANT BIODIVERSITY BOOKLET

This booklet is the fourth deliverable of the “Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp Plant Biodiversity Project.” Deliverable 4 was developed from all the other three deliverables. It summarizes the key information of all the deliverables.

Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp Plant Biodiversity Project

Deliverable 4: Plant Biodiversity Booklet

This project is partially funded by: University of Manitoba Graduate Entrance Scholarship (Tania); Graduate Enhancement of Tri-Council Stipends (Tania); and, the Social Science and Humanities Research Council, Project #435-2020-0923 (Davidson-Hunt, PI)

Nawrin Tania (Project Manager), University of Manitoba
in partnership with:

Iain Davidson Hunt (Advisor), Natural Resources Institute
Melissa Payne (Partner), KCA Youth & Family Wellness Camp

OGIMAAWABIITONG KENORA CHIEFS ADVISORY YOUTH AND FAMILY WELLNESS CAMP

PLANT BIODIVERSITY

A GUIDE FOR FINDING, IDENTIFYING COMMON PLANTS AND LEARNING THEIR USES

PLANT BIODIVERSITY PROJECT
IN PARTNERSHIP WITH
THE OGIMAAWABIITONG
KENORA CHIEFS ADVISORY
YOUTH AND FAMILY
WELLNESS CAMP.

The Kenora Chiefs Advisory Youth & Family Wellness Camp Plant Biodiversity Booklet is produced by Nawrin Tania for the Kenora Chiefs Advisory Youth and Family Wellness Camp staff and the visitors of the Camp.

A huge thank you to Iain Davidson-Hunt for his guidance and support on this project. Also, a special thank you to Melissa Payne, Sheldon Mcleod, Ryan Haines and Serena Kenny for their insights and knowledge.

PHOTO CREDITS

Page 80: Cultural ecosystem services by Nature & plants. © NatureScot 2020

Page 81: Ontario's Boreal Forest. Laurel Richardson, Macblog.

Page 82, 83, 84: KCA Youth & Family Wellness Camp. Photo taken by Iain Davidson Hunt. Used with permission.

Page 105: Black spruce photo by NetPS Plant Finder. ©2024 Northscaping Inc.

Page 108: Red pine photo. Website of the Ministry of Natural Resources and Forestry, Ontario.

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Page 109: Jack pine photo. Website of the Ministry of Natural Resources and Forestry, Ontario.

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The Ogimaawabiitong Kenora Chiefs Advisory Youth and Family Wellness Camp is located on the 371 Strecker Road, Kenora, Ontario. The site is a 326-acre property of land comprised of undulating topography with ridges and slopes of mixed wood forest, hayed fields, and coniferous forests, along with lower areas consisting of diverse wetlands. The Camp offers abundant land-based programming options that include youth programs, cultural and gathering places, a beach, and an equestrian farm. It's a beautiful setting with many plants and gorgeous foliage, excellent for a nature lover.

OGIMAAWABIITONG KCA YOUTH & FAMILY WELLNESS CAMP

PLANT BIODIVERSITY

BOOKLET

A GUIDE TO FINDING, IDENTIFYING COMMON PLANT SPECIES AND LEARNING THEIR USES

This booklet is intended to provide definitive information on the flora in the vicinity of the KCA Youth & Family Wellness Camp. As this project is intended for learning purposes, The landscape is divided among grasslands, vegetated areas, and stands of forests. This project focused on the shrub patches and forest stands. The booklet will provide KCA Camp staff and visitors with resources that inform them about dominant plant species, their ecological significance, values, and where to find them on the property. This information may be utilized by KCA staff to develop other products and services relevant to the programming they deliver at the Youth and Family Wellness Camp, such as, name plates for the plants or gaming activities related to plants.

The information in this booklet has been compiled from many sources including publications and online documents. A list of these sources has been provided at the end of this booklet on page 130. For readers interested in the sources for specific information details are provided in third deliverable of this practicum, "Summary report," found on pages 66-67.

Note: While some uses of plants are provided we purposely leave out details on their preparation for use. People who want to learn how to use or harvest these plants and mushrooms should consult with someone who is knowledgeable and not use this guide for that purpose.

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PLANT STANDS

PLANT PATCHES

GLOSSARY

Biodiversity describes the variety of life on nature at every scales, including genes, ecosystems, and the processes associated with evolution, culture, and the environment that keep life possible (25). Plants contribute to the total biodiversity of a place by giving it structure, shelter, and food. They also help define its environment (26). Trees, shrubs, grasses, herbaceous plants that bloom, ferns, mosses and liverworts are among them. The terms species diversity, genetic diversity within species, and ecosystem level are all included in the term **"Plant biodiversity"** (27). Being familiar with the local flora can give one a good idea of what can grow there and what those plants may be used for. Additionally, knowledge of plant biodiversity is crucial for differentiating between safe and toxic species.

Numerous studies have found that people depend on nature for their psychological, emotional, physical, and spiritual needs (43). Being in tune with nature has been linked to several advantages, including reduced stress, a sense of purpose, and ecologically sound conduct. According to research, exposure to and time spent in nature—including when nature is observed from indoor spaces—benefits children's physical, psychological, emotional, social, and intellectual health, and development. Current research suggests that facilitating access to nature, parks, and other natural areas plays a vital role in enhancing the health of human beings (44). As plants represent an essential component of nature, connecting with nature and learning about plants could play a greater important part in our process of ecological enlightenment.

Cultural Ecosystem services by nature and plants. This image is a modified version of the original image from NatureScot.

This guide focuses on giving an overview of the plant biodiversity at the Ogimaawabiitong Kenora Chief Advisory (KCA) Youth and Family Wellness Camp.

The world's largest terrestrial biome is the **boreal forest** (28). Massive areas of unmanaged forest cover the high-latitude regions of Canada, Russia, and the United States that make up the circumboreal belt of forest, which accounts for over 30% of the earth's total forest area and has more surface freshwater than any other biome (28).

From a biological standpoint, boreal forests are forests that thrive in high-latitude regions where six to eight months of freezing temperatures occur and where trees may grow to a minimum height of five meters (28).

A Map of Ontario. The region highlighted through the band of trees is the boreal forest region. Source: Laurel Richardson, macblog.

The collection of organisms in a particular location uniform enough to be regarded as a unit is referred to as a **stand** (29). So, an uninterrupted group of trees that are mostly like one another to be distinguished from nearby communities in terms of composition, structure, age, height, class, distribution, spatial arrangement, condition, or location on a site of even attributes, is called a forest stand (29).

Patches are groups of species or communities encircled by a matrix whose composition or structure differs from the communities of the matrix (30). So, a **forest patch** is any distinct region that has a certain form, size, and arrangement that is utilized by a species of forest plant (30).

Blueberries, for example, that are part of a forest stand are incorporated into the stand and could be distinguished as a blueberry patch; nevertheless, following a fire, a blueberry heather without trees may be surrounded by a forest stand.

Forest stands at the KCA Youth & Family Wellness Camp.

Any study that looks at how ecosystem patterns and processes have changed through time and how they interact with one another is considered **ecological history** (31). Anthropogenic influences are typically included in such changes, while they are not necessarily required to be considered specifically (32,33). Among the various functions ecological history plays in ecological restoration is that of a tool for determining and characterizing suitable targets for restoration initiatives (34).

Scenic view of KCA Youth & Family Wellness Camp.

The KCA Youth and Family Wellness Camp's land has historically been utilized for long-term farming activities, and certain portions have been hayed to gather feed for the Camp's equestrian farm. In this process, variations in the community structure and biodiversity of plants, birds, animals, organisms, etc. have been brought about by human activity and natural disturbances like fire, particularly in areas where habitats coexist. This phenomena known as the **"Edge effect"** is explained in ecology, and given the ecological history of the KCA Camp, it is important to bring up in the context of this feature. The presence of many shade-intolerant plant species and the sighting of a few bird species in different patches are significant pointers to the past changes that occurred in this property.

Broad-leaved trees that lose all their leaves in a single season make up much of the vegetation in a **deciduous forest** (37). In Ontario, the forest life is most varied in the deciduous forest stands (38).

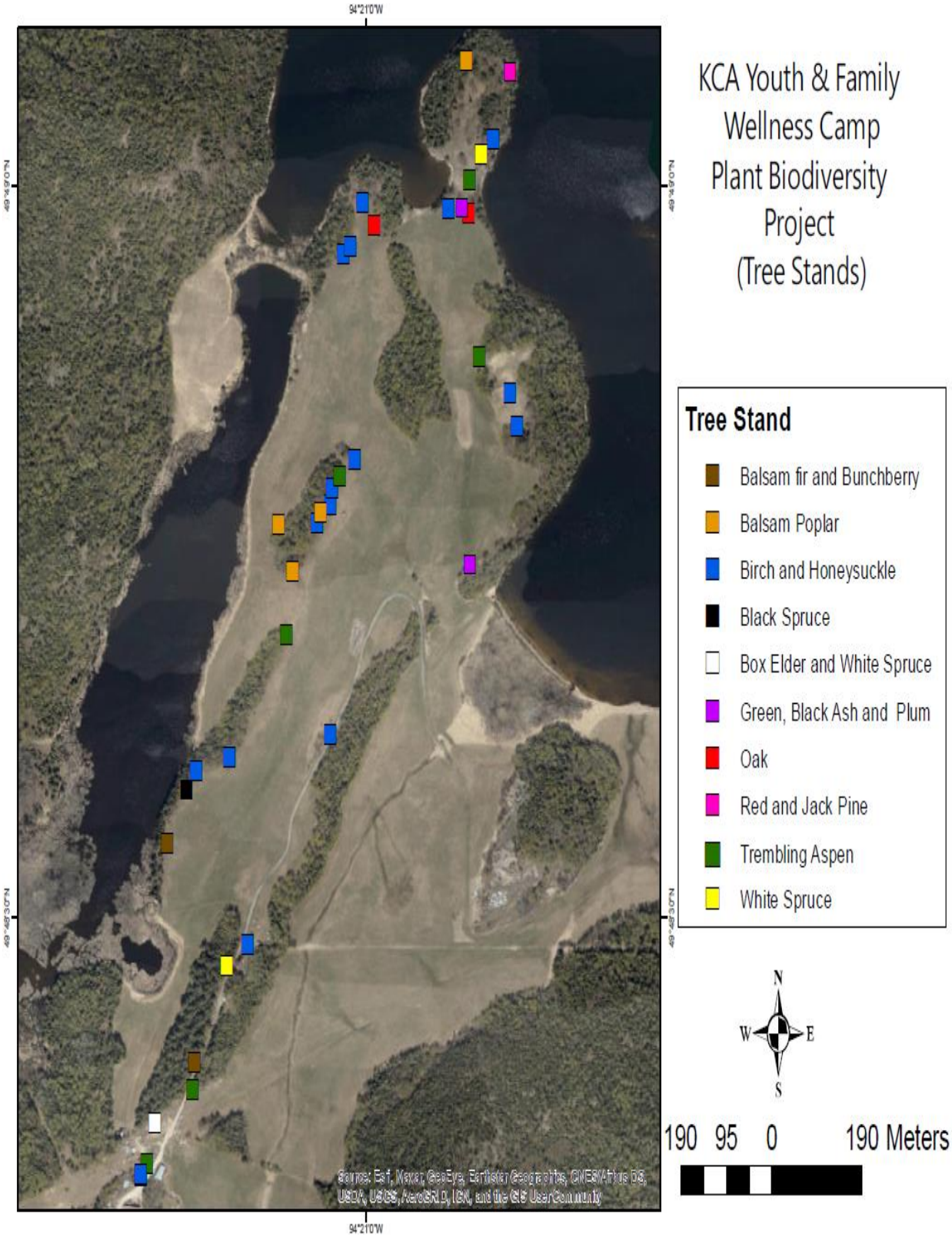
A **coniferous forest** is composed of plants which typically have evergreen leaves fashioned like needles and seeds connected to the scales of a stiff bracted cone that do not drop off (39). Conifers are significant decorative and timber trees in mild temperate and boreal climates, where they are most common (39).

A forest that is home to both deciduous trees and coniferous trees which share same resources such as light, water, and nutrients are known as a **mixed wood forest** (35). Particularly in the Northern Hemisphere, mixed forests are a vegetational transition between coniferous and broad-leaved deciduous forests (36).

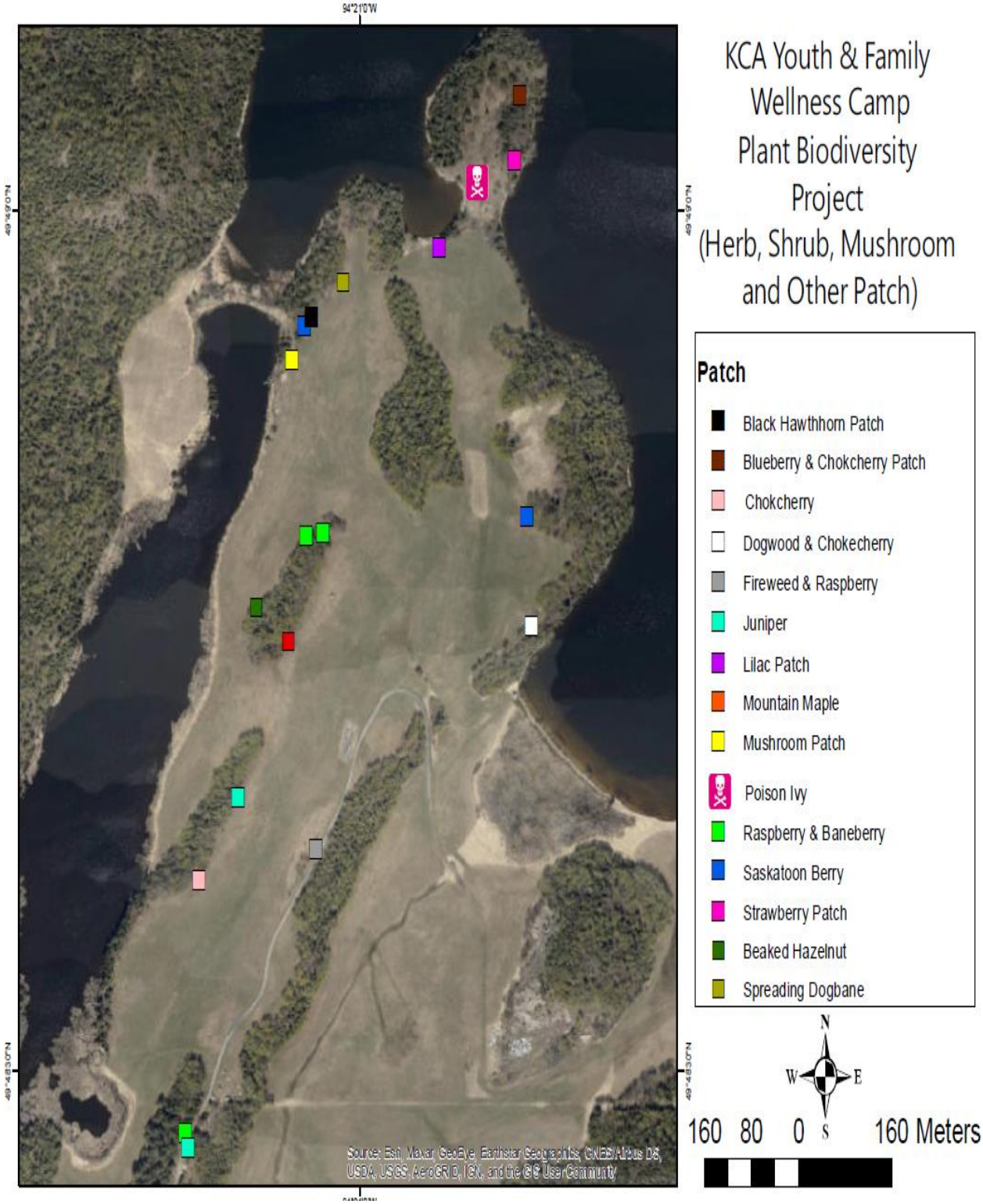
The layer of vegetation between the forest canopy and the forest floor that is made up of small trees and shrubs is known as the **understory** of the forest (40). Usually, the understory of a forest is a warm, moist, and protected layer dominated by vines, bushes, and saplings if there are areas of light where little trees can develop (40). Little animals and birds that reside in the treetops can find food and refuge from the understory vegetation of the forest (40).

Image: Landscape of KCA Youth & Family Wellness Camp.

MAP OF THE KCA YOUTH AND FAMILY WELLNESS CAMP PLANT BIODIVERSITY



MAP OF THE KCA YOUTH AND FAMILY WELLNESS CAMP PLANT BIODIVERSITY



PAPER BIRCH STAND

Paper birch or white birch is the most common species observed at KCA Youth & Family Wellness Camp. Birch stands are found in fourteen different locations in the selected areas of the Camp. Birches ranging from (0.1-0.2) meters in diameter, with a few around 0.5 meters, grew in clayey/loamy soil. Birch stands are primarily situated in mixed wood forest areas with sloping sites in the property. Common understory species found in the birch stands are various types of grasses and herbs. In the birch stands on this property, yarrow was found near the end of one stand around the pond, along with timothy grass, reed canary grass, alfalfa, goldenrod, tansy, Canadian anemone, wild sarsaparilla, spreading dogbane, and few species of mushroom in rare instances (King bolete mushroom, lobster mushroom) throughout the stands.

Birch stand at KCA Camp.

The other observed common understory species are the northern bush honeysuckle, glaucous honeysuckle, and beaked hazelnut. Birch and deciduous poplar occurred mixed together in two locations and the birch stands show signs of past fire disturbances. Signs of wildlife use were observed for example, around birch stands near the pond, red-winged blackbirds and red-eyed vireos were seen flying around which may have used the birch stands for cover and food sources.

Paper Birch/White Birch is a deciduous tree rarely over 9 to 11 meters but can grow higher than that in Ontario. It has fuzzy twigs, white bark, and egg-shaped leaves with hair tufts in the vein axils. Birchwood is valued and is widely known throughout the northern hemisphere. Birch essential oil is used for aromatherapy. Birch treetops for natural-looking semi-artificial trees have a market among interior design companies. Birch branches make attractive furniture, bird cages, baskets, and wreaths with properly maintained leafy branches. Birch bark in the shape of flat sheets, strips, or leaves, as well as hollowed birch logs, are also in high demand for use in floral arrangements, accent pieces for decor, lamp bases, bird feeders, flowerpots, and candles. The antiviral properties of betulin against the AIDS virus and the anticancer properties of betulinic acid against melanoma and malignant brain tumors all point to the enormous potential of birch bark as a source of substantial pharmaceuticals.

Image: 1st row, from left to right: 1) Common Yarrow 2) Glaucous Honeysuckle 3) Spreading Dogbane. 2nd row: 1) Lobster Mushroom 2) Wild Sarsaparilla 3) Reed Canary Grass.

Image: 1st row: 1) Common Tansy 2) Beaked Hazelnut 3) King Bolete Mushroom. 2nd row: 1) Alfalfa 2) Canadian Anemone 3) Canada Goldenrod.


TREMBLING ASPEN STAND

After birch, **trembling aspen** is the second most common species observed and present at almost all the selected sites of the KCA Youth and Family Wellness Camp. Birch stands are found in four different locations in the selected areas of the Camp and trembling aspen mixed with birch trees is found in one location. Balsam poplar is seen frequently grown around the trembling aspen stands in the selected areas.

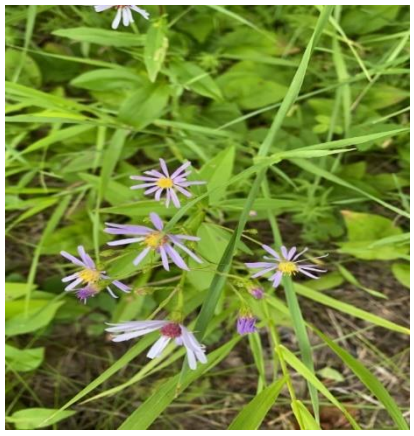
Trembling aspen is shade-intolerant like other aspens and is an incredible species for fast growth. It is a broad-leaved, medium- to large-sized hardwood, reaching heights of up to 12-24 meters (on average). Egg-shaped to round, alternate leaves; flowers grow on catkins. Very intolerant of shade. It often reproduces in clones, becoming up to 21 meters tall from root suckers. One of the species with the most significant geographic distribution in North America and is found throughout Canada's wooded regions. Trembling aspen frequently follows fires on fertile terrain and is found with balsam poplar, large tooth aspen, white birch, pines, and oaks depending upon the location. Trembling aspen is a significant commercial timber species used to make sawn lumber, chipboard, and pulpwood. Today, it generates a few items, including furniture, pallets, and tongue depressors, thanks to its lightweight, decay-resistant wood. Trembling aspen is used as shelter by several birds and small mammals. It also serves as food source for wildlife such as black bear, deer, beaver, moose, and ruffed grouse. These animals consume the fallen bark, buds, and leaves of this plant.

BALSAM POPLAR STAND

Balsam poplar is another common plant species observed at the selected sites. Balsam poplar stands are found in five different locations at the Camp. It is a tough, quickly growing tree that typically lives only a few decades, while some trees might survive for 200 years. Several species of aster, downy arrowwood, western bracken fern have mostly dominated balsam poplar stands as understory species. Woodpecker nests were observed in some of the broken poplars which indicates sign of wildlife use.

Medium- to large-sized, broad-leaved hardwood, 15 to 18 meters high on average. Fragrant buds; alternate egg-shaped to lance-shaped leaves. **Balsam poplar** trees develop clonal patches from their widely dispersed root systems. Female flowers are greenish, whereas male blossoms are crimson. Along with conifers, black ash and trembling aspen, depending upon the location, it is found in lowland areas that are chilly and damp. When alternative species are not accessible in northern regions, balsam poplar is utilized for milling house logs and structural timber. Treetops for creating natural-looking semi-artificial trees are in high demand among interior design companies. Branch utilization includes furniture decoration, bird cages, baskets, wreaths, and exceptionally maintained leafy branches. Animal feed supplements may be made from the leaves and tiny woody components.

Image: Understory species of Balsam poplar stand. From left,1st row: 1) Large leaved aster 2) Smooth blue aster. 2nd row: 1) Downy arrowwood 2) Western brackenfern.


BUR OAK STAND

Two **bur oak** stands are observed throughout the selected areas. It is also seen mixed with other trees. Oak trees exhibit various life history characteristics that reflect how they evolved in this area with frequent wildfires. Oaks may also be found in woods protected from fire and savannas that burn yearly. As a result, it is assumed that the corky and thick bark and deep roots are adaptations to get scarce nutrients or withstand environmental stress. Oak's valuable features can vary fire behavior by impacting fuels and their combustion, affecting fire regimes.

Bur oak is a large tree with spreading branches that reach 12 to 13 meters tall. It bears large leaves with a shiny green exterior. Having deep furrows, the bark is thick and dark brown. The fruit is an acorn, and the cap has a fringed rim that extends halfway down the nut. It grows best in deep, fertile bottomlands; it is also found in highland limestone soils and, at the northern limits of its distribution, on shallow soils over granitic bedrock, sometimes in mixtures with other species. It is tolerant of shade and dryness and its thick bark makes it fire-resistant, which explains why it may be found in grasslands.

Oak trees provide many benefits for animals and humans. The acorns are loved by wildlife, notably deer, squirrels, and birds, who may also eat the leaves. Furniture, flooring, waterproof containers, and other items are made from wood and utilized by humans.


WHITE SPRUCE STAND

BOX ELDER STAND

White spruce stands are observed in two locations and white spruce mixed with **box elder** is seen to grown in one location of the selected stands. Catbird sound was heard around the spruce stands which suggests wildlife use of the stands.

White spruce is an evergreen conifer. It's average size is 15 meters, but few can grow upto 28 meters tall. White spruces are tall, erect forest trees with thin, compact crowns and coarse branches that frequently reach the ground. Spruce needles are square and sharp. The bark is rough and somewhat grey. Spruce cones feel softer than pinecones because of their thinner scales. Primarily found in fresh/moist mixed woods, understory occurrence can occur in a variety of soil, site, and stand conditions. Rarely appearing in pure stands in the overstory, balsam fir, trembling aspen, and black spruce are among its frequent neighbors. It is very significant for food and cover of many animal species, soil stability, watershed value, and enjoyment due to its vast geographic distribution and abundance. White spruce is mainly used for pulpwood and timber for many buildings, including prefab homes, mobile homes, furniture, boxes and crates, and pallets. Additionally, it is utilized for paddles, musical instruments, and house logs. The white spruce is an excellent decorative and shade tree frequently used as a Christmas tree in various regions. Snowshoe hares feed on spruce bark, twigs, and needles and can find shelter on white branches during winter.

Box elder, a tree commonly found along fencerows, railways, and the boundaries of old fields, is a river bottom tree that is also an aggressive invader of disturbed regions. Box elder or Manitoba maple may reach heights of 15-22 meters but is generally smaller and occasionally has a diameter of 1 meter. Despite its short lifespan, the tree can sprout new branches if the main stem is destroyed. Manitoba maple can be tapped to produce maple syrup.


BALSAM FIR STAND

Balsam fir stands are observed at two locations of the selected areas including around the wetland areas. **Bunchberry** is seen growing around the balsam fir trees as an understory species and occurring together in a mixed stand.

Balsam fir is a slender evergreen tree of 15 to 18 meters height. Balsam fir has smooth grey bark covered with pitch blisters. The needles of balsam fir have two white stripes on the bottom and are flat. Two rows are created on a single plane by twisting and spirally attaching them. Since the needle is flat, it cannot be rubbed between the fingers. Its regular crown eventually tapers to a spire-like apex, making it a unique tree of the northern woods of central and eastern Canada. It is observed in pure stands or grows with trembling aspen, white birch, white spruce, and black spruce. It is tolerant to a variety of soils and temperatures. It is a slow-growing, transient tree that may be found in cedar swamps, bogs, coniferous and mixed woodlands. There is a high demand for balsam fir boughs, wood, resin, and bark for essential oil extraction, even though there is no contemporary commercial medicinal use. In addition to serving as an aromatic and antibacterial component in soaps, cosmetics, flavorings, floor polishes, and disinfectants, it is utilized to create an "absolute",a process by which the essential oil is extracted using a solvent for fragrances. Balsam fir wood is mainly used for pulp since it is too delicate and fragile to form decent timber. The resin, also known as Canada balsam, has been utilized as a source of turpentine and as an adhesive for microscope slides and optical lenses. Christmas trees made of balsam fir are also cultivated.

Canadian bunchberry or **dogwood bunchberry** was observed as an understory species in the balsam fir stand. It is a low, erect perennial that grows 0.1 to 0.2 meters tall from a rhizome that spreads widely and frequently forms large patches. It can be found on the fringes of bogs and swamps, beneath conifers, in mixed woodlands, or under conifers. Despite being bland and unappealing to humans, berries are an essential food source for animals. However, they provide a tasty pudding when cooked with whey! This species is one of several being researched for natural chemicals that may be used as chemotherapeutic agents in the treatment of cancer. The roots have been used to make a mild tea that has been used to alleviate newborn colic.

Image: Canadian Bunchberry.


BLACK ASH STAND


GREEN ASH STAND

Mostly **green ashes** are found among ashes in total three locations and the green ashes are (0.5-0.6) meters in diameter. Although black ash has been listed as an endangered species in eastern and southern Ontario, we only found a few **black ash** trees on the property. Notable wildlife use of the stands includes beaver and deer trails observed around the plum trees. **American plum** is observed growing as an understory species of the ash stand.

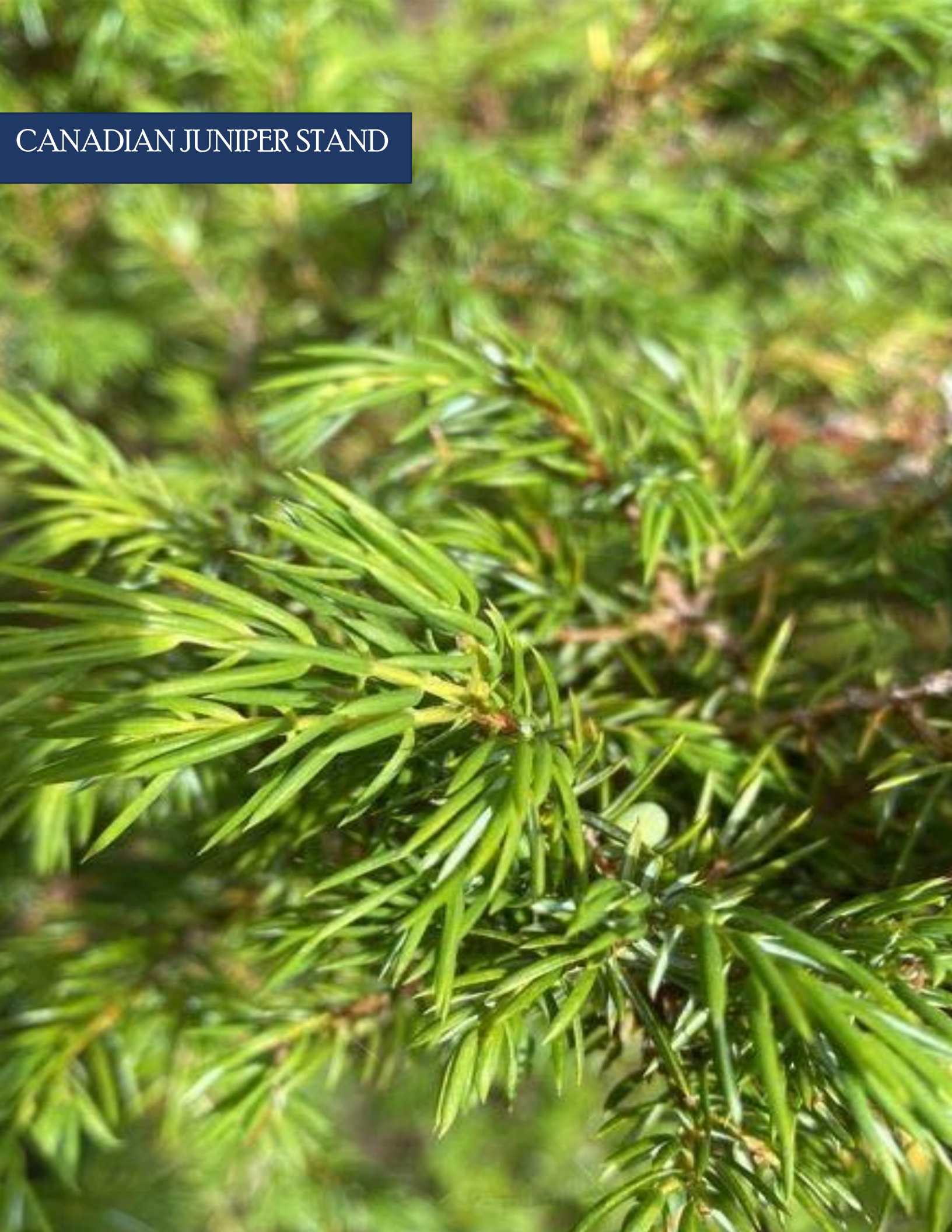
Black ash is a broad-leaved hardwood typically 17 meters tall. Although black ash trees are generally around 17 meters, they can occasionally reach heights up to 24 meters. It frequently has a leaning or "crooked" appearance. Black ash occurs often in northern marshy forests from eastern Manitoba to the Atlantic provinces. Although it occasionally grows in pure stands, it often coexists alongside species, including black spruce and balsam fir. Black ash's wood is very ring-porous, making it the perfect material for basketry splints, barrel hoops, snowshoe frames, canoe ribs, and woven chair seats. If it is moistened and pounded, it splits into thin sheets. It is used mainly for furniture and interior finishes and is deeper in color with more grain.

The typical **green ash** tree matures to a height of 18 meters and a diameter of 0.3 to 0.6 meters. Green ash features opposing compound leaves, much like other ashes do. Unnoticeable blooms of green ash occur in the springtime before the leaves appear. Green ash trees are typical of areas that are briefly flooded in the spring. Due to its shade intolerance, green ash is an early successional, quickly growing, but short-lived tree.

American plum is a shrub or small tree that may grow up to 7.7 meters tall and produces thickets. The opposite leaves are oblong, have a long, pointed tip and coarse teeth. The bark is smooth and thin. Loose, spherical clusters of white flowers bloom on the plant. The American plum may be found on open, disturbed, dry slopes, old fields, fencerows, roadside edges, and damp wooded areas. Outside of its natural habitat, it is planted in Canada as an ornamental.

Image: American Plum.


BLACK SPRUCE STAND


CANADIAN JUNIPER STAND

Black spruce stand is observed to grow near the pond at the KCA Youth and Family Wellness Camp property. **Canadian juniper** is seen to grow around black spruce trees in this location. It is also seen to grow in two other locations of the selected areas on the property.

Black spruce is a small to medium-sized tree (average height 11-12 meters) with a thin, conical crown typically stunted or appears as a tall, vegetated pole in wetlands with inadequate drainage. When spruce trees mature, their bark turns scaly and wrinkled, usually making them bumpy to the touch. Long-lived, relatively slow-growing, moderately shade-tolerant plant. Black spruce is widespread throughout N.W Ontario and Canada while being the provincial tree of Newfoundland.

It occurs in various soil/site conditions, from dry/fresh, highland mineral soils to moist, organic lowlands; it is frequent in the overstory and the understory. In the overstory, establishing pure stands or mixed associations with white spruce, jack pine, balsam fir, trembling aspen, and white birch.

Canadian Juniper is a low, spreading, or erect shrub that seldom reaches a height of 1.5 meters. Evergreen leaves with needles. It is a natural shrub found throughout Canada and the Northern Hemisphere. It is especially abundant around Lake Superior and the Ontario-Manitoba border in the west.


RED PINE STAND


JACK PINE STAND

This type of stand is found in one location of the property. The **red pine and jack pine** occurred mixed together or formed separate patches within the stand. **Prickly roses** are seen growing around the pines as an understory species.

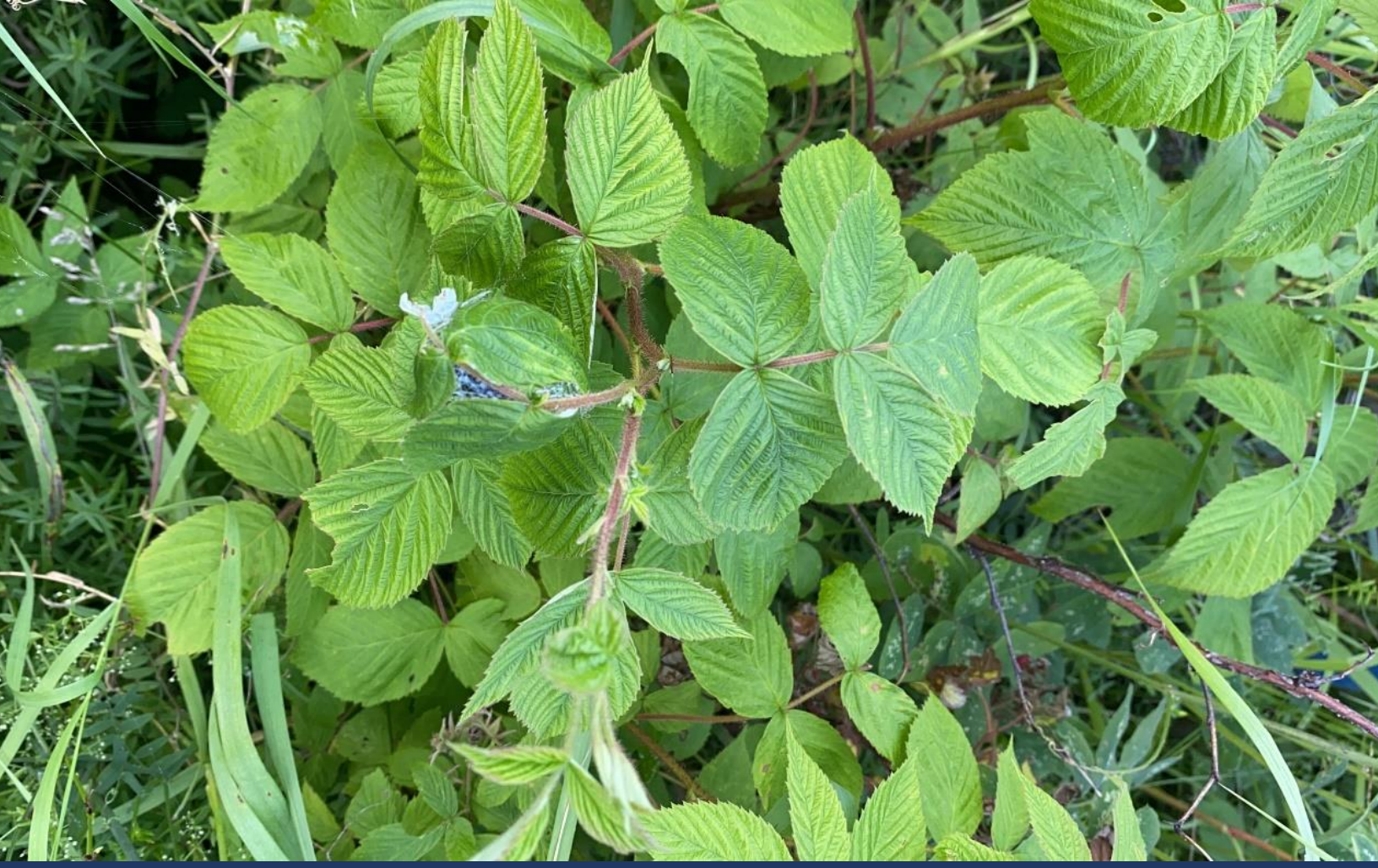
Red pine is a tall tree that may grow up to 36 meters tall but, on average, is 7 meters tall. This conifer is recognized as one of the red pines because its needles are arranged in pairs. Pinecone scales have a stiff, woodsy texture. It coexists with jack pine, oaks, and aspens and thrives on acidic, sandy, well-drained soil. Red pine spreads quickly, is intolerant of shade, and frequently requires fire to colonize a new region. Most natural stands develop following a forest fire; the fire thins down the overstory and develops a seedbed by eliminating humus. The fire also minimizes competition from other trees and shrubs and cone-destroying insects and other plants and shrubs. Red pine is used commercially due to its straight-grained, reasonably hard red pine wood. It is planted mainly to provide wood for poles, timber, cabin logs, railroad ties, posts, pulpwood, and fuel. On rare occasions, the bark is used to tan leather. Red pine is also used for landscaping and to provide animal habitat due to its vivid bark. For several bird and animal species, red pine serves as cover. The seed is consumed by songbirds, deer, and small animals. Red pine is employed in agroforestry as tree strips for windbreaks. They are cultivated and maintained to safeguard animals, improve agricultural output, and prevent soil erosion.

Jackpine is the most common pine in Canada that grows in northern woodlands. Jack pine is often less than 18 meters tall and has a scraggly appearance. The needles on pine trees typically remain active for one to three years, turning yellow-brown in the fall before falling off. Jack pine is prevalent in Northwest Ontario. It frequently grows among oaks, red pine, and big-toothed aspens in dry, sandy, acidic soil. It can also occasionally be found in bogs with leatherleaf. Jack pines have a rapid growth rate, a brief lifespan, and a low shade tolerance. Common in the overstory while, scarce in the understory of old woods. Either in mono-specific stands or with black spruce in the overstory, often forming an even-aged, post-fire forest. Less frequent in mixed woods with other species, such as trembling aspen. Jack pine is a priceless commercial species that is utilized for pulpwood, railroad ties and lumber.

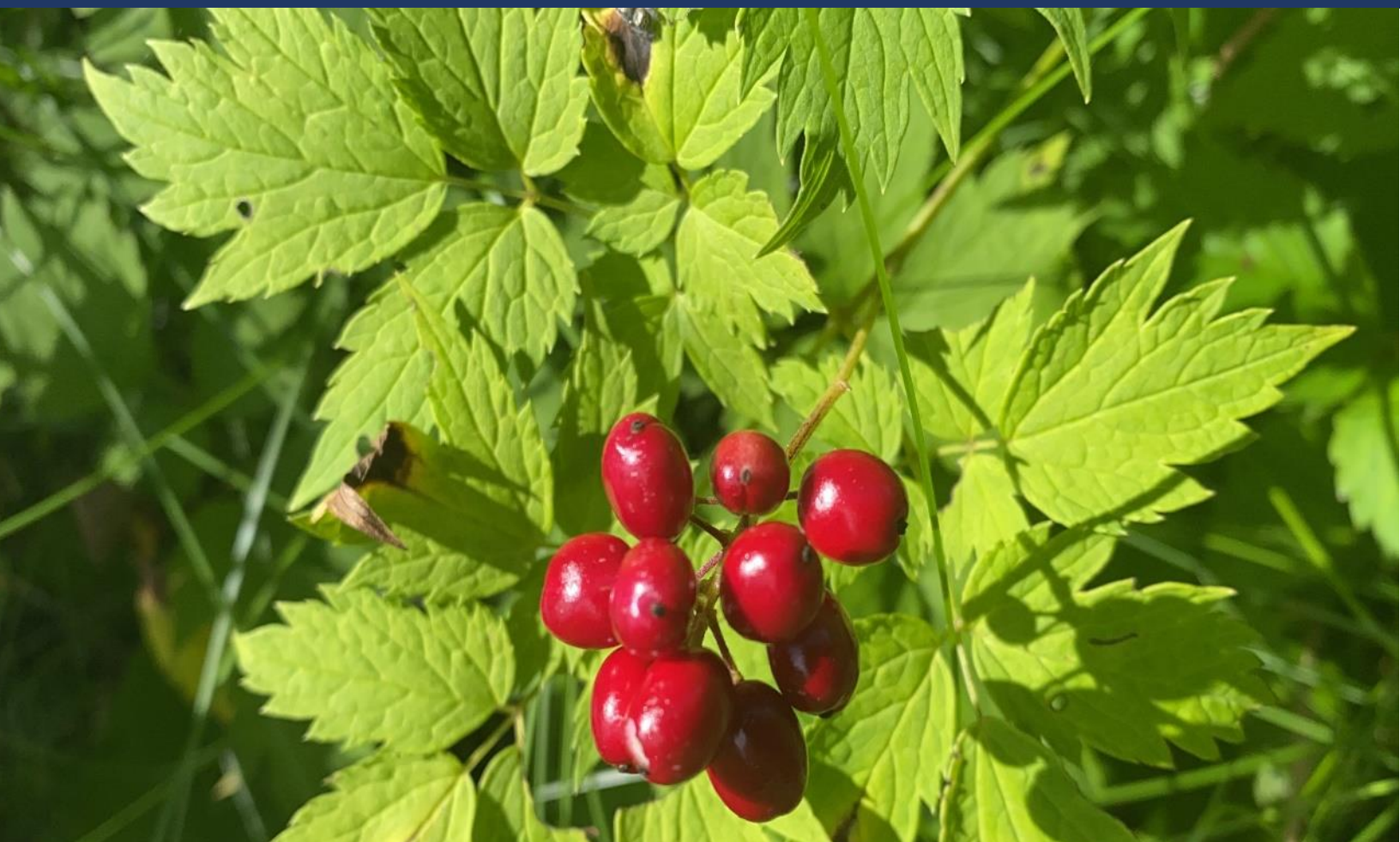
Prickly roses were observed as understory species around red pine stands. Erect deciduous shrub that may grow up to 1 meter tall. The stems are heavily coated with straight, bristly prickles. The leaves are split into 5-7 elliptical, double, coarsely toothed leaflets. They have five pink petals, a yellow center, and many anthers, making them incredibly appealing. The fruits, or hips, are rounded to slightly pear-shaped, crimson to purple, and still have greenish sepals at the tips. They can be found in open woodlands, thickets, and rocky slopes from British Columbia's interior to Quebec, up north to Alaska, the Yukon, and the southern Northwest Territories. Like other rose species, the Anishinaabe have used an infusion of the prickly wild rose's root as an eyewash and have consumed the buds and rose hips. Rose petals are an ingredient in salads or

consumed as a snack. The fruit makes excellent jelly and is rich in vitamin C. Rosehip tea has a pleasant, mild flavor.

Image: Prickly rose.



RASPBERRY & BANEBERRY PATCH



Raspberry and baneberry patches are observed in three locations at the selected areas of the KCA Youth & Family Wellness Camp, occurring mixed together or forming separate patches. Although often they are observed as an understory species of other tree stands.

Raspberry is a varied species with various morphologies, but it often resembles garden raspberries in that it is an upright, deciduous shrub. Raspberry plants frequently have long stems typically covered in many bristles and/or hooked prickles. The fruits are red and raspberry-like, although often smaller. The blooms are white (pink in one form), individually or in loose clusters. It is prevalent in Northwestern Ontario. Scattered within forest settings on a variety of soil, sites, and stand conditions while in open spaces and disturbed terrain can be abundant. The commercial potential of raspberries is well known, and there may also be a market for the leaves for herbal medicine. Red dye may be made from the berries by boiling them.

The tall perennial **baneberry** has broad compound leaves and a terminal spike of tiny white blooms that develop into vivid red berries. Throughout North America, baneberries may be found in abundance in lush, shaded forests and beside stream borders. Common in Northwest Ontario. Predominantly in fresh/moist, frequently calcareous, fine-grained mineral soils in hardwood and mixed wood forest settings. Baneberry has no immediate commercial use due to its toxic properties and highly specialized use in low concentrations.

RED OSIER DOGWOOD & CHOKECHERRY PATCH

Red osier dogwood and **chokecherry** patches have been observed in two locations including near the beach area. Red-osier dogwood, technically a dogwood and not a willow, is frequently called "red willow". Cattails are also seen growing around the beach area as understory species.

Red osier dogwood is an upright or loosely spreading shrub that seldom grows higher than 2 meters, sometimes producing dense thickets, stems that frequently root at the nodes, and branches that range from purple to brilliant crimson. It has clusters of white, berry-like fruits. It can develop thickets in low, damp environments like streambanks, lakeshores, floodplains, and roadside ditches. Deer and moose forage among the branches and vegetation. To enhance the landscape and attract birds, red osier dogwood is frequently planted as an ornamental. It is also commonly used as a secondary plant in windbreaks and landscaping.

Chokecherry is an upright, woody, deciduous shrub or small tree that forms thickets. It seldom rises higher than 9 meters. The leaves are satiny and dark green on surface and lighter underneath. Chokecherry can be found throughout Canada and is native to North America. Chokecherries are primarily used to produce delicious preserves, juice, jelly, and syrup. Shelterbelt plantings, windbreak plantings, plantings for wildlife, and mass plantings for erosion control are all examples of conservation purposes. The seeds are poisonous because hydrocyanic acid is produced in the leaves, stems, and seeds especially so when the seed is cracked open when consumed.

VELVETLEAF BLUEBERRY PATCH

Velvetleaf blueberry patch is observed in one location near the lake area. Chokecherry and **staghorn sumac** are also seen grown around blueberry patches.

Blueberry is a short, deciduous shrub with lower leaf surfaces coated in thick, velvety hairs and tends to develop in dense patches. The thin, smooth-edged, oblong to elliptic leaves. Tiny and greenish white with pink undertones, the flowers are produced in small clusters at the tips of the branches and bloom before the leaves have fully opened. The medium-sized, clustered blueberries have a pale, waxy sheen and are pleasant and juicy. It can occur in peat bogs, wet, shady forests, clearings, and rocky outcrops. Although it would be challenging for northern areas to compete with the existing market and supply lines for blueberry fruit, locally, there may be room for value-added food or beverage goods. Major pharmaceutical corporations are already actively looking into its possibilities in medicine despite insufficient proof supporting its effectiveness.

Staghorn sumac is found in exposed, disturbed places like roadsides, hillsides, clearings, and forest margins. Antler-like, fuzzy branches give rise to the popular name "staghorn sumac" for this species. Because of its gorgeous autumn foliage and clusters of delicious fruit, staghorn sumac is frequently planted as an ornamental. Staghorn sumac thickets offer food and cover to a variety of birds and animals, including grouse, pheasants, deer, and moose.

Image: Staghorn sumac.

MOUNTAIN MAPLE PATCH

Mountain maples are observed as an understory species around many trees stands. Particularly in one location it is seen to grow as its own patch.

It is a little tree or shrub between 3 and 5 meters high. A typical understory tree found in eastern Canada's woodlands. It thrives on wet soils with good drainage found along streams, in ravines, and on damp rocky slopes. Prevalent, frequently forming thickets, on freshly cleared northern forest terrain. Tolerant of shade, seldom surviving in the open. Mountain maple is often used as an ornamental tree. Moose and deer enjoy eating leaves and tender stems. Consequently, the tree is sometimes called "moosewood" or "moose maple". Birds eat the buds in winter, while beavers and porcupines consume the bark. It can tolerate extensive browsing and will continue to grow.

SASKATOON BERRY PATCH

Saskatoon berry is observed as an understory species around many trees stands. Particularly in two locations it is seen to grow as its own patch.

A tall shrub with brown branches, no thorns, and simple alternating, oval leaves with teeth at the apex. Early blooming white flowers spray at the terminals of the branches and have tasty purple fruit (berry-like pomes). West of Manitoba, **saskatoon berry** is the most widespread native variety of serviceberry. It occurs from British Columbia to western Quebec and the midwestern and western USA on rocky hills, streams, and forest margins. The market for Saskatoon berries is well-established when grown in areas that produce abundant and full berries.

BLACK HAWTHORN PATCH

Black hawthorn is observed as an understory species around many trees. Particularly in one location it is seen to grow as its own patch.

Up to 11 m tall, large, deciduous shrub or small tree with greyish bark and short, sharp thorns. The leaves are approximately oval or wedge-shaped, glossy, dark green, and coarsely serrated across the top. The fruits, which grow in drooping bunches and are purplish black with 3 to 5 huge nutlets inside each, are borne in flat-topped clusters with white flowers. They are found in open, well-drained woodlands and rocky slopes from British Columbia and Alberta through southwest Saskatchewan (perhaps also Manitoba), central Ontario. Today, the fruits mainly make jam and jelly.

STRAWBERRY PATCH

Strawberry patch is observed in one location near the lake area.

Herbaceous perennials with three-parted, coarsely serrated leaves, white flowers with five petals, and delicious, juicy red fruits that are well-known to virtually everyone for their scent and delicate flavor. They spread by creeping stolon or runners. From British Columbia to the Maritimes and Newfoundland, they flourish in open woodlands and meadows throughout Canada. Alaska and Yukon are further north, where the blue leaf strawberry may be found. Wild strawberries may be eaten and are scrumptious.

AMANITA & CHANTERELLE MUSHROOM PATCH

Amanita mushroom, poisonous for human consumption, was observed in one of the patches, and an animal trail was marked alongside. Some **chanterelles** and other unidentified mushrooms were noted but not identified to species. However, they were not the most common edible mushrooms found in the region.

Amanita i**s** a huge, watery-capped mushroom that can range in color from light yellow to orange in the northwest boreal forest. The gills and a white spore deposit are other distinguishing characteristics. In coniferous and deciduous open woodlands in the northern hemisphere, amanita mushroom is prevalent and extensively spread.

A few less frequent types of **chanterelles** can be found in both white and black forms, and their colors can range from bright yellow to deep crimson. Depending on the kind and age, chanterelle crowns can grow up to 0.03 to 0.13 meters. False gills, which resemble short waves imprinted on the mushroom's surface, are on the underside of all chanterelle caps. Chanterelles do not grow on living or dead wood; instead, they do so from the earth. They frequently have a high rate of growth. They are found in mixed hardwood woodlands but have also been occasionally discovered amid mature pines, cedars, and other conifers, low rivers, and stream banks. Chanterelle mushroom is edible but not cultivated.

GPS COORDINATE POINTS OF THE PLANTS SHOWN IN MAP

Type	UTM	Latitude	Longitude	Type
Birch Stand 1	15 U 0402862 UTM 5518774	49.813540	-94.350212	Tree
Birch Stand 2	15 U 0402809 UTM 5518694	49.812812	-94.350929	Tree
Birch Stand 3	15 U 0402851 UTM 5519035	49.815885	-94.350430	Tree
Birch Stand 4	15 U 0402861 UTM 5519044	49.815967	-94.350294	Tree
Birch Stand 5	15 U 0402878 UTM 5519099	49.816465	-94.350071	Tree
Birch Stand 6	15 U 0403056 UTM 5519176	49.817186	-94.347617	Tree
Birch Stand 7	15 U 0403082 UTM 5518812	49.813917	-94.347165	Tree
Birch Stand 8	15 U 0402685 UTM 5518399	49.810139	-94.352578	Tree
Birch Stand 9	15 U 0402640 UTM 5518384	49.809997	-94.353199	Tree
Birch Stand 10	15 U 0402822 UTM 5518426	49.810404	-94.350681	Tree
Birch Stand 11	15 U 0402706 UTM 5518162	49.808012	-94.352227	Tree

Birch Stand 12	15 U 0402556 UTM 5517874	49.805398	-94.354238	Tree
Birch Stand 13	15 U 0402556 UTM 5517874	49.805398	-94.354238	Tree
Birch Stand 14	15 U 0402994 UTM 5519089	49.816394	-94.348457	Tree
Trembling Aspen Stand 1	15 U 0402841 UTM 5518752	49.813339	-94.350499	Tree
Baslam Poplar Stand	15 U 0402814 UTM 5518708	49.812939	-94.350863	Tree
Trembling Aspen Stand 2	15 U 0402775 UTM 5518635	49.812600	-94.351326	Tree
Poplar Stand 1	15 U 0402818 UTM 5518771	49.812803	-94.351651	Tree
Poplar Stand 2	15 U 0402806 UTM 5518961	49.815130	-94.351104	Tree
Oak Stand	15 U 0402893 UTM 5519070	49.816474	-94.350058	Tree

Oak Stand 2	15 U 0402971 UTM 5519080	49.816206	-94.349855	Tree
Green, Black Ash & Plum Stand	15 U 0403022 UTM 5519083	49.816414	-94.348207	Tree
Oak Stand 3	15 U 0403023 UTM 5519126	49.816344	-94.348066	Tree
Trembling Aspen Stand 3	15 U 0403039 UTM 5519157	49.816731	-94.348063	Tree
White Spruce Stand 1	15 U 0403056 UTM 5519172	49.817012	-94.347848	Tree
Oak Stand 4	15 U 0403063 UTM 5519243	49.817285	-94.347633	Tree
Red & Jack Pine Stand	15 U 0403021 UTM 5519277	49.817972	-94.347291	Tree
Poplar Stand 3	15 U 0403033 UTM 5518902	49.818088	-94.348128	Tree
Poplar Stand 4	15 U 0403092 UTM 5518721	49.813100	-94.347003	Tree

Black Spruce Stand	15 U 0402626 UTM 5518361	49.809788	-94.353388	Tree
Balsam Fir Stand	15 U 0402599 UTM 5518293	49.809172	-94.353746	Tree
White Spruce Stand 2	15 U 0402677 UTM 5518135	49.807764	-94.352623	Tree
Balsam Fir & Bunchberry Stand	15 U 0402631 UTM 5518015	49.806678	-94.353232	Tree
Box Elder & White Spruce Stand	15 U 0402576 UTM 5517939	49.805985	-94.353977	Tree
Trembling Aspen Stand	15 U 0402564 UTM 5517889	49.805534	-94.354131	Tree
Birch & Honeysuckle Stand	15 U 0402556 UTM 5517876	49.805416	-94.354239	Tree

Mountain Maple Patch	15 U 0402780 UTM 5518671	49.812523	-94.351032	Tree
Raspberry and Baneberry Patch	15 U 0402837 UTM 5518774	49.813506	-94.350823	Shrub
Fireweed & Raspberry Patch	15 U 0402801 UTM 5518952	49.813536	-94.350560	Shrub
Mushroom Patch	15 U 0402820 UTM 5518997	49.815212	-94.351037	Mushroom
Saskatoon Berry Patch	15 U 0402828 UTM5519007	49.815538	-94.350852	Shrub
Black Hawthhorn Patch	15 U 0402879 UTM 5519100	49.815629	-94.350743	Shrub
Lilac Patch	15 U 0403012 UTM 5519091	49.816309	-94.348774	Shrub

Strawberry Patch	15 U 0403055 UTM 5519187	49.817150	-94.347616	Herb
Blueberry & Chokcherry Patch	15 U 0403081 UTM 5519263	49.817789	-94.347536	Shrub
Saskatoon Berry Patch 2	15 U 0403063 UTM 5518789	49.813707	-94.347423	Shrub
Dogwood & Chokecherry Patch	15 U 0403065 UTM 5518670	49.812637	-94.347365	Shrub
Chokcherry Patch	15 U 0402693 UTM 5518402	49.810167	-94.352467	Shrub

Juniper Patch	15 U 0402675 UTM 5518113	49.807566	-94.352645	Shrub
Poison Ivy	15 U 0402945 UTM 5519119	49.816662	-94.3491462	Shrub
Beaked Hazelnut	15 U 0402757 UTM 5518694	49.812803	-94.351651	Shrub
Spreading dogbane	15 U 0402861 UTM 5519044	49.815967	-94.350294	Shrub

REFERENCES

1. Marles RJ, Clavelle C, Monteleone L, Tays N, Burns D. Aboriginal plant use in Canada's northwest boreal forest. UBC Press (University of British Columbia); 2000.
2. Kuhnlein H, Turner N. Traditional plant foods of Canadian indigenous peoples: nutrition, botany and use. Routledge; 2020 Oct 28.
3. Farrar JL. Trees of the northern United States and Canada. Iowa State University Press; 1995.
4. Pilette J, Alliance CR. Little Traverse Bay Bands of Odawa Indians Native Plants Initiative. Report from Little Traverse Bay Bands of Odawa Indians, Environmental Services Department for Conservation Resource Alliance. 2009 Oct 19.
5. Smith HH. Ethnobotany of the Ojibwe Indians. Good Press; 2021 May 19.
6. Baldwin KA, Sims RA. Field guide to the common forest plants in northwestern Ontario. Thunder Bay: Ontario Ministry of Natural Resources, Northwest Science & Technology; 1997.
7. Meeker JE, Elias JE, Heim JA. Plants used by the Great Lakes Ojibwa. Great Lakes Indian Fish &; 1993.
8. Zasada JC, Phipps HM. Populus balsamifera L. Balsam poplar. Silvics of North America. 1990;2:518-29.
9. Stoner N. Bur Oak. University of Nebraska-Lincoln. https://hles.unl.edu/bur-oak
10. Plants Database. United States Department of Agriculture. Natural Resources Conservation Service. https://plants.usda.gov/home
11. Soper JH, Heimburger ML. shrubs of Ontario. ROM; 1982.
12. Dodds, Jill S. 2022. *Pinus resinosa* Rare Plant Profile. New Jersey Department of Environmental Protection, State Parks, Forests & Historic Sites, State Forest Fire Service & Forestry, Office of Natural Lands Management, New Jersey Natural Heritage Program, Trenton, NJ. 17 pp.
13. HOW TO FIND, IDENTIFY, AND PREPARE CHANTERELLE MUSHROOMS**.** REALTREE. TIMBER 2 TABLE ARTICLES. https://realtree.com/timber-2-table-articles/how-to-find-identify-and-prepare-chanterelle-mushrooms
14. Pennsylvania Game Commission. https://www.pgc.pa.gov/Education/WildlifeNotesIndex/Pages/SnowshoeHare.aspx
15. https://plants.usda.gov/home/factSheetPlantGuideSearchResults?resultId=ed2efc37-8b4d-478d-bcb5-e7201c99ef57
16. Varner JM, Kane JM, Hiers JK, Kreye JK, Veldman JW. Suites of fire-adapted traits of oaks in the southeastern USA: multiple strategies for persistence. Fire Ecology. 2016 Aug;12:48-64.

17. Morton BR, Lewis RG. Native trees of Canada. Ottawa [Ont.]: Department of the Interior; 1921.

18. Ministry of Natural Resources and Forestry. Government of Ontario. https://www.ontario.ca/page/ministry-natural-resources-and-forestry

19. Red Pine - Pinus resinosa. The Arboretum. University of Guelph. https://arboretum.uoguelph.ca/thingstosee/trees/redpine#:~:text=Red%20pine%20is%20Ontario's%20only,reddish%20tinge%20with%20broad%20scales.

20. Agriculture. Chokecherry Production in Manitoba. https://www.gov.mb.ca/agriculture/crops/crop-management/fruit-crops/print,chokecherry-production.html#:~:text=It%20is%20native%20to%20North,and%20from%20B.C.%20to%20Newfoundland.

21. Gardening at USask. College of Agriculture and Bioresources. University of Saskatchewan https://gardening.usask.ca/articles-and-lists/articles-disorders/disorder-poplar-fuzz.php#:~:text=The%20male%20flowers%20are%20reddish,can%20spread%20in%20the%20wind

22. Wiigwaasabak: The Tree of Life. CBC SHORT DOCS. https://www.cbc.ca/shortdocs/shorts/wiigwaasabak-the-tree-of-life#:~:text=For%20Anishinaabe%20people%2C%20the%20birch,the%20land%20and%20her%20community.

23. Turner NJ, Ari Y, Berkes F, Davidson-Hunt I, Ertug ZF, Miller A. Cultural management of living trees: an international perspective. Journal of Ethnobiology. 2009 Sep;29(2):237-70.

24. Staghorn sumac. The Arboretum. University of Guelph. https://arboretum.uoguelph.ca/thingstosee/trees/staghornsumac#:~:text=Staghorn%20Sumac%20is%20often%20planted,leaves%20were%20used%20for%20smoking.

25. https://www.amnh.org/research/center-for-biodiversity-conservation/what-is-biodiversity

26. https://www.forestresearch.gov.uk/tools-and-resources/fthr/urban-regeneration-and-greenspace-partnership/greenspace-in-practice/benefits-of-greenspace/plant-biodiversity/

27. Ebert AW, Engels JM. Plant biodiversity and genetic resources matter!. Plants. 2020 Dec 4;9(12):1706.

28. http://ibfra.org/about-boreal-forests/#:~:text=From%20a%20biological%20perspective%2C%20boreal,a%20canopy%20cover%20of%2010%25.

29. Nyland RD. Silviculture: concepts and applications. Waveland Press; 2016 May 13.

30. Luisa BG. The ecology of natural disturbance and patch dynamics. Academic press; 2012 Dec 2.

31. https://education.nationalgeographic.org/resource/habitat/

32. Szabó P. Historical ecology: past, present and future. Biological Reviews. 2015 Nov;90(4):997-1014.

33. Rhemtulla JM, Mladenoff DJ. Why history matters in landscape ecology. Landscape Ecology. 2007 Dec;22:1-3.

34. Jackson ST, Hobbs RJ. Ecological restoration in the light of ecological history. science. 2009 Jul 31;325(5940):567-9.

35. Bravo-Oviedo A, Pretzsch H, Ammer C, Andenmatten E, Barbati A, Barreiro S, Brang P, Bravo F, Coll L, Corona P, Ouden JD. European mixed forests: definition and research perspectives.

36. https://www.britannica.com/science/mixed-forest

37. https://www.britannica.com/science/deciduous-forest

38. https://www.ontario.ca/page/forest-regions

39. https://www.britannica.com/plant/conifer

40. https://brewerint.com/news-insights/agriculture/forestry-understory-management/

41. The Canadian Encyclopedia. https://www.thecanadianencyclopedia.ca/en/article/cattail

42. Feeley T. Pine, Fir, or Spruce Tree? Iowa State University Extension and Outreach. https://www.extension.iastate.edu/news/2005/nov/061401.htm#:~:text=To%20tell%20spruce%20and%20fir,%2C%20stalk%2Dlike%20woody%20projections.

43. Maller C, Townsend M, Leger S, L., Henderson-Wilson C, Pryor A, Prosser A, et al. Healthy Parks, Healthy People: The Health Benefits of Contact with Nature in a Park Context. Parks Stewardship Forum. 2009;26(2):51-83.

44. Tillmann S, Button B, Coen SE, Gilliland JA. 'Nature makes people happy, that's what it sort of means:' children's definitions and perceptions of nature in rural Northwestern Ontario. Children's Geographies. 2018;17(6):705-18.

POSSIBLE PROGRAMMING FOR THE KCA CAMP USING THIS BOOKLET

Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp at 371 Strecker Road, Kenora, Ontario, provides year-round access to traditional healing and wellness programs. While the Camp was established to support and mentor Indigenous youth, anyone and everyone is welcome to stop by and enjoy the beauty and features of the property. It is a lush location with an enormous diversity of plants and lovely greenery, ideal for a nature enthusiast. This site was selected due to previous interactions between my supervisor, Dr. Iain Davidson Hunt, and staff of the KCA Youth and Family Wellness Camp. After I visited the site and conversed with staff a project concept was developed and discussed with KCA staff. It was decided that this project would provide background information to KCA staff that they can use for their upcoming unique initiatives and facilities.

Few possible programming is recommended with the help of this booklet:

- Working with Elders to document Anishinaabe names and uses of plants.
- Name plates for the common plants.
- Gaming activities related to the observed plants for youths & Elders.
- Guided trails to find the plants according to the maps attached with this booklet.
- Harvesting edible plants mentioned in this booklet by the Camp visitors.
- Educational & informational bulletin board about the plant biodiversity of the Camp.
- Other.

THANK YOU

ABOUT THE AUTHOR

Nawrin Tania has been a nature enthusiast and plant lover since her childhood. With her lifelong passion for plants and environment, she graduated in Plant Science from Bangladesh and joined the University of Manitoba as a master's student in Natural Resource Management. Nawrin discovered the KCA Youth and Family Wellness Camp through her supervisor, Dr. Iain Davidson-Hunt, and quickly became interested in studying the lush vegetation of this Camp. She undertook the KCA Youth and Family Wellness Camp Plant Biodiversity Project as part of the Practicum for her Master's work and partnered with Melissa Payne to create this booklet. Nawrin wholeheartedly thanks all the KCA Youth and Family Wellness Camp staff for cooperating in producing an informative guide for the staff and visitors to the Camp.

CHAPTER 6: CRITICAL REFLECTION

This chapter outlines the abilities and knowledge I gained from the M.N.R.M. program, the planning process, my learning from the assumptions and expectations of the project, the results of project decision-making, and the critical aspects of the project that helped me with the successful completion of the project.

CHAPTER 6: CRITICAL REFELCTION

After two years in the MNRM program, completing classes, and gathering data following the project proposal's acceptance, it took six months to finish this project. Looking back on this project has seemed like a serendipitous experience. Initially I was in the thesis stream and was discussing with my supervisor Dr. Iain Davidson Hunt about the prospects of various projects that would further complement my plant science background. Later, he informed me about the promising location to research plant biodiversity of the Kenora through his previous connection with Ogimaawabiitong KCA Youth and Family Wellness Camp. Consequently, I thought about what I needed to accomplish to graduate and thought about how I might use my previous knowledge and experience as a plant science student to make a meaningful project. Discussing further about the duration of my program and a few unavoidable circumstances, it was decided it would be better for me to change my master's route to practicum stream rather than thesis.

Fortunately, I was able to take the project management course taught by Dr. Iain Davidson-Hunt and Professor Sheldon McLeod in my second year which made me realize that it's sometimes important to change course. By focusing on the last year of project management in the practicum stream, I have improved my knowledge of plant biodiversity in Canada's boreal forests and expanded my grasp of project planning.

Here is a breakdown of the information and abilities I acquired during the planning and execution of my MNRM practicum project, along with everything that I learnt considering the project deliverables I've produced.

Project Planning

I learned about the Ogimaawabiitong KCA Youth and Family Wellness Camp through my supervisor, Dr. Iain-Davidson Hunt and because of my interests in ethnobotany and plant taxonomy I realized it would be the perfect project for me to take on. Following up with Melissa and Serena and learning about their possible future developments and key activities at the Camp involving the lush vegetation of the Camp, we were able to find out how I might help them with the project from my academic position.

This was a new process for me to get familiar with since I had not undertaken any research projects in Canada before, and the staff of the Camp had little knowledge about the vegetation that could be used as a foundation, so we had to presume we would find vegetation like other parts of Kenora. With help from my supervisor and the staff at the Camp, we developed the project goal: summarizing the plant biodiversity of the Ogimaawabiitong Kenora Chiefs Advisory Youth and Family Wellness Camp. To achieve this goal, I developed four deliverables for my project plan that I believed would help the KCA staff to produce further educational materials for them and the visitors.

The project plan was created using the internationally acclaimed Project Management Professional curriculum and guidebook, which was followed in the NRI Project Management

(PM) course. I am appreciative that we have addressed a wide range of project management topics in detail, particularly those that are relevant to bigger projects with many stakeholders and changing components such as tools for efficient planning, quality management, risk, and resource assessment strategy. Overall, I thought the objectives and deliverables provided a solid framework for moving the project forward. At first, I struggled to focus on one objective and provide the project partners with deliverables that were both practical and educational. I was able to focus and adhere to my scope, tasks, and responsibilities throughout the project by creating a project plan and meeting with my advisor and project partner.

Assumptions and Expectations

The Ogimaawabiitong KCA Youth and Family Wellness Camp's plant biodiversity is presumed to have been identified and submitted by August 2023, as was previously stated in the proposal. After my first year at the Natural Resources Institute, I had to move to the practicum stream for personal reasons. I was able to enroll in the Project Management course during my second year, but this ultimately caused a delay in the production of the Integrated Project Plan and other deliverables. In addition, I had to put my project on hold for several months due to my parents' and my own health reasons. My choice was supported by my project partner, and we worked together to negotiate a revised schedule that was included in the change management plan. This break gave me the chance to learn how to handle changes to projects more easily and successfully. The project was able to go smoothly and on schedule since I was also able to update and rectify my Gantt chart and the critical path calculation in the IPP in accordance with the revised deadline.

Similarly, there was some doubt about the notion that I, the project manager, would take all the plant photos on the property. I had underestimated the importance of using phone cameras to take high-quality photos of the plants I observed. All the plant photographs were shot while using the camera of plant identification apps, therefore some of the photos did not have the best quality and were not taken at the greatest resolution. Additionally, several photos of the plant species were lost during the identification process since they were not saved to the phone gallery. With proper photo credit and permission, I had to collect a few photographs of the plants from the internet and Dr. Iain Davidson-Hunt. This modification taught me to always take backup images for research purposes and enabled me to make sure the booklet's plant illustrations and photographs are of the highest caliber.

Project decisions

The only noteworthy change I made to the project was to postpone completing the deliverables after receiving approval for both my project proposal and my integrated project plan. I decided to take a two-month break because I had to travel to Bangladesh to see my parents, who had undergone surgery to address their medical conditions. I finished collecting my data and worked on several tasks that needed to be done to meet the deadlines, such as hiring the GIS expert and

completing my literature review for the summary report, before I took a break. As a result, more details about the plants being gathered were discovered, and the project was better understood. The requirements and acceptance criteria of the project would have been far less clear to me if I had created the project deliverables after just the first year of my degree.

I didn't realize how much work would go into designing the booklet's final layout until I started working on it. Another question I had to answer before I edited the booklet's text was how much information should be moved from the summary report to the booklet. By now I realized that I also needed to obtain some of the plant photographs from other sources because I was missing some of them. My supervisor, my project partner, and the committee members all provided input and recommendations that helped me complete the layout and photographs with plant information that were adequate for any reader to be familiar with the Camp's vegetation.

Communication

I was aware that the most important thing I could do to make sure the project succeed would be to communicate with the project partner clearly and regularly. Personally, I found it to be a fulfilling aspect of the project and a turning point. It was also a laborious and demanding portion of the project, particularly when it came to revising the booklet. It is essential to emphasize the significance of communication management strategy in such circumstances, and I am appreciative that I was able to become aware of this during the project's implementation.

Since I did not live in Kenora and could not talk to the project partner in person most of the time, everything was done by email. There was a good probability that I would have to stand by for their response for a few days. One strategy that always helped me, in this case, to be consistent with my project schedule is that I would email my deliverable to the project partner and the committee members at least 15 days before the deadline for the deliverable submission hits. This allowed me to have more float time and I could get back to them with revised deliverables on time. It was also crucial for this project because otherwise I had to change the project timeline each time and the change management needed to be changed as well with the permission of the project partner.

I went to as many events as possible at the KCA Youth and Family Wellness Camp during my one-month stay at Kenora for data collection. This helped me learn more about the project and get to know the affiliated community members of the Camp before producing the booklet. Even though this was not specifically included in the project plan, it was vital for me to observe how the visitors to the Camp engage in communal activities and how they prefer to use the Campsite for recreational purposes. Because my deliverables, especially the booklet, aimed at providing the visitors with a starting point for environmental interpretation. I discussed the process and joy of environmental interpretation more in my background information report for this project.

Quality management

In guaranteeing the project's successful completion, I discovered that the quality Management procedure was the second most helpful and significant. The primary concern was whether the plant identification apps would give accurate results. Luckily, the quality management procedure already provided me with solutions to these issues that could compromise the quality of the deliverables, such as cross-checking the plant samples with field guidebooks and internet sources for accuracy. Although to recheck the GPS coordinate points of the plants and maintain the quality of the map, I had planned to revisit the Camp in the summer of 2023; I was not able to do so for my health issues. Apart from this challenge, I am pleased with the accuracy of my quality management plan.

Background Information Report

By working on the Background Information Report, I acquired the knowledge of the significance of nature and plant biodiversity in addressing human psychological, emotional, and spiritual needs. A deeper bond with natural regions and a resulting drive to maintain them might be fostered by meaningful human interaction with nature. Therefore, solid environmental interpretation may strengthen an individual's bond with the natural world and motivate them to act responsibly. It also allowed me to study the organizing principles of ecological systems, their possible applications in everyday life, and how someone who is environmentally literate might comprehend them. As a result, with ecological literacy, that individual would also know how to build sustainable communities.

While researching plant biodiversity, I did not read about the other ways one could measure plant biodiversity including the evenness of the species and their functional diversity since these were out of my project scope. But a few particular aspects of studying plant biodiversity and ecological history, such as “Edge effect” and “Plant species richness,” made me think deeply about the changes in the habitat, plant species, wildlife, and the organisms in the environment. Through my observations, I found the signs of many human-made or natural disturbances in the property, and from the literature, I learned how these disturbances can result in changes in the community structure. These changes can also be a long ongoing process from past to future. Trembling aspen and oak are shade-intolerant species growing throughout the forest edges. Sighting red-winged blackbirds and red-eyed vireos where the hayed fields and the forest edges came together clearly made me understand the varieties of birds and plant species because of these changes. I recorded 80 plant species throughout the selected areas, and I noted the variety of plant species in each stand or patch, through which I was able to study the plant species richness of the Camp. Habitats changed throughout the Camp areas and thus also had a greater role in the species richness of the Camp. Producing the background information report and learning about my findings while collecting data helped me understand these processes more effectively.

Conclusion

I am fortunate to have had this chance to learn more about the plant biodiversity of Kenora through the vegetation of the Ogimaawabiitong KCA youth and Family Wellness Camp. I am certain that the practical experience I have gained from this project and the project management course, which has exposed me to the various aspects of project management, will be beneficial to me in the future. Having witnessed the entire process from beginning to end and faced some of its difficulties, I now feel more comfortable taking on the job of project manager.

Lastly, the chance to collaborate with the Kenora Chiefs Advisory has been very fulfilling and a steppingstone for my professional career. I would love to be a part of any future projects that might be undertaken in the light of the deliverables produced for this project.

APPENDIX A: INTEGRATED PROJECT PLAN (IPP)

This Integrated Project Plan is a comprehensive plan that unifies all the project components to accomplish the project's goal including a background information report. It provides a precise list of objectives and the actions required to reach them.

APPENDIX A: INTEGRATED PROJECT PLAN

Project name: Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp Plant Biodiversity Project

Project Manager: Nawrin Tania

Project sponsor: Dr. Iain Davidson-Hunt (NRI)

Project partner: Melissa Payne, Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp.

Table of Contents

Executive Summary

Ecosystems are fundamentally dependent on plants. Almost every terrestrial creature, including humans, gets its nourishment from plants. Numerous goods for human use are produced by plants, including firewood, lumber, textiles, pharmaceuticals, dyes, insecticides, oils, and rubber. On the other hand, plants may create poisons that are detrimental to human health. Knowing the local flora will offer a person a decent notion of what can grow there and what will those be useful for. Also, to distinguish between plants that are safe from poisonous ones, it is essential to learn about plant biodiversity. For both senior people and the general public, learning about the local plant biodiversity and locating the species with the aid of a booklet rather than utilizing electronic technology may be preferred due to the time and effort savings.

Considering this, we concentrated on providing a summary of the plant biodiversity at the Ogimaawabiitong Kenora Chief Advisory (KCA) Youth and Family Wellness Camp. The Project Concept in Appendix A describes the importance and justification for this project. By working with KCA Youth and Family Wellness Camp, we plan to provide educational materials to the KCA staff so they may make this knowledge of plant biodiversity accessible to others. This project involves researching and documenting the prevalent plant species in particular patches of the KCA Youth and Family Wellness Campsite. The project has one overall objective, and 4 primary deliverables as follows:

Objective

• List the observed plant biodiversity of the KCA Youth and Family Wellness Camp by August 2023.

Deliverable 1:

• A list of the names of the observed plant species at the selected patches with their coordinate points will be created as a form of dataset by July 2023.

Deliverable 2:

• A summary report of the uses of the plants and the ecological association of the selected patches will be completed by July 2023.

Deliverable 3:

• PDF version of a map of the KCA Youth and Family Wellness Camp indicating major patches and dominant plant species of the property will be completed by July 2023.

Deliverable 4:

• A final draft of the booklet/guide will be completed by August 2023.

The Integrated Project Plan (IPP) covers specifics of the project including the Project Charter, Project Scope, Project Schedule, Resource Needs and Acquisition Plans, Relationship Management throughout the Project, a detailed Risk Assessment, an in-depth Quality Management Plan, overall Budget Summary, and how changes to the project will be managed.

Any suggested changes will be discussed with the KCA Youth and Family Wellness Camp and me early in the project. The proposed adjustment must be accepted by all stakeholders, and performance will be assessed in relation to the overall objectives and deliverables. Therefore, it is necessary to schedule feedback meetings with partner groups once a month and ensure that any adjustments are incorporated into the map and the booklet's final PDF form. To accurately reflect the entire plant biodiversity of the KCA Youth and Family Wellness Camp, the final edition of the booklet must incorporate all study findings concerning the plants on the selected patches.

A comprehensive risk analysis identified the most significant risk to completing this project as "Personnel- Unable to acquire sufficient GIS capacity" To avoid this risk, it will be made sure that job advertisements identify needed competency clearly. Another mitigation strategy will be to identify a person with sufficient training to produce a map before the deadline in case the selected candidate is unavailable to do the job while contracted.

I, Nawrin Tania, am carrying out this project as the project manager with the support of my academic advisor, my project partner Melissa Payne, as well as my master's committee. My educational background is in Plant Science, and therefore I am qualified and able to complete the necessary research as outlined with the objective of summarizing plant biodiversity of the KCA Youth and Family Wellness Camp.

As my expertise is in Plant science and Melissa has sufficient knowledge and information about the project site, the successful completion of the project is undoubtedly anticipated to result in a useful booklet with a map that can help anyone to find plants and navigate around the patches.
This research is supported in part by funding from the Social Science and Humanities Research Council Grant #435-2020-0923 (PI Davidson-Hunt) and the University of Manitoba Graduate Enhancement of Tri-agency Stipends (GETS) Programme.

Project Charter:

The Project Charter is a document that has been developed as a product of several meetings with the goal of outlining the whole project. The original Project Concept, which itself is Appendix A, served as the basis for its development. It is an agreement that I, the project manager, Iain Davidson-Hunt (my advisor) and Melissa (the project partner), have signed to affirm the goals and deliverables that have been agreed upon. It gives a general summary of the entire project, explains why it is necessary, and offers a rough estimate for completion dates. This agreement serves as the foundation for all subsequent project documents, such as the scope, schedule, budget, and quality management. The charter will act as a live document during the project's execution, allowing me and the partner organization to document and approve any changes to the project's plans.

Project Overview:

This project is being implemented to survey the plant diversity of the Kenora Chief Advisory (KCA) youth and Family wellness Camp property in Kenora, Ontario. The plant diversity survey will summarize the observed plant species, their uses, and their location in the form of a plant list and a guide/booklet that include a map of areas surveyed and plants found. The site is a 326-acre property of land comprised of undulating topography with ridges and slopes of mixed wood, hayed fields, and coniferous forests, along with lower areas consisting of diverse wetlands. As this project is intended for learning purposes, the deliverables will provide KCA staff with resources that inform them about eco-sites, their ecological significance, dominant plant species, their values, and where to find them on the property. This information may be utilized by KCA staff to develop other products and services relevant to the programming they deliver at the Youth and Family Wellness Camp; for example, incorporating the nutrient content of the detected plant species from existing literature could be a similar project that can be undertaken as a parallel or follow up project.

Justification/Need:

Identifying the local plant communities of a specific area and gathering their functional roles is essential for assembling ethnobotanical knowledge, managing the lands, and maintaining the overall ecosystem health of that location. KCA works with the mission of providing programs and services to the First Nations in the areas of health, education, and social services in a holistic, traditional manner, ensuring the existence of the Anishinaabe way. This project will provide resources that can support the staff in developing products and services to educate Camp users and visitors about the existing flora. All the information collected through this project will be compiled in a PDF booklet and a PDF map which will eventually help to shorten the time that elders spend searching for plants at the Camp and will spare them from navigating difficult terrains. The risk of not undertaking this project for KCA will be the missed opportunity to document the site-specific details of plant biodiversity and developing products and services of value to KCA programmes delivered at the Youth and Family Wellness Camp. It will also provide the opportunity to avoid development in areas of the site that have educational value.

Objectives and Deliverables:

Objective

- List the observed plant biodiversity of the KCA Youth and Family Wellness Camp by August 2023.

Deliverable 1:

- A list of the names of the observed plant species at the selected patches with their coordinate points will be created as a form of dataset by July 2023.

Deliverable 2:

- A summary report of the uses of the plants and the ecological association of the selected patches will be completed by July 2023.

Deliverable 3:

- PDF version of a map of the KCA Youth and Family Wellness Camp indicating major patches and dominant plant species of the property will be completed by July 2023.

Deliverable 4:

- A final draft of the booklet/guide will be completed by August 2023.

Requirements:

List of plants:

- Survey vegetation in areas indicated for cultural and recreational activities and which allow for easy access by staff, visitors, and Camp users.
- Cross-checking the names of the observed plants with at least two plant identification apps pre-approved by KCA Youth and Family Wellness Camp.
- Compiling the coordinate points of the location of the selected patches and the coordinate points for individual plants from the list.

Summary of the uses

- A comprehensive literature review of the ecological significance of the eco sites found in the selected patches.
- The summary of the uses of the observed plant biodiversity must reflect the western knowledge about the plants and their various uses (e.g., Commercial, medicinal, food, crafts) from existing literature.

Geographical map:

- Consultation with a GIS expert to create a PDF version of the map that can be printed on paper.

- The map should clearly indicate locations crossed reference to the list of plants found at that location.
- The map should be accessible without using any electronic device or the internet.
- The map should be user-friendly and easy to maneuver.

Booklet/Guide:

- The draft of the booklet should be produced as a PDF version that can be printed on paper and include the PDF map.
- The draft of the booklet must include high quality photographs or illustrations of the plants found at the selected patches.
- Must reflect the feedback and suggested edits from KCA representative.

Resource and Cost Estimates:

The project is anticipated to cost about CAD 3,000, considering that KCA might perform some services using its workforce.

- The consultation cost with a GIS specialist is unclear; it will be clarified after hiring and negotiating with the consultant. A rough estimate might be- CAD 400.
- Accommodation cost for review of map and booklet- CAD 2,000.
- Transportation cost to Kenora for review process- CAD 300.
- Plant identification apps subscription fee- CAD 50.

Roles and Responsibilities:

Nawrin (Project manager)

- Edit and complete the Integrated Project plan (IPP).
- Compile existing plant data collected in Summer of 2022 into a plant list.
- Review coordinate points of the patches and plants from collected data for producing the map and identify gaps requiring further surveys.
- Arranging meetings with the spokesperson from KCA.
- Edit and complete the plant list with feedback from KCA.
- Arranging meetings with the GIS expert.
- Prepare the PDF version of the map with consultation from the GIS expert.
- Prepare a final PDF version of the booklet.

Iain (Advisor)

- Review/Edit the Integrated Project Plan (IPP).
- Secure committee member (NRI).
- Review/Edit the list of the plants.
- Review/Edit the final draft of the booklet.

Monojit (GIS Expert)

- Prepare the PDF version of the map with the input and feedback from Nawrin and KCA Youth and Family Wellness Camp.

Melissa (Partner)

- Review/ Edit the Integrated Project Plan (IPP).
- Communicate with the other KCA Youth and Family Wellness Camp authority members and provide feedback on the list, map, and the final draft of the booklet.

Charter Approvals:

Charter (Version 1) – Approved by Project Manager, Advisor and Partner on November 7, 2022

Project Scope

This project scope document explains what may be achieved from the project and potential assumptions that cannot and will not be fulfilled. The project manager, adviser, and partner organization concur on the project scope document, and further details of the expectations from this project mentioned here will be reflected accordingly on the project charter document.

Exclusions from Scope:

The overall goal of this project is to summarize the observed plant biodiversity of the KCA Youth and Family Wellness Camp. Since the information that will be gathered is extensive, the following potential expectations are not included in the scope of this project since they cannot be met:

1. This project will only reflect on the knowledge and uses of plants specified in western literature.
2. Since the project will not work with quantitative data, it will not be possible to give out plant abundance, plant richness-related data, or the exact number of plants of each particular species.
3. The map will indicate locations crossed reference to the list of plants found at that location, but it will not be possible to guarantee a level of precision similar to the navigation apps used on smartphones.
4. Only the PDF version of the map and booklet will be handed over upon completion of the project; the printing process and circulation of the booklet will depend on the members of KCA Youth and Family Wellness Camp, according to their convenience.
5. There will be no infrastructure-related activity or installation of signage on the property since it will be too broad for this project's scope but can be developed as follow-up projects in the future.
6. Planning an activity for youth/visitors of the KCA Youth and Family Wellness Camp is excluded from the project scope and will be up to KCA Youth and Family Wellness Camp members to carry out.
7. This project will not include nutritional contents of the observed plant species.

Assumptions:

In planning for this project, several assumptions that are currently accepted as true include the following:

1. It is assumed that from the data collected during Summer of 2022, a list of plants will be created in a form of data set that will include the common scientific names and GPS coordinate points of the observed plants at the selected patches.
2. It is assumed that KCA staff can build upon this project to include Elders knowledge of plants at a later date.

3. Plant data utilized in the project will represent areas identified by KCA staff.
4. Edible fruit plants are present throughout the surveyed area.
5. Since high-quality photos and illustrations of the plants of the selected patches will be added to the booklet, it is assumed that all images will be taken on the property.
6. It is assumed that the project manager, with the assistance of a GIS expert will be responsible for making the PDF map.
7. The hire of a GIS specialist will be scheduled in advance to guarantee the project continues on track. Thus, the timing of the project progression may need to be adjusted.
8. It is assumed that the PDF map and the PDF booklet will help elders to shorten the time that they spend searching for plants at the Camp and will spare them from navigating difficult terrains.
9. A promotional workshop or presentation can be arranged by project partner to disseminate results of the project.
10. It is assumed that the draft of the booklet and PDF map will be utilized by KCA staff to develop signage or other educational materials after conclusion of the project.
11. Incorporating the nutrient content of the detected plant species from existing literature could be a similar project that can be undertaken by KCA members as a parallel or follow up project.

Constraints:

Following are some constraints that have been found during project planning that may affect the project's success at different levels:

1. The project manager will not be available to initiate the project until after Jan 1, 2023 due to other commitments.
2. This project is constrained by the areas only surveyed during Summer of 2022.

Acceptance Criteria:

The following are the clear standards for evaluating the accomplishment of milestones and deliverables linked with the KCA Youth and Family Wellness Camp Plant Biodiversity Project:

1. List of plants comprised of all collected information during data collection.
2. Any proposed adjustments must be discussed with the KCA Youth and Family Wellness Camp and me early in the project. All parties must accept the proposed modification, and performance will be evaluated to the overall goals and deliverables.
3. Feedback meetings with partner organizations must reflect the suggested edits with the final PDF version of the map and the booklet.

4. The final draft of the booklet must include all research findings about the plants on the selected patches so that it is representative of the overall plant biodiversity of the KCA Youth and Family Wellness Camp.

Scope Management:

Iain, Melissa, and I are responsible for carefully reviewing and approving any suggested project scope changes. Changes will be taken into account, and a decision will be made within 48 hours if it is determined that they are essential to the project's success and raise the quality of the finished product. Changes to the project's timeline and meeting dates are not permitted unless they are indispensable for its success.

Upon a proposed change:

1. Any changes that require an adjustment to the project charter will need to be discussed at a meeting of the project manager, partner and advisor during the development of the project plan.
2. When a change is made to the charter during planning, this change will be noted in the project charter and the date of the meeting recorded.
3. During project implementation, scope management will also be considered in the change management plan and the change log after approval.
4. The feasibility and cost impact of changes will be examined.
5. The Project Charter will be revised to reflect any accepted changes that affect the project's deliverables and objectives, and a new copy will be given to the project team.

Project Schedule

The Project Schedule has been created because of developing Project Activities, a Work Breakdown Structure, the Sequence Diagram, defining Milestones, and calculating the Critical Path. Schedule details are provided as Appendix B. The project manager will utilize the project schedule as a tool for time tracking, updating it each day of the project with task progress. Although the project has been scheduled as shown below, the schedule is a living document and is subject to change as the project moves forward. Float tasks may be finished at different dates as long as the project's critical path remains unchanged. Whenever necessary, with mine, Iain's, and Melissa's agreement, tasks may be added to the project timeline. The Change Management Plan and Change Log will be used to track significant changes, which will then be managed appropriately.

The schedule has been created as a Gantt chart to easily visualize the progression of tasks which are organized by tasks and deliverables coordinating with the Critical Path calculations, as outlined by schedule below:

- Deliverable 1: List of Plants.

Task/Activity:

1. Review Data
2. Lit scientific names in dataset.
3. Compile coordinate points in dataset.

- Deliverable 2: Summary report.

Task/Activity:

4. Literature review of uses.
5. Literature review of ecological association.

- Deliverable 3: PDF map.

Task/Activity:

6. Hire GIS expert
7. Revise map

- Deliverable 4: PDF booklet.

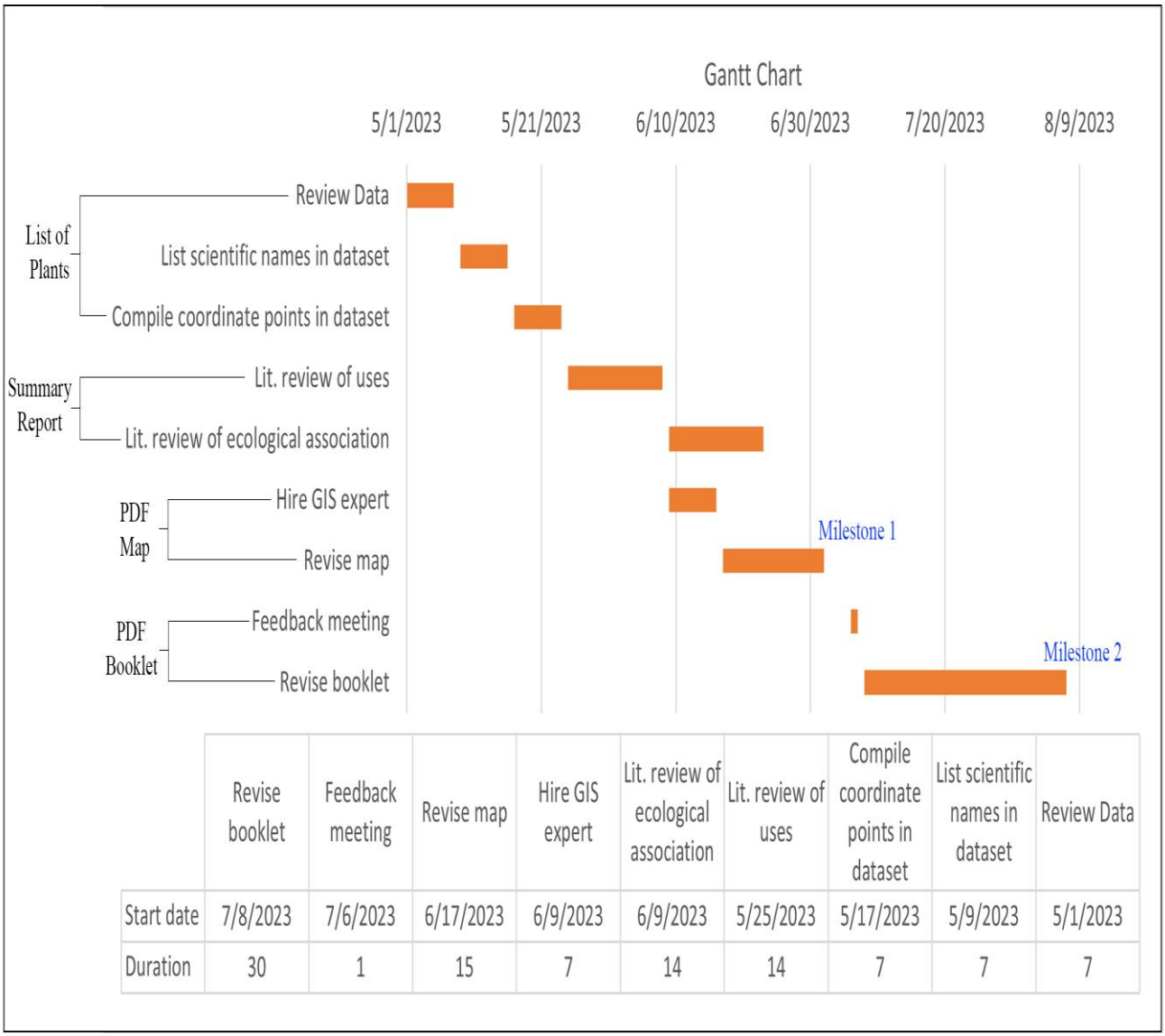
Task/Activity:

8. Feedback meeting
9. Revise booklet.

The schedule outlines task durations, start and end dates based on a single day and time, and is considering most of the work is done in a 40-hour work week. At times, the project manager has
been scheduled over a weekend to perform time sensitive data analysis or research, but weekend work

is not expected outside of these exceptions. Unless otherwise noted, tasks are automatically assigned
to the project manager, who holds the full responsibility for completing tasks, adhering to project schedule, as well as holding all others accountable for their assigned tasks.

The completed Project Schedule is provided on the following page and is current at the time of writing this document. (June 14, 2023) As calculated in the Critical Path Calculations table (Appendix
B) the early start/early finish and late start/late finish dates are the same due to the nature of project
activities. The project start is set as May 1 and will end by August 8,2023 as completion is essential to affected parties' schedules including graduation requirement deadlines, meaning there is
no available float time outside of the allotted calendar. The schedule is a living document, and is made available to the project partner, advisor, and partner.



	Revise booklet	Feedback meeting	Revise map	Hire GIS expert	Lit. review of ecological association	Lit. review of uses	Compile coordinate points in dataset	List scientific names in dataset	Review Data
Start date	7/8/2023	7/6/2023	6/17/2023	6/9/2023	6/9/2023	5/25/2023	5/17/2023	5/9/2023	5/1/2023
Duration	30	1	15	7	14	14	7	7	7

Resource Plans

The resources required for the project's completion that must be acquired in addition to those possessed or made accessible by project members are listed in the section that follows. The "Skills and Knowledge" section outlines what is required in addition to the knowledge already had by the three team members and how we intend to acquire it, while the "Materials, Supplies, and Equipment" section outlines the equipment required for various project components. Appendix C has a detailed description of the resource requirements.

Skills and Knowledge:

Several skills and knowledge are essential for the project "KCA (Kenora Chiefs Advisory) Youth and Wellness Camp Plant Biodiversity Project" to achieve all objectives and deliverables to the highest quality standards. The project partners provide most of the skill and knowledge needs, as shown in the resource (skills and knowledge) needs assessment, but one additional expert will need to be contracted to develop a geographical map.

Materials, Supplies, Equipment

A significant portion of the project can be completed using the project manager and Advisor's equipment, which includes a personal laptop with all essential programs (Word, Excel, and PowerPoint), a cell phone, an internet connection, and access to UofM libraries for research. The following techniques will be used to obtain additional materials, supplies, and equipment that are not previously owned:

1. Plant Identification apps subscription- A membership to PictureThis and iNaturalist will be acquired from their respective websites by the project manager as they are available to anyone who pays for a membership.

2. GIS software packages- GIS expert will be hired and paid by the project manager to use GIS software packages to produce the PDF map of the KCA Youth and Family Wellness Camp.

3. Accommodation and transportation cost for the data collection and review- Stipend from Advisor.

Managing Relationships:

The success of the project depends on effective communication, thus the parties that must be kept updated at different points during the project are listed in the following section. Appendix D is a comprehensive summary of the Relationship Management Plan. For people to be informed of progress or changes to their responsibilities within the project, this plan specifies who must be communicated with and when. Internal parties who participate in decision-making and external parties who have a distinct but equally significant role in the project's success divide communications. Understanding what others need from us, what we need from them, the mode of communication, and the time to fulfill both parties' requirements and our own are essential parts of the communications strategy.

Interested Parties Register

The following people are involved in the project on an internal level and are crucial to its success. Planning, making decisions, handling finances, providing data, attending meetings, and requesting updates on activities including (but not limited to) the progression and accomplishment of tasks and milestones, are all part of communication with them.

1. Iain Davidson-Hunt (Advisor)

2. Melissa Payne (Project Partner)

3. NRI Practicum Committee Member

The following people are not involved in the project, but they play important roles in achieving the project's research objectives. Everyone involved in the project has been recognized, and all communication must be transparent and truthful whether they are contributing research data, offering input, or will be positively or negatively impacted by the project's conclusion.

4. KCA Youth and Family Wellness Camp Staff.

The list of recommended communication channels and times with different project parties is provided below to guarantee schedule compliance and high-quality work completion. The project plan's most efficient means of communication are recommended, while other methods that are more practical for the parties involved may also be employed:

1. Email – The easiest way to communicate in a professional context, guaranteeing that all communications are recorded throughout the project. Email will be used frequently or as needed for communication, as well as to get in touch with the partner and the committee members and provide them with relevant links and research resources. All project members will have access to the project manager's email address for usage as needed for research-related purposes. The project manager's email will be used to communicate with committee members and the partner to keep track of quotations and other information as the deliverables are produced. *(Interested Parties: 1, 2, 3)*

2. Phone – This approach will be employed when a communication need is more urgent or demands a prompt response. An email will be sent after the conversation or decision to record

the relevant information. Members of the project team will be given each other's phone numbers and encouraged to get in touch this way. *(Interested Parties: 1, 2, 3)*

3. Zoom – The project team will utilize this technique for discussions important to the project and when choices and adjustments need to be considered and decided, as it is convenient for the committee members and the project manager and requires no additional equipment to record. *(Interested Parties: 1, 2, 3,)*

4. In-Person – In person meetings including the feedback meeting will be arranged according to the partner and committee member's availability.

Product Service Promotion Plan

This project, "Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp Plant Biodiversity Project" is intended to define and share definitive information on the flora in the vicinity of the KCA Camp. To help the staff promote the KCA Youth and Family Wellness Camp using the booklet, a "Product Service Promotion Plan" has been created. The promotion strategy that will be used to generate the necessary demand and support for moving research outputs forward is outlined below.

Overall Goal of the Project

The overall goal of this project is to ensure that employees at the KCA Youth and Family Wellness Camp are well-informed about the local flora and to demonstrate the integration of western knowledge about the observed plants.

Intended Audience:

- KCA Youth and Family Wellness Camp Staff

Key Messages of the Promotion Plan

1. The natural habitats of KCA Youth and Family Wellness Camp provide an opportunity for learning of the flora.
2. The booklet provides a resource for KCA Youth and Family Wellness Camp staff to know what flora is present and where it is located.
3. This booklet is just a start for KCA Youth and Family Wellness Camp to develop programming for youth.
4. A next step would be for KCA Youth and Family Wellness Camp to work with Indigenous Knowledge Keepers and Elders to showcase their knowledge of the flora.

Suggested Communication Vehicles

Following are the suggested communication vehicles required for a successful promotion plan. Descriptions and reasons for choice can be found in the full document in Appendix E.

1. Social media

2. Workshop

Risk Management

Since every project carries some level of risk, a thorough risk analysis has been made for this project; the entire document is available as Appendix E. The Risk Management Plan begins with a detailed list of potential risks related to this project as a consequence of several in-depth discussions with the advisor and partner organization regarding deliverables, schedules, contractual or hired work, impacted parties, and the data needed. The risks that are known are included in a "Probability and Impact Matrix," where risk probability and impact are carefully assessed on the provided scale to determine the risks that are most relevant to the project. The magnitude of each risk is ranked according to its likelihood of occurrence in a Risk Register that the project manager uses to keep track of risks as they develop throughout the course of the project. Each risk in this project that has a higher probability has a corresponding response plan that is detailed below and presented in the corresponding appendix.

The following table is the Risk Response Plan which addresses the top scoring risk from the Probability and Impact Matrix and the Risk Register. The Risk Response Plan addresses the response strategy (Avoid, Mitigate, Accept) and the details of associated strategy.

Risk	Response Strategy	Response Details
Personnel – Unable to acquire sufficient GIS capacity.	Avoid	To avoid this risk, it will be made sure that the job advertisements identify needed competencies clearly.
	Avoid	To avoid this risk, the job advertisement will be published in different social media platform early in the 2023, and the interested applicants will be communicated as early as possible so that the right candidate can be selected before the deadline of the hiring of GIS expert.
	Mitigate	To mitigate this risk, the selected candidate will be asked during interview to provide their availability to work on the project along with the start and finish date.

	Mitigate	To mitigate this risk, a job offer will be circulated among NRI students, and one competent student will be identified as a backup GIS expert, who has sufficient training and available to do the job.
	Accept	If no competent candidate is identified, or the hired person is not available when contracted to do the job, the pre-selected student from NRI will be hired to produce the map.

Quality Management:

The following Quality Management Plan demonstrates how quality will be defined and measured throughout the project. To identify which activities and deliverables create risks to quality, a careful review of all of them was conducted. Although there are no external standards or regulations that directly apply to the analysis, there are several requirements that must be followed in the event that it is put into practice in order to guarantee that the project's feasibility and quality standards are satisfied. This section outlines the biggest threats to the project's quality as well as the precautions we have put in place to ensure that project requirements are satisfied.

Most Significant Risks to Quality:

The following list outlines various project requirements that pose the most significant risks to the quality and success of the project:

1. Errors in Plant identification apps needs to be dealt with.
2. Imprecision in the measurements of the coordinate points should be avoided.
3. This project only focuses on the areas suggested for cultural and recreational activities at the Camp by the KCA staff. As a result, it will only reflect the research findings of the selected and surveyed patches which must reflect the overall plant biodiversity.
4. Photos and illustrations of the plants of the selected patches should be of higher resolution, for example HD (1280x720) or higher, having 240 or 300 ppi (pixel per inch) for printing, so that anyone can identify the plants with the help of the booklet.
5. The map should clearly indicate locations crossed reference to the list of plants found at that location. The map has to be accessible without using any electronic device or the internet, and, it should be user-friendly and easy to maneuver.

Quality Management Procedures:

1. Errors in Plant identification apps needs to be dealt with.

    a. Although two different plant identification apps will be used which are pre-approved by the KCA to identify the observed plants, and the probability of a wrong identification is very low, plant sample will be crosschecked consecutively with plant taxonomical guidebooks and internet for accuracy.

2. Imprecision in the measurements of the coordinate points should be avoided.

    a. To ensure the collected coordinate points during Summer 2022 are precise and correct, KCA Youth and Family Wellness Camp will be revisited during Spring, 2023 to recheck the collected data.

3. Data acquired for plant biodiversity documentation must be general enough to allow for qualitative analysis.

    a. Collected data will contain enough research findings to address all the objectives of this project.

b. Collected data will be reviewed by the advisor to ensure required data is obtained and appropriate for research purposes.

4. This project only focuses on the areas suggested for cultural and recreational activities at the Camp by the KCA staff. As a result, it will only reflect the research findings of the selected and surveyed patches which must reflect the overall plant biodiversity.

a. Compiled dataset, along with the summary report, will be cross-checked with the plant information from a patch that was not initially selected for the plant survey to ensure at least more than half of the vegetation is already documented.

5. Photos and illustrations of the plants on the selected patches should be of higher resolution, for example HD (1280x720) or higher, having 240 or 300 ppi (pixel per inch) for printing, so that anyone can identify the plants with the help of the booklet.

a. Professional digital camera will be used to do capture photos.

b. High quality photos of the observed plants will be collected from the internet and included in the booklet with proper photo credit, in case unable to capture on the site.

6. The map should clearly indicate locations crossed reference to the list of plants found at that location. The map must be accessible without using any electronic device or the internet, and it should be user-friendly and easy to maneuver.

a. The map will be provided to the KCA staff to review and check if it is suitable for use.

The project manager's responsibility is to ensure the project's overall success by adhering to the overall quality requirements. Quality must be carefully implemented and tracked as the project develops. The project manager is accountable for the following duties to guarantee the quality of all project-related activities:

Roles and Responsibilities:

The project manager's responsibility for overall quality standards is to ensure the project's entire success, but the advisor and partner must also carefully implement and monitor quality as the project progresses. The project manager, the advisor, and the project partner are accountable for the following duties to guarantee the quality of all project-related activities.

1. To guarantee accuracy and relevance, all deliverables will be carefully reviewed and given to the project partner and project adviser for approval before the final draft of the booklet is prepared.

2. The project partner and adviser will be kept in regular and open communication with the project manager to make sure all tasks are finished as planned before moving further.

4. To be ahead of the project timeline and submit the deliverables on time, necessary research for next steps will be done by the project manager during "breaks" in activities.

5. The project schedule will be thoroughly kept track of and checked daily by the project manager to make sure all tasks are done on time (or early) to prevent rushing through subsequent tasks.

Budget Summary

The table below lists the most accurate estimates of associated project costs, grouped by the type of activity/expense. Unforeseen expenses have been worked into the cost estimates and may result from additional resource needs, or price changes. Project costs are supported in part by funding from the University of Manitoba Graduate Fellowship (UMGF). A detailed budget allocation is provided as Appendix F.

Resource Group	**Activity / Task**	**Associated Cost**	**Total**
Travel	Data collection	Transportation	CAD 300
		Accommodation	CAD 2000
Equipment and supplies	List all scientific names	Plant Identification apps	CAD 50
		Internet	CAD 50
Personnel	PDF map	GIS expert salary	CAD 400
Unknown		Unknown	CAD 200
		Total	CAD 3000

Change Management

The project's change management strategy is presented in the section that follows and outlines a predictable course of action in case any adjustments are necessary. The project has been extensively examined to determine the most likely tasks/activities that provide chances for change since it is crucial that the project advances in a timely way despite modifications. Changes may be brought about by unforeseen events, external parties, or by internal parties such as the project manager or the partner organization.

Change Management Plan

How the changes will be managed if they arise:

1. The risk and quality management plan has identified identifiable and knowable risks, and if those risks arise, the applicable plan's procedures will be implemented.

2. The following methods will be used to manage change if a partner, team member, project manager, or other project participant requests one.
a. A meeting with the individual seeking the modification will be arranged to thoroughly understand why it is necessary and what will be needed to answer the request.
b. The modification request will be noted in the change management log, and the necessary steps will be taken.
c. A meeting will be held, the project charter will be modified, and the meeting where the charter change was decided upon will be noted in the charter change log.
d. The relevant document will be amended, and the change will be noted in the change management log if the change necessitates a difference in the plan's timeline, scope, or other elements.

If the change is approved and carried out:
1. Before deciding to accept, reject, or adjust to a change, the project manager, adviser, and partner must analyze any planned or unanticipated modifications to the project.
2. The agreed modification shall be recorded where necessary, such as the project charter with the related meeting recorded, authorized, and signed.
3. Any other modifications that could result from the currently accepted change will be examined by looking at the project timeline.
4. The impacted persons will be notified of the change by phone if they are involved in task execution, and an email will be sent to all project participants informing them of the change and its justifications.

Change Documentation and Meetings:

1. The Project Charter shall be updated with the date of any meetings and the approved signatures from the Project Manager and Partner organization for any substantial modifications to the project (those that influence the schedule, funds, or people).
2. It will be updated to reflect authorized adjustments to any other project plan documents that are impacted by the modification.

3. If deemed essential, any minor adjustments (those not affecting the schedule, budget, or people) shall be reported to those impacted by phone or email.
4. The project manager, advisor, and the partner organization will all have access to a project Change Log (Active Document) that will be produced expressly for the needs of this project to record any changes (major and small).
5. It will be made sure that the change log contains details on the change's nature, the decision-makers, the justifications for accepting or rejecting the change, and the recipients of the communication.

Change Control Log:

Project Name: Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp Plant Biodiversity Project					
Project Manager's Name: Nawrin Tania					
No.	Change Request Description	Submit Date	Status/Comments	Approve/Reject /Defer	Implement Date
1.	Submission of final project document with all the deliverables.	12/23/2023	Delayed submission due to change of the timeline of the project completion.	Approved.	12/23/2023

Appendix 1: Background Information Report

Introduction

A plant biodiversity study is being carried out as part of this project at the Kenora Chief Advisory (KCA) Youth and Family Wellness Camp in Kenora, Ontario. A list of plants and a guide that includes a map of the areas studied and the plants identified will serve as a summary of the observed plant species, their uses, and whereabouts. The location is a 326-acre plot with uneven topography mixed with various wetlands. The deliverables will inform KCA personnel about eco-sites, their ecological relevance, dominating plant species, their values, and where to find them on the land because this project is meant to be educational. KCA staff may use this information to develop additional services relevant to the programming they deliver at the Youth and Family Wellness Camp.

Boreal Forest Ecology of Northwestern Ontario

The largest of Canada's 15 terrestrial ecozones is known as the Boreal Shield, where the Canadian Shield and the boreal forest meet (1). When used in the singular, the word "boreal forest" often refers to the wooded region of the boreal zone as forests are so prevalent there (2). The boreal forest, which makes up most of Canada's environment, runs continuously from the east coast to the Rockies and covers a large territory across Canada (1). For Gardner (1981) and Winterhalder (1983), the rich variety of plants and habitats of boreal forests are the consequence of the multiple effects of moisture produced by the climate, soil conditions, and terrain (2). Examples of rich biological ecosystems in boreal forests are aquatic habitats, such as rivers and lakes with wild rice, wild birds, fish, and, more recently, burned-out places, thought by archaeologists to be continually re-colonized by new plants and animals (2).

Primarily due to palynological studies conducted in Canada, experts' understanding of the paleoecology and environmental history of the boreal forest and Great Lakes-St. Lawrence Forest has substantially increased over the past three decades (3). Palaeobotanical data from the Arctic treeline and the transition between forests and grasslands have shown that these areas underwent significant displacements over the Holocene period (3). With little to no *Picea mariana* (Black spruce) and a predominance of *Picea glauca* (White spruce), around 10,000 B.P, the first postglacial boreal forest emerged on the Canadian Shield mountains. It likely had more *Quercus spp.* (Oak), *Ulmus spp.* (Elm), *Populus spp.* (Poplar), and heliophytic plants and shrubs than its modern equivalent (3). As the temperature continued to warm, *Picea spp.* (Spruce) decreased and was replaced by *Pinus banksiana* (Jack pine) at approximately 9000 BP. Species like *Myrica spp., Alnus crispa, and A. rugosa* were among those that successively migrated into the boreal forest, enriching its floral composition. Around 7400 years ago, when *Pinus strobus* (White pine), *Fagus spp*. (Beech), and *Tsuga spp*. (Hemlock) came to Nina Lake, which was situated between the boreal forest and the Great Lakes-St. Lawrence Forest. Over the past 4,000 years, spruce, jack pine, and *Abies balsamea* (Balsam fir) have grown and become key boreal forest features (3).

Compared to the other, more temperate Canadian forests, the boreal forest is extremely flammable and burns more frequently (4). During the dry summers, large portions of the boreal forest are burned by lightning and human-caused fires. However, most of its plant species have evolved to

withstand flames or swiftly re-colonize burned regions. Fire disturbances are essential to the survival of the forest because they let out nutrients from fire debris on the forest floor, they let daylight through the canopy, and facilitate the reproduction of some plant species by breaking apart pinecones and releasing seeds (4).

Coniferous trees adapt exceptionally well to the harsh boreal climate (5). The predominant species of the Canadian boreal forest include *Larix laricina* (Tamarack), fir, spruce, and pine. They are always green, apart from the tamarack, which sheds its needles every fall. The boreal forest is also rich in broad-leaf deciduous trees, including *Populus tremuloides* (Trembling aspen), *Populus balsamifera* (Balsam poplar), and *Betula spp.* (Birch) (5). Although trees predominate among plant species, the boreal forest also has many shrubs, mosses, and lichens. Some bushes, including *Salix spp*. (Willow), *Alnus spp*. (Alder), *Vaccinium spp*. (Blueberry), *Cornus sericea* (Red-osier dogwood), and *Lonicera spp*. (Honeysuckle) produce colorful or berries that draw birds and serve as food for many animals such as tiny rodents and bears (5).

It is essential to research the vegetation and ecology of the boreal forest to summarize and document the plant biodiversity and ecological association of a particular area in Northwestern Ontario. The Field Guides to the Forest Ecosystem Classification and Typical Plants of Northwestern Ontario can assist in looking more closely at these elements, as detailed on page 32. of this Background Information Report (Plants and Eco sites Identification with Forest Ecosystem Classification and Field Guide to Common Plants in Northwestern Ontario).

Figure 1. Forest Regions of Canada (6).

Indigenous Uses of Plants in Northwestern Ontario:

North America's northern and boreal forests are characterized by a low population density, where many residents live in isolated tiny towns (7). Both the residents of these towns and urban dwellers across Canada rely on forest resources for various commodities and non-commodities. Despite specific changes in the socio-cultural orientation, the central focus of past and present economic growth has been the extraction and manufacture of wood and fiber products (7). Indeed, the First Nations peoples and the Europeans who inhabited and moved to these areas have a long history of harvesting numerous plant resources for nutritional, industrial, therapeutic, and spiritual benefits (7).

Western literature and traditional knowledge demonstrate the beneficial characteristics of the plants found throughout the vegetation of Northwestern Ontario. For example, in their 1981 paper, Arnason et al. found that the nutritional data in many of the species collected by Indigenous Peoples in the boreal forests of Ontario exceeded conventional plant sources for vitamins and minerals (8). Based on phytochemical components, the same study also demonstrated that at least 105 medicinal plants used by Indigenous peoples have the intended benefit. In this category, conifers were the most utilized plant species (8). Canada has conducted multiple studies on the medicinal plants collected by Indigenous communities (9). A list of medicinal plants used in northern Ontario was obtained through interviews with local Elders and a literature review on ethnobotany. In these studies, conducted by Canada, plants utilized by Indigenous Peoples to treat disorders were found to have more significant medicinal potential than a randomly selected sample (9).

Further, edible wild plants are found in Northwestern Ontario, including *Corylus cornuta* (Beaked hazelnuts, *Achillea millefolium* (Yarrows), *Solidago spp.* (Goldenrods), *Cantharellus spp.* (Chantarelles), *Juniperus spp.* (Junipers), *Rubus chamaemorus* (Cloud berries), honeysuckle, birch trees, and black spruces (10). Although berries are wild foods, most are consumed by general people as nutritious fruit. Numerous edible plants are found in Northern forests and freshwaters, including edible tubers, leaves, blossoms, and stems. While some must be cooked or roasted, others may be eaten raw (10).

In addition to edible plants, the non-timber forest products industry is an important part of Northwestern Ontario's economy and the region's traditional use of plants. The biological species present in various forested habitats that are valued by humans for various purposes—aside from wood—are known as non-timber forest products, or NTFPs (11). A possible source of valuable NTFPs is the birch tree and its surrounding vegetation, which is noticed throughout my research location. Additionally, birches hold a significant cultural value for many Indigenous Peoples (11).

The valuable plants of the boreal forest recorded in Western and traditional literature are noticed to be distributed throughout the forests of Northwestern Ontario, including in the natural sites of Kenora. Drawing from this knowledge, educational materials can be developed for further academic research and public awareness.

Vegetation characteristics of Kenora, Ontario Found in Literature:

Kenora in Northwest Ontario is situated at a junction of historic trade routes on the northern shores that pours into the Winnipeg River from Lake of the Woods (12).

Ecoregion: Described by a distinctive range and pattern of environmental factors, such as temperature, precipitation, and humidity, an ecoregion is a distinct area of land and water enclosed inside an ecozone (A vast region of land and water that is distinguished by a unique bedrock domain that is distinct from the bedrock domain next to it in origin and chemistry). The plant varieties, substrate development, various ecosystem processes, and related biota that reside in an ecoregion are all significantly influenced by its climate (13).

The ecosystems of Ontario contain ecoregions that fall into different locations of Ontario. The parts of Ecoregions 4S and 5S (as indicated in The Ecosystems of Ontario, Part 1: Ecozones and Ecoregions), as well as six site districts, are located in the Kenora District (14). Kenora includes the Lake of the Woods Ecoregion-islands, areas around Lake of the Woods and the Lake Wabigoon Ecoregion- from the northern part of Lake of the Woods north to Red Lake and east to Lac Seul, Sioux Lookout, Dryden, and Rainy Lake (13). These ecoregions are characterized by hot summers and freezing winters (15). At Kenora, the mean annual temperature is 2.l° C, with mean daily temperatures over 0°C being common from April to October.

The landscape in the Kenora district is dominated by forests (65.3%), of which mixed forest makes up 25.2%, sparse forest 23.8%, coniferous forest 14.3%, and deciduous forest 2.0%. (13). The western portion of this ecoregion has a substantial tract of barren and thinly vegetated bedrock-dominated terrain, where the establishment of forests is restricted by an extreme fire regime, a crisp environment, and deep substrate. Fire cycles in upland coniferous forests extend from 50 to 187 years, often replacing whole stands (13).

The vegetation of the Lake of the Woods Plains Ecoregion exhibits a transitional quality between southern hardwood-dominated regions and northern coniferous boreal forest (15). Site disturbance has a significant impact on the composition of the vegetation. Jack pine often grows on relatively shallow, well-drained soils with a rougher texture, especially after fire (15).

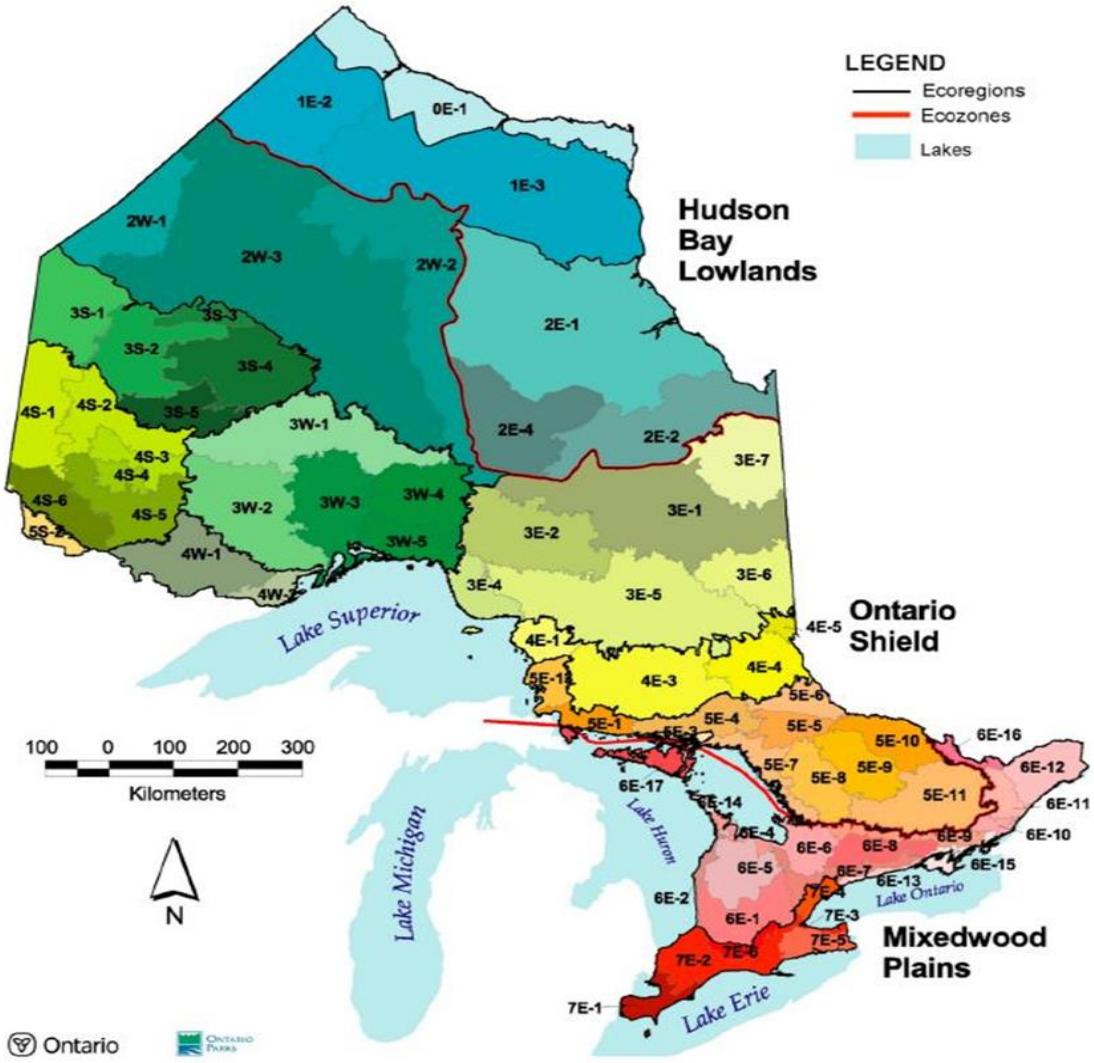


Figure 2. Map showing the ecozones, ecoregions and eco districts of Ontario, Canada (13).

Furthermore, black spruce grows in these ecoregions more frequently after logging operations. Black spruce is the most prevalent plant on moist, poorly drained terrain (15). On well-drained areas across the ecoregions, stands or occurrences of white and red pine, *Ella americana* (Basswood), *Acer spp*. (Red maple, Manitoba maple), and bur oak can occasionally be observed. Black ash, and balsam poplar are more prevalent in the ecoregion and grow on poorly drained soils (15).

The vegetation in the Lake Wabigoon ecoregion strongly resembles the boreal region (13). Lowland ecosystems are dominated by black spruce and tamarack, with black ash and balsam poplar serving as the most frequent hardwood partners. It is significant to highlight that the vegetation communities in this ecoregion represent a zone of quick ecological transition and reflect a sharp climate gradient (13). Bur oak, large-tooth aspen red pine are common in warmer, drier locations in much of the ecoregion's central and southern regions (13).

Ecological History and Edge Effect

Ecological history is any research that examines how ecosystem processes and patterns have evolved throughout time and how they interact with one another (53). The property of the KCA Youth and Family Wellness Camp has traditionally been used for long-term farming, with some of it being hayed to collect feed for the Camp's equine farm. Human activity and natural disturbances like fire have contributed to differences in the community structure and biodiversity of plants, birds, animals, creatures, etc., in this process, especially in places where habitats interact. As mentioned earlier, the boreal forest can be extremely flammable and in many of the plant stands of the KCA Youth and Wellness Camp signs of previous fire disturbances has been noticed. Given the ecological history of the KCA Camp, it is vital to discuss the phenomenon known as the "Edge effect" in the context of this feature. The plant biodiversity of the KCA Camp is heavily effected due to the varied fragments of landscape created by this event.

A fragment's vulnerability to flames spreading from neighboring cultivated fields increases with its size (58). Due to increased light availability, which promotes higher desiccation and increased understory growth, forest fires are more prevalent along edges (58). Forest edge adjacent plants are typically shade-intolerant (54). Like vines and shrubs, these plants also have the capacity to tolerate dry circumstances. If there are significant weather occurrences, old-growth forest patches near the edge are more vulnerable than continuous forests (56). Since old-growth forest species are accustomed to steady, humid environments, they may be susceptible to changes in microclimate (57).

Specific plant and animal species can colonize the boundaries of their habitats due to environmental factors (54). Compared to smaller patches, larger patches exhibit more richness in native species (55).

Fostering a Connection to Nature Through Ecological Literacy

The link between humans and nature has long been discussed among scholars (16). According to Shultz (2002), one's connection to nature may be characterized as the "extent to which an individual includes nature within his/her cognitive representation of self" (p. 67). As Aldo Leopold famously stated, "We are members and citizens of the biotic community" (17). This knowledge conveys the simple demand that we must thoroughly and carefully consider the ecological necessities and circumstances that support all life. Wilson's (1984) concept of biophilia assumes that people have an innate biological affinity to the natural world (16). Perhaps what is starting to resemble a growing global ecological enlightenment can be explained by biophilia (17).

Orr (1989) is credited for suggesting the word: 'Ecological Literacy,' which was subsequently developed by Kassas (2002a). Kassas contended that to get intimate with nature is to form a personal connection that includes amazement, delight, and an understanding of its scientific, aesthetic, and resource significance (18). An ecologically literate person would understand

ecological systems, their organizational principles, and the potential applications for incorporating them into daily life. Thus, with ecological literacy, that person would also understand how to create sustainable societies (19).

Whether one is ecologically literate, human beings need to commune with nature. Research has only recently clarified human reliance on nature and the advantages of connecting with nature (20). Numerous studies have found that people depend on nature for their psychological, emotional, physical, and spiritual needs. Being in tune with nature has been linked to several advantages, including reduced stress, a sense of purpose, and ecologically sound conduct (16). According to research, exposure to and time spent in nature—including when nature is observed from indoor spaces—benefits children's physical, psychological, emotional, social, and intellectual health and development (21). Concerns regarding behavioral and socio-emotional issues linked to a lack of exposure to natural surroundings, commonly referred to as "nature deficit disorder"- (NDD), have been raised as a result of children's decreasing access to and time spent connecting with the natural world (21).

In the face of NDD, numerous strategies can be utilized to foster a personal and emotional connection with the natural world, whether for tourists from afar or residents (22). Current research suggests that facilitating access to nature, parks, and other natural areas plays a vital role in enhancing the health of human beings (20). Further, there is a growing awareness that leisure services, parks, and recreation facilities facilitate physical activity and its subsequent health improvement (23). Popular public activities include guided nature hikes and interpretive trails (22). In turn, experiencing the rich and diverse varieties of plants in nature through these activities can contribute to an increased interest in the environment. Interpretative centers can play a significant role in the rapidly expanding tourist sector and are an integral component of the global endeavor to conserve and disseminate civilizations' rich knowledge of plants to the public (24). As plants represent an essential component of nature, connecting with nature and learning about plants through the help of interpretive centers could play a greater important part in our process of ecological enlightenment.

Environmental Interpretation: Recreation and Learning

"Interpretation is a communication process designed to reveal meanings and relationships of our cultural and natural heritage to the public (Visitors) through first-hand experiences with objects, artifacts, landscapes, or sites" - Interpretation Canada (1976), (25).

As they introduced early 20th-century travelers to the grandeur of the North American wilderness, nature guides paved the way for contemporary interpretation (26). In Interpreting Our Heritage, Freeman Tilden first defined interpretation as-

"An educational activity which aims to reveal meanings and relationships through the use of original objects, by first-hand experience, and by illustrative media, rather than simply to communicate factual information" (26).

Interpretation and education can have two separate functions in ecotourism: they can manage visitors and meet tourist information demands (22). Many different terms are used to name outdoor education programs, including “environmental education, conservation education, adventure education, experiential education, and environmental interpretation” (23).

A potent tool for fostering long-lasting and meaningful connections with nature is effective environmental interpretation (16). It is an instructive, informative, and enjoyable exercise (27). Experiences in nature can be defined by the purity of the natural environment, the individual's full presence and awareness in that environment, and the patterns of interaction that provide a framework for inquiry and meaning (16). In many outdoor spaces, interpretation can facilitate a sense of connection to the environment and can alter how people see and use natural resources (16). Visitors are frequently introduced to natural resources through environmental interpretation, which piques their curiosity and helps them relate the experience to a deeper meaning (16). The visitor, the interpreter, and the resource all have a variety of interacting and interdependent connections that make up interpretation. Direct engagement with nature that is personally meaningful might foster a stronger relationship to natural areas and a consequent motivation to take care of those areas. Thus, effective environmental interpretation may foster a visitor's relationship with nature and encourage environmentally friendly behavior (16)

Between two extremes, environmental interpretation walks a fine line (25). In good environmental interpretation, both scientific facts and emotional and spiritual relationships to nature are valued. Therefore, environmental interpretation should be both entertaining and educational (25). The objectives of environmental interpretation are explained as being to be enjoyable to both the interpreter and the sightseer, increasing their awareness of the natural and cultural surroundings, inspiring them, and providing perspective to their life. Visitors' interactions with the site encourage them to follow site rules and create site advocates. Like how it improves the organization's image of who owns the site, it also helps visitors connect with the organization and promotes public engagement in management (25).

Indigenous Environmental Education through Interpretation:

Landscapes have significance and importance that can only be understood by visiting certain locations or engaging in specific activities (37). Sterling (2001:12) states, "It is the change of mind on which change towards sustainability depends," and that a new perspective on teaching that acknowledges the interconnectedness of people and nature is required (38). Put another way; it is easier for individuals to connect with and enjoy different landscapes and cultures when they have a personal connection to them (37). Park interpretation is a typical representation of landscape-level environmental education (EE). This EE approach is probably familiar to anybody who has camped in a provincial or national park (37).

Indigenous knowledge traditions and methods of knowing have also been included in environmental education (39). Indigenous knowledge is described by UNESCO (n.d) as "the understandings, skills, and philosophies developed by societies with long histories of interaction with their natural surroundings” (40). Indigenous people have developed their understanding of

the environment and resource management via experimentation and observation over many generations of life in specific ecosystems (41).

The phrase "traditional ecological knowledge" (TEK) is frequently used to refer to this body of information acquired through experience and handed down through the generations (42). Like TEK, indigenous knowledge refers to local information specific to a certain culture or civilization (43).

"Elders are keepers of tradition, guardians of culture, the wise people, the teachers. In Aboriginal societies, elders are known to safeguard knowledge that constitutes the unique inheritance of the nation." (44).

Elders' traditional knowledge is one of the finest sources of information since indigenous people have been utilizing plants for many years (45). Working with indigenous populations, including those in Canada, is a common way to find valuable non-timber forest products. More than 500 plant and fungus species are utilized by indigenous people in northwestern North America (46). From the Wabigoon First Nation in northwestern Ontario, wild rice and wild berry products are gathered and sold (47;48). To safeguard their intellectual property rights and against being taken advantage of by big businesses, those who utilize these typically keep therapeutic "recipes" and formulations private (45).

Gathering plants is not as prevalent as one or two generations ago (37). Many Elders and middle-aged individuals still have a good understanding of which plants may be used as food or medicine, where to locate them, and how to utilize them, even though they don't collect and use them as much as they formerly did. Because plants and their shared ecosystems cannot travel, making them very simple to study and visit (37). Elders are excellent instructors because of this, and they are at their best when instructing on a piece of land that they are familiar with (37).

According to Simpson (2000), who studied Anishinaabe learning practices in Manitoban and Northern Ontario Ojibway cultures, lifelong experience is the best way to acquire cerebral, emotional, physical, and spiritual knowledge (49). Ojibway culture frames education by seeing and participating in events. Elders teach younger people how to do things rather than necessarily telling them, which makes the learner pay close attention and helps the learner develop their own abilities and competency (46;50).

It is crucial to remember that programs created by and in conjunction with Indigenous people and based on their knowledge and values would also help instruct non-Indigenous learners. As Beckford et al. (2010) noted, non-Indigenous learners would benefit from encountering Indigenous methods of thinking and interacting with the environment because they would regard taking care of and respecting the natural world as moral duties (52).

According to Kimmel (1999), ecotourism is also a great way to spread knowledge about the environment (51). The uniqueness of the travels (with elders serving as guides) is likely to impart a contemplative and appreciative attitude that one might apply to their own surroundings, even if the tourist returns to a city or somewhere quite unrelated to the boreal forest (37).

Although there are some significant variations between indigenous knowledge sharing through elders and Western approaches to environmental interpretation, both satisfy the primary goals of nature interpretation.

Maps and Booklets as Interpretive Tools:

While researching nature interpretation, Sam Ham observed that visitors of the North-West Trek, a wildlife park in Washington, enjoyed sensory interaction (25). Specific tools, such as a booklet or guide, bibliographical cards, pictures of rare species of plants and animals, historical, topographic, or vegetation maps, etc., are significant because these might create an unexpected response from the visitor, enrich a special occasion, or satiate the naturalist's curiosity (25).

Navigating unfamiliar environments is a complex activity common to daily life (28). It is facilitated by experience gained via direct and guided exposure to the outside environment, for instance, with the help of navigation aids. However, as acquiring direct exposure to unfamiliar areas is often not feasible, indirect information sources and navigation aids are usually required to navigate new environments (28). The advent of GPS-enabled smartphones and digital mapping software has eliminated the risks of getting lost for the well-equipped hiker (29). However, in Western civilizations, technology and country hikes are often at odds with one another; using technology is more usually understood to be connected to modernity and the separation of humans from nature and one another. Research finds that in navigation, the absence of modern technology and its indicators (such as a phone connection) fosters "rural talent," meaning being more adaptive in situations while in rural areas (29).

Traditional navigation aids like printed 2D route maps can be used to convey spatial information, while more advanced visualization tools can reflect the structure of the natural environment (28). By offering helpful visual interfaces between inner (mental) conceptions of space and the outer environment, navigational aids may, to varying degrees, make it easier to find one's way.

These spatial representations must provide sufficient accuracy to allow users to navigate a new area without taking a wrong turn (28). Studies have demonstrated that 2D visual maps may assist participants as much as first-hand experience. A study found that compared to individuals navigating independently without assistance or prior knowledge, individuals with lower distances traveled with the help of 2D visual maps had shorter travel durations and fewer pauses during navigation (28).

Similarly, booklets can be created in parks or camps to interact with nature and provide hands-on lessons about the land while being safe, courteous, and responsible. Families can take a booklet and travel with it, giving their children a starting point for their self-guided experience.

Plants and Ecosites Identification with Forest Ecosystem Classification and Field Guide to Common Plants in Northwestern Ontario

Plant Identification: Plant identification is the procedure of classifying an organism that is frequently encountered into a taxon so that its name and other distinctive characteristics may be assigned to it (30). The circumstances and site of a plant's discovery are crucial factors in the identification procedure (30).

Ecosite: Site types known as ecosites are determined by both biotic (plant community structure and composition) and abiotic elements, including soil quality, nutrients, moisture, and hydrology (11). The Ontario Forest Ecosystem Classification System uses ecosites to classify the forest land base and use an ecosystem-based approach to planning for forest management. Ecosites, typically measuring between 10 and 100 hectares, are mappable landscape units utilized by the Ontario Ministry of Natural Resources (OMNR) (11).

According to Cauboue et al. (1996), an ecosystem is defined as a "complex interacting system that includes all plants, animals, and their environment within a particular area" (13). Ecosystems comprise numerous interconnected components of matter and energy and have a composition, structure, and function. As a result, ecosystem function changes structurally and compositionally every second, every hour, and every year (13).

The Forest Ecosystem Classification (FEC) for Northwestern Ontario is a foundation for integrated, multi-use resource management considering wildlife, recreation, and other issues besides logging (31). Forest ecosystems consist of more than simply the trees in the prominent canopy. The climate, understory vegetation, soil, and other physical site elements significantly influence the evolution and development of the forest ecosystems in northern Ontario. The categorization system in FEC was created using information gathered from many old forests with various soil types and landforms in Northwestern Ontario (31).

The 152 most prevalent forest (mainly boreal) plants are the focus of The Field Guide to the Common Forest Plants in Northwestern Ontario (32). According to their common growth type or habit, the plants featured in Northwestern Ontario are divided into six primary categories: trees, shrubs, herbs, graminoids, ferns, bryophytes, and lichens. This guide identifies forest plants by carefully examining essential field characteristics and directs the user's attention to diagnostic features. With the aid of this manual, NWO FEC could assist in further ecological knowledge of specific forest communities (32).

Project Methodology:

This research project aims to 'summarize the observed plant biodiversity of the KCA Youth and Family Wellness Camp.' The objectives have been broken down into four specific deliverables as follows:

1. Identify and document the names of the observed plant species at the selected patches with their coordinate points in the form of a list.

2. Document a summary report by researching the uses of the plants and the ecological association of the selected patches from the existing literature.

3. Produce a PDF version of a map of the KCA Youth and Family Wellness Camp indicating major habitat patches and dominant plant species of the property from the collected and documented plant list.

4. Summarize the collected information cohesively in a booklet.

My research focuses on a particular branch of Plant Science. I will identify and document plants and their ethnobotanical, nutritional, and other benefits of a vegetation site from existing literature published. The site I will examine is Ogimaawabiitong Kenora Chiefs Advisory (KCA) Youth and Family Wellness Camp at 371 Strecker Road, Kenora, Ontario. The Youth and Family Wellness Camp provides year-round access to traditional healing and wellness programs. While the Camp was established to support and mentor Indigenous youth, anyone and everyone is welcome to stop by and enjoy the beauty and features of the property. It is a lush location with an enormous diversity of plants and lovely greenery, ideal for a nature enthusiast. This site was selected due to previous interactions between my supervisor, Dr. Iain Davidson Hunt, and staff of the KCA Youth and Family Wellness Camp. After I visited the site and conversed with staff a project concept was developed and discussed with KCA staff. It was decided that this project would provide background information to KCA staff that they can use for their upcoming unique initiatives and facilities.

In addition to using a case study as part of my study design, I will adopt a pragmatic worldview. According to Creswell a case study is, “An in-depth exploration of a bounded system (e.g., an activity, event, process, or individuals) based on extensive data collection,"(33). The definition of a bounded system is further defined by him as follows: "the case is separated out for research in terms of time, place, or some physical boundaries.” (33) Pragmatic perspective and mixed research are frequently linked (34). Contrary to committing to any one system of philosophy and reality, my main interest will be the research problem itself, followed by all necessary methods to comprehend the problem (34). Humans create meaning by interpreting and interacting with the environment around them, drawing from their social and historical context to make sense of their environment (35). By physically spending time in this environment and acquiring information, my goal is to comprehend the people's context or surroundings. Throughout this research, I will draw from my personal and academic experiences as a student with a background in Plant Science. Most of my research analysis will be inductive, deriving conclusions from the information gathered in the field.

In this process, I will first examine the existing documents related to those plants and determine which documents will answer my evaluation questions. The strategies of inquiry applied will be like a qualitative strategy (e.g., ethnography) and are therefore best studied from a qualitative research approach. The most suitable research design for this project is 'Document

review/analysis,' which O'Leary (2004) describes as the 'collection, review, interrogation, and analysis of various forms of text as a primary source of research data' (36).

To fulfill the objectives of this project, data collection will be completed with a few sources of information, as it is done in qualitative research. These sources of information will include plant identification apps, field guides, and online sources to accomplish my research objectives. My exposure to multiple data sources will provide greater validity to my findings. I will undertake two data collection methods: observation and document review.

With the help of the guides and plant identification apps, the vegetation, and the ecological association of the selected KCA Youth and Family Wellness Camp patches will be researched and documented. The data collection will begin by identifying the KCA Youth and Family Wellness Camp plants with the help of pre-approved Plant Identification apps and a Field guide to the Common Plants of Northwestern Ontario. The selected Plant Identification apps are: PictureThis and Seek by iNaturalist, and they have been chosen because they offer powerful plant identifiers allowing for the quick identification of flowers, leaves, trees, herbs, and more. The Field Guide to the Common Plants of Northwestern Ontario offers a systematic approach to observing a plant's field characteristics and is designed to be accessible to the botanical layperson by avoiding technical terminology. Most common plants of NW Ontario are categorized in this field guide with their species name, scientific name, and illustrations, which I will use to crosscheck the results from the plant identification apps. I will use a simple handheld GPS device to collect the exact GPS coordinate points of the plants and the area of the forest patches within which the plants are found allowing me to create a list of plants, associated forest patches, and locations, which are needed to produce my first deliverable.

The second data collection tool I will use (second deliverable) is an in-depth document review of books, visual and text documents, online resources, academic journal articles, government documents, and institutional reports. Through the document review, I will summarize the uses of the observed plants and their associated ecology of the patches focusing on information such as their ecological history or significance.

Drawing from these two data sources, I will produce a PDF map and booklet to present the collected and interpreted information during this project systematically. The PDF map and booklet will be provided to the KCA Youth and Family Wellness Camp staff so that they can use these as resources to create educational materials for Camp visitors.

Works Cited:

1. Boreal Shield Ecozone: Ecological Framework of Canada; [Available from: http://www.ecozones.ca/english/zone/BorealShield/index.html

2. Hyslop BG, Colson AJM. It's about time. North American Archaeologist. 2017;38(4):299-326.

3. Liu K-B. Holocene Paleoecology of the Boreal Forest and Great Lakes-St. Lawrence Forest in Northern

Ontario. Ecological Monographs. 1990;60(2).

4. Roi GHL. Boreal Zone The Canadian Encyclopedia; 2013 [Available from: https://www.thecanadianencyclopedia.ca/en/article/boreal-forest#.

5. Blancher P, Bradbury S., Cobb T, Fisher C, Hannah KC, Johns B, et al. Canada's boreal forest2006.

6. Canada NR. Forested Ecozones: Natural Resouce Canada; 2009 [Available from: ecosys.cfl.scf.rncan.gc.ca/images/classif/forest-reg2_e.pdf.

7. Davidson-Hunt I, Duchesne LC, Zasada JC, eds., editors. The Future of the Non-Timber Forest

Product Industry. Forest communities in the third millennium: linking research, business, and policy toward a sustainable nontimber forest product sector; 2001; Kenora, Ontario: U.S. Department of Agriculture, Forest Service, North Central Research Station.

8. Arnason T, Hebda JR, Johns T. Use of plants for food and medicine by Native Peoples of eastern Canada. Canadian Journal of Botany. 1981;59:2189-325.

9. Hassan HM, Jiang Z-H, Syed TA, Qin W. Review: Northern Ontario medicinal plants. Canadian Journal of Plant Science. 2012;92(5):815-28.

10. Nature O. Edible Wild Plants in Northwestern Ontario: A Primer. Available from: https://ontarionature.org/wp-content/uploads/2017/10/wild-edibles.pdf.

11. Berkes F, Davidson-Hunt I, Ruta T, Sinclair J. Scientific, and First Nation Perspectives of Non-Timber Forest Products: A Case Study from The Shoal LakeWatershed, Northwestern Ontario. Edmonton, Alberta: University of Alberta, G208 Biological Sciences Building; 2002.

12. James P. Robson Dr, Andrew J. Sinclair Dr., Iain J. Davidson-Hunt Dr., Dr. APD. What's in a name? The search for 'common ground' in Kenora, Northwestern Ontario. Journal of Public Deliberation. 2013;9(2).

13. William J. Crins, Paul A. Gray, Peter W.C. Uhlig, Wester MC. The Ecosystems of Ontario, Part 1: Ecozones and Ecoregions. 2009.

14. Burgar RJ. A Proposal for Wilderness Areas, Nature Reserves and Forestry in the Kenora Forest District. The Forestry Chronicle. 1970:56-61.

15. Gr. M. Wickware, Rubec CDA. Ecoregions of Ontario. Ecological Land Classification Series. 1989:1 37.

16. Dussler R, Deringer SA. Exploring the Effects of Interpreters' Experiences of Mindfulness Interventions on Their Connection with Nature and Subsequent Environmental Interpretation. Journal of Interpretation Research. 2020;25(1):26-45.

17. Stone MK, Barlow ZE. Ecological Literacy: Educating Our Children for a Sustainable World: North Atlantic Books; 2005.

18. Saito CH. Environmental Education and Biodiversity Concern: Beyond the Ecological Literacy. American Journal of Agricultural and Biological Sciences. 2013;8(1):12-27.

19. Wooltorton S, Bennell D. Ecological literacy: Noongar way. Every Child. 2007;13(4):30-1.

20. Maller C, Townsend M, Leger S, L., Henderson-Wilson C, Pryor A, Prosser A, et al. Healthy Parks, Healthy People: The Health Benefits

of Contact with Nature in a Park Context. Parks Stewardship Forum. 2009;26(2):51-83.

21. Tillmann S, Button B, Coen SE, Gilliland JA. 'Nature makes people happy, that's what it sort of means:' children's definitions and perceptions of nature in rural Northwestern Ontario. Children's Geographies. 2018;17(6):705-18.

22. Ben-Ari ET. Speaking for Nature: Nature interpreters foster connections between people and the natural world. BioScience. 2000;50(7).

23. Kaczynski AT, Henderson KA. Environmental Correlates of Physical Activity: A Review of Evidence about Parks and Recreation. Leisure Sciences. 2007;29(4):315-54.

24. Miretski I. Game Changer: Encouraging Cross-Cultural Collaboration through Fun Interactive, Interpretive Experience in the Discovery Forest, Kenora, Ontario. Winnipeg: University of Manitoba; 2013.

25. Regnier K, Gross M, Zimmerman R. The Interpreter's Guidebook. Techniques for Programs and Presentations. University of Wisconsin: UW-SP Foundation Press Inc; 1994.

26. A. VJ. Interpretive Master Planning. California: Acorn Naturalists; 1994.

27. Weiler B., D. D. An exploratory investigation into the roles of the nature-based tour leader. Tourism Management. 1993:91-8.

28. Boumenir Y, Georges F, Valentin J, Rebillard G, Dresp-Langley B. Wayfinding through an unfamiliar environment. Percept Mot Skills. 2010;111(3):829-47.

29. Smith TA, Laurier E., Reeves S., A. DR. “Off the beaten map”: Navigating with digital maps on moorland. Transactions of the Institute of British Geographers. 2019;45(1):223-40.

30. Davidson-Hunt IJ, Jack P, Mandamin E, Wapioke B. Iskatewizaagegan (Shoal Lake) Plant Knowledge: An Anishinaabe (Ojibway) Ethnobotany of Northwestern Ontario. Journal of Ethnobiology. 2005;25(2):189-227.

31. R. A. Sims, W. D. Towill, K. A. Baldwin, Wickware GM. Field guide to the forest ecosystem classification for northwestern Ontario. Thunder Bay, Ontario: Ontario Ministry of Natural Resources, Northwest Science & Technology; 1997.

32. Baldwin KA, Sims RA. Field Guide to the Common Forest Plants in Northwestern Ontario. Ontario: Ontario Ministry of Natural Resources; 1997.

33. Creswell, J. W. & Plano-Clark, V. L. (2018). Designing and Conducting Mixed Methods Research (3rd ed.). Thousand Oaks, CA: Sage. https://blogs.ubc.ca/qualresearch/category/big-abstract-ideas/

34. Creswell, J. W. (2014). Research Design Qualitative, Quantitative, and Mixed Methods Approaches (4th ed., p. 304). Thousand Oaks, CA: SAGE Publications. https://lled500.trubox.ca/2016/182#:~:text=Pragmatic%3A%20The%20pragmatic%20worldview%20is,needed%20to%20understand%20the%20problem.

35. Creswell JW, Creswell JD. The Selection of a Research design. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches: Sage Publication; 2003.

36. O’Leary Z. The Essential Guide to Doing Your Research Project: Sage Publication; 2017.

37. Driedger, C. Jane. "A journey of a thousand miles begins with a single blueberry: Learning journeys of the Whitefeather Forest, Pikangikum First Nation, Ontario." Master's thesis, 2006.

38. Sterling SR, Orr D. Sustainable education: Re-visioning learning and change. Totnes: Green Books for the Schumacher Society; 2001 Oct.

39. Nesterova Y. Rethinking environmental education with the help of indigenous ways of knowing and traditional ecological knowledge. Journal of Philosophy of Education. 2020 Aug;54(4):1047-52.

40. UNESCO (n.d.) What is Local and Indigenous Knowledge? Available online at: http://www.unesco.org/new/en/natural-sciences/priority-areas/links/related-information/whatis-local-and-indigenous-knowledge/.

41. Gragson TL, Blount BG, editors. Ethnoecology: knowledge, resources, and rights. University of Georgia Press; 1999.

42. Berkes F. Chapter One: Context of Traditional Ecological Knowledge. Sacred Ecology: Traditional Ecological Knowledge and Resource Management. Philadelphia, PA: Taylor & Francis. 1999:3-17.

43. Davidson-Hunt, I., Journeys, Plants, and Dreams: Adaptive Learning and Social-Ecological Resilience. PhD Thesis. Winnipeg, Canada: University of Manitoba; 2003.

44. Simpson L. Indigenous environmental education for cultural survival. Canadian Journal of Environmental Education (CJEE). 2002 Jan 1:13-25.

45. Marles R. Non-timber forest products and aboriginal traditional knowledge. UNITED STATES DEPARTMENT OF AGRICULTURE FOREST SERVICE GENERAL TECHNICAL REPORT NC. 2001:53-65.

46. Turner NJ. “Keeping it Living": Applications and Relevance of Traditional. InForest Communities in the Third Millennium: Linking Research, Business, and Policy Toward a Sustainable Non-timber Forest Product Sector: Proceedings of Meeting Held October 1-4, 1999, Kenora, Ontario, Canada 2001 (Vol. 217, p. 66). US Department of Agriculture, Forest Service, North Central Research Station.

47. Davidson-Hunt I, Berkes F. Learning as you journey: Anishinaabe perception of social-ecological environments and adaptive learning. Conservation ecology. 2003 Dec 1;8(1).

48. Mohammed G. Recommendations for sustainable development of non-timber forest products. UNITED STATES DEPARTMENT OF AGRICULTURE FOREST SERVICE GENERAL TECHNICAL REPORT NC. 2001:116-20.

49. Simpson L. Stories, Dreams, and Ceremonies--Anishinaabe Ways of Learning. Tribal College. 2000;11(4):26-9.

50. Davidson-Hunt IJ. Indigenous lands management, cultural landscapes and Anishinaabe people of Shoal Lake, Northwestern Ontario, Canada. Environments. 2003 Aug 1;31(1):21-42.

51. Kimmel JR. Ecotourism as environmental learning. The Journal of Environmental Education. 1999 Jan 1;30(2):40-4.

52. Beckford CL, Jacobs C, Williams N, Nahdee R. Aboriginal environmental wisdom, stewardship, and sustainability: lessons from the Walpole Island First Nations, Ontario, Canada. The journal of environmental education. 2010 Jun 23;41(4):239-48.

53. Szabó P. Historical ecology: past, present and future. Biological Reviews. 2015 Nov;90(4):997-1014

54. Wales BA. Vegetation analysis of north and south edges in a mature oak-hickory forest. Ecological Monographs. 1972 Sep;42(4):451-71.

55. Noss RF. Assessing and monitoring forest biodiversity: a suggested framework and indicators. Forest ecology and management. 1999 Mar 22;115(2-3):135-46.

56. Koelemeijer IA, Ehrlén J, Jönsson M, De Frenne P, Berg P, Andersson J, Weibull H, Hylander K. Interactive effects of drought and edge exposure on old-growth forest understory species. Landscape Ecology. 2022 Jul;37(7):1839-53.

57. Esseen P, Ehnström A, Ericson B, Sjöberg L, K (1997) Boreal forests. Ecological Bulletins 46:16–47.

58. Corlett RT, Primack RB. Tropical rain forests: an ecological and biogeographical comparison. John Wiley & Sons; 2011 Mar 3.

Appendix B: Project Concept

General Information:

Project Name: Ogimaawabiitong KCA (Kenora Chiefs Advisory) Youth and Family Wellness Camp Plant Biodiversity Project

Sponsor/Partner Name: Kenora Chiefs Advisory (KCA)

Date: 10/22/2022

Justification/Need:

Identifying the local plant communities of a specific area and gathering their functional roles is essential for assembling ethnobotanical knowledge, managing the lands, and maintaining the overall ecosystem health of that location. KCA works with the mission of providing programs and services to the First Nations in the areas of health, education, and social services in a holistic, traditional manner, ensuring the existence of the Anishinaabe way. This project will provide resources that can support the staff in developing products and services to educate Camp users and visitors about the existing flora. All the information collected through this project will be compiled in a PDF booklet and a PDF map which will eventually help to shorten the time that elders spend searching for plants at the Camp and will spare them from navigating difficult terrains. The risk of not undertaking this project for KCA will be the missed opportunity to document the site-specific details of plant biodiversity and developing products and services of value to KCA programmes delivered at the Camp. It will also provide the opportunity to avoid development in areas of the site that have educational value.

Project Description:

This project is being implemented to survey the plant diversity of the Kenora Chief Advisory (KCA) Youth and Family Wellness Camp property in Kenora, Ontario. The plant diversity survey will summarize the observed plant species, their uses, and their location in the form of a plant list and a guide/booklet that include a map of areas surveyed and plants found. The site is a 326-acre property of land comprised of undulating topography with ridges and slopes of mixed wood, hayed fields, and coniferous forests, along with lower areas consisting of diverse wetlands. As this project is intended for learning purposes, the deliverables will provide KCA staff with resources that inform them about eco-sites, their ecological significance, dominant plant species, their values, and where to find them on the property. This information may be utilized by KCA staff to develop other products and services relevant to the programming they deliver at the Youth and Family Wellness Camp; for example, incorporating the nutrient content of the detected plant species from existing literature could be a similar project that can be undertaken as a parallel or follow up project.

General resource and cost estimates are as follows:

Transportation	CAD 300

Accommodation	CAD 2000
Plant Identification apps	CAD 50
Internet	CAD 50
GIS expert salary	CAD 400
Unknown	CAD 200
	Total CAD 3000

Timeframe:

The whole project is anticipated to last from August 2022 until August 2023. Up until April 2023, data will be collected and analyzed. Early in May 2023, the project's first draft of the pamphlet will be delivered to the partner organization for review and feedback. By June 2023, the pamphlet and map will be finished. By August 2023, the final report and reflections will be compiled.

Planning Estimates:

The estimated deadlines of the project are as follows:

1.	Project Plan – Final Copy	June 2023
2.	Project Meeting – Project Review/Approval by:	July 2023
3.	Data Analysis & Summary Report:	July 2023
4.	Review of the data:	July 2023
5.	Feedback and adjusting major changes:	July 2023
6.	Final Meeting & completion of the booklet with the map:	August 2023

How are your organization's other Activities Impacted?

The following time is estimated to be additional to activities mentioned on schedule details:

1. Project Document Review (3 documents) x 20-40 mins 60-120 minutes
2. Project Meetings (3-4 estimated) x 1 hr 3-4 hours
3. Final Project Review (March) 1-2 hours
4. Committee Meeting (March) 1 hour
5. Summary Report and Map Review 1-2 hours
7. Final Meeting & Workshop 3-4 hours

Total: 10.75-16.5 hours

To reduce or eliminate any operational delays, Melissa, Iain, and I will plan the indicated time frames at a time that works best for us. To minimize any delays to organization operations, Nawrin will execute the project ahead of schedule and present it for approval to the appropriate parties in the allocated time period.

Essential Contacts:

Melissa Payne, RD, B.S.A
Clinical Registered Dietitian
Ogimaawabiitong Kenora Chiefs Advisory

Monojit Saha
Department of Environment and Geography
University of Manitoba

Other Resource Needs or Supports: None identified at this time.

Appendix C: Schedule Details

Activity List

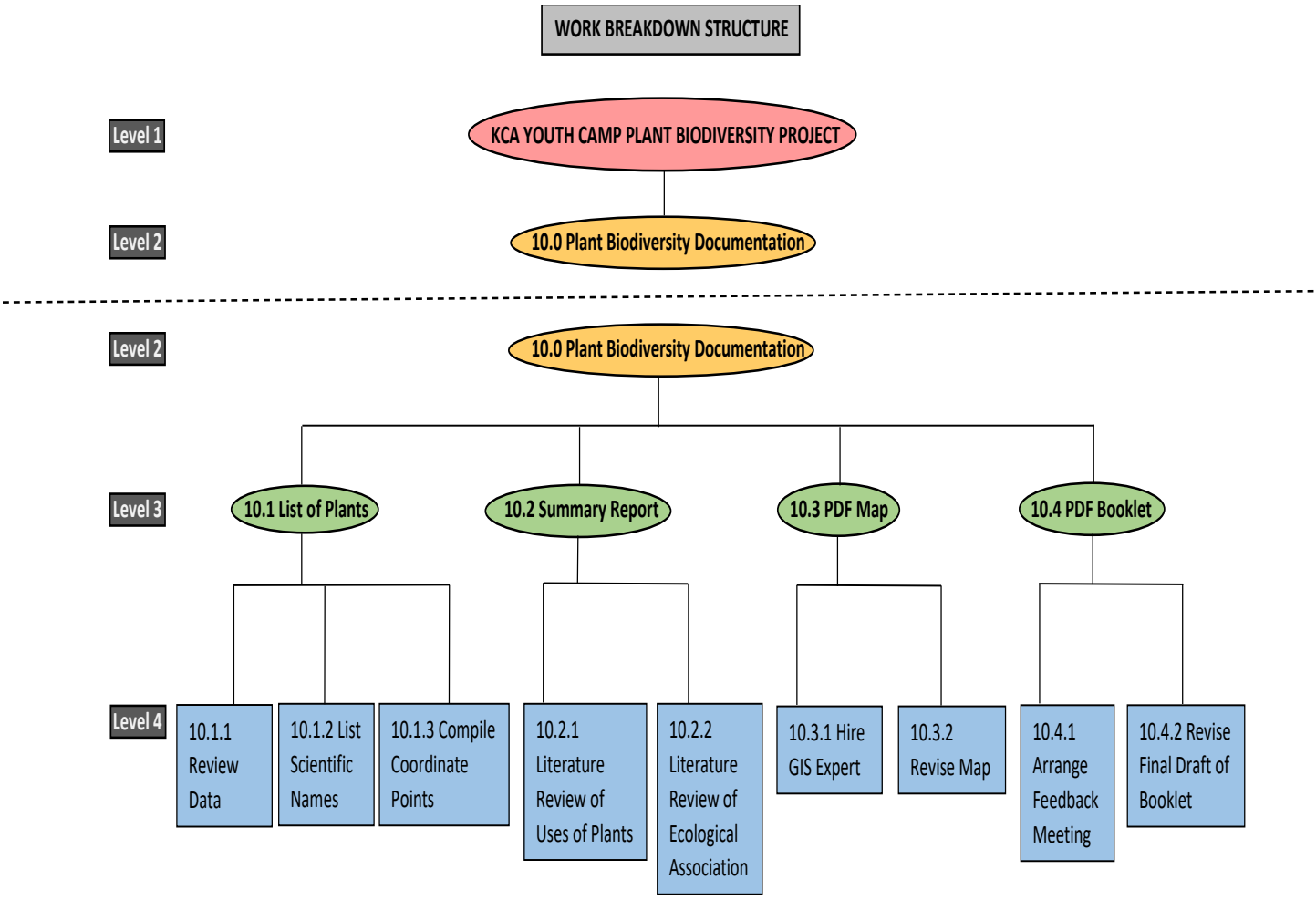
The following activity list is the breakdown of activities numerically organized in the Work Breakdown Structure and depicted in the Sequence Network Diagram. The Activity list serves as a living project document, used to document the start and finish of tasks, thus tracking their actual duration compared with their estimated duration.

WBS No.	Deliverable	Work Package	Est'd. Duration	Date Initiated	Date Complete	Actual Duration	Comments
10.1.1	List of plants	Review Data	1 week				Data collected during the Summer of 2022 will be listed and rechecked during the spring of 2023. To be completed no later than July 2023.
10.1.2		List scientific names of observed plants in a dataset	1 week				
10.1.2		Compile coordinate points in the dataset	1 week				
10.2.1	Summary report	Literature review of the uses of the plants	2 weeks				
10.2.2		Literature review of the ecological association of the patches	2 weeks				Must be completed by July 2023.
10.3.1	PDF map	Hire GIS expert	1 week				GIS expert will be contacted and hired via online communication no later than June 2023.
10.3.2		Revise map	15 days				GIS expert will revise the map with feedback from the project manager no

							later than July 2023.
10.4.1	PDF booklet	Arrange Feedback meeting with partner	1 day				one-hour session meeting will be set up for suggestions and feedback of the final draft of the booklet.
10.4.2		Revise final draft of booklet	1 month				To be completed no later than August, 2023

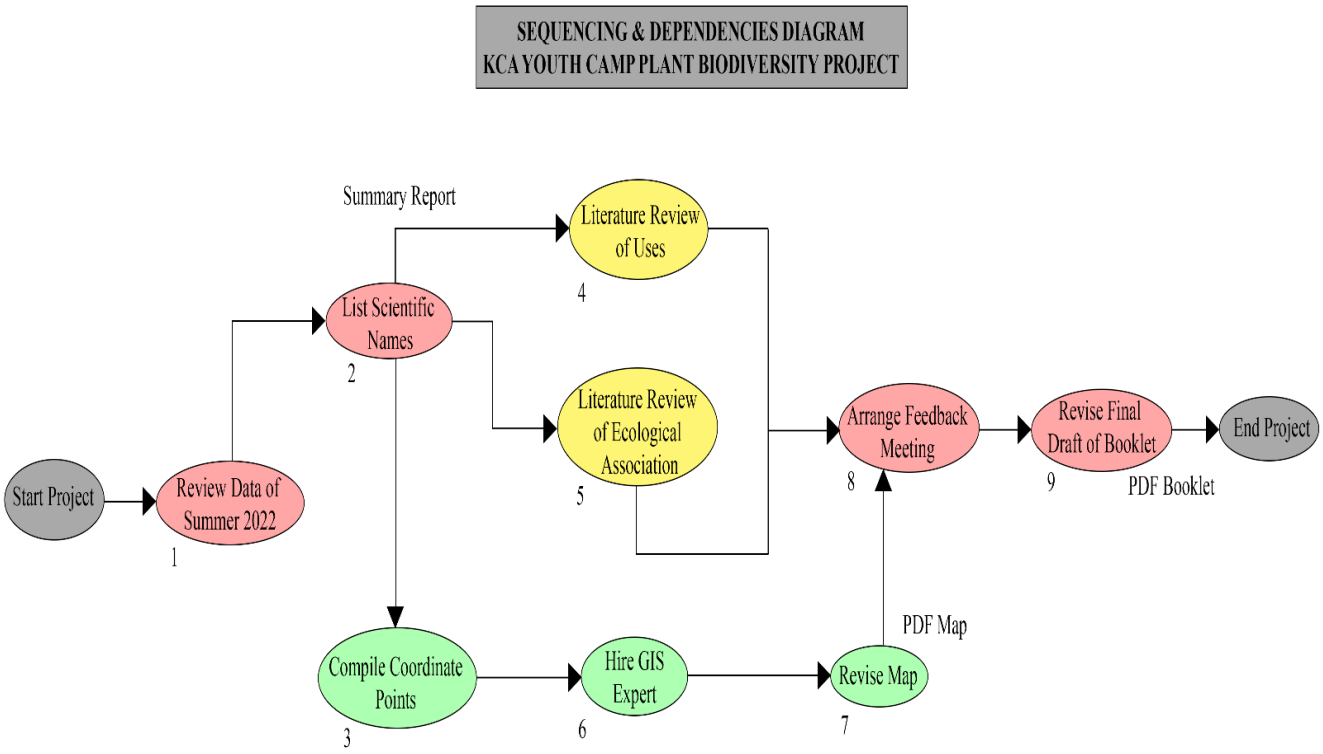
Work Breakdown Structure

A hierarchical diagram known as the "Work Breakdown Structure" shows the tasks connected to each project objective or deliverable. It provides for the creation of (A) The Activity List, which estimates task durations, and (B) The Sequence Network Diagram, which allows for the structuring of dependent activities within the project. It serves as the breakdown of the necessary "work packages" and facilitates the production of both. The Project Charter's larger deliverable criteria are broken down into the Work Breakdown Structure.



Sequence Network Diagram

A flowchart designed to arrange interdependent tasks inside the project and help with task scheduling is called the Sequence Network Diagram. An arrow designates a work that depends on a preceding task, providing a visual roadmap for the project's development. When one work is finished, another can start, and other tasks can start when others are finished. To ensure the project schedule is completed on time, milestones are employed.



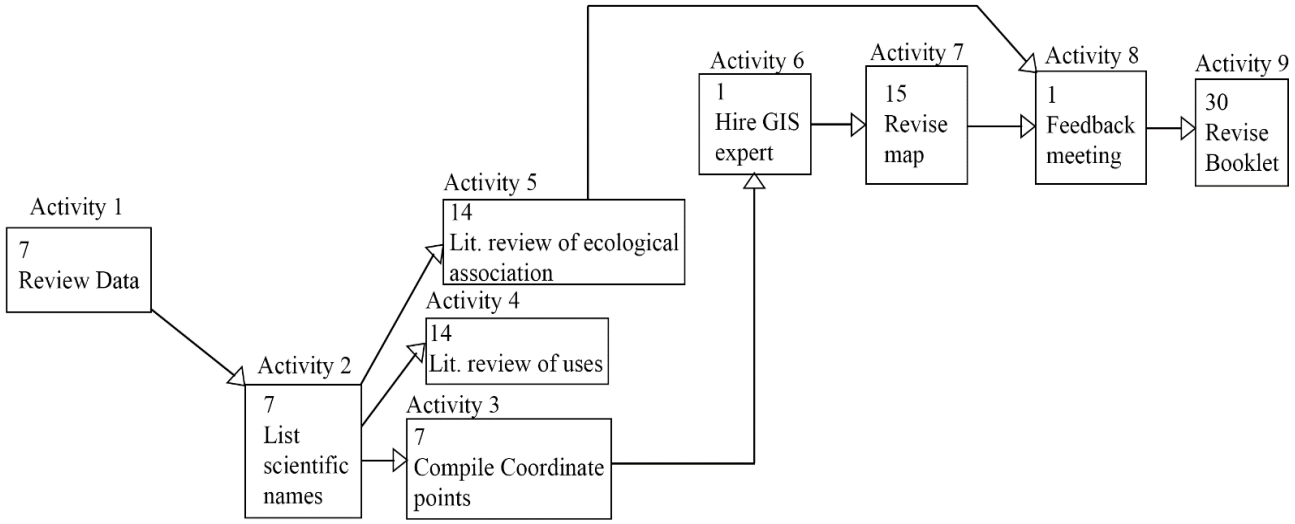
MILESTONES

Ref.	Milestone	Completion expected	Actual completion
1.	Producing PDF Map	2023/7/2	
2.	Final draft of booklet	2023/8/8	

Critical Path Chart and Calculations

The project's Critical Path, which is determined by adding all dependent project tasks together without adding float time, is the project's lowest potential duration. Zero float time tasks cannot be altered in the schedule and must begin and terminate on the planned dates. Following the figure is a table containing critical path calculations, with activity float time shown in the far-right column. The conclusion of the table calculates the project's early start/early finish dates and late start/late completion dates.

Critical Path Chart:



Critical Path Calculation:

#Activity	Activity Description	Dependency	Duration	Early Start	Early Finish	Late Start	Late Finish	Float Time
1	Review Data	N/A	7	May 1	May 8	May 1	May 8	0
2	List scientific names in dataset	1	7	May 9	May 16	May 9	May 16	0
3	Compile coordinate points in dataset	2	7	May 17	May 24	May 17	May 24	0
4	Lit. review of uses	2	14	May 25	June 8	May 25	June 8	0
5	Lit. review of	2	14	June 9	June 23	June 9	June 23	0

	ecological association							
6	Hire GIS expert	3	7	May 9	May 16	June 9	June 16	31
7	Revise map	6	15	May 17	June 1	June 17	July 2	31
8	Feedback meeting	5,7	1	June 5	June 6	July 6	July 7	31
9	Revise booklet	8	30	June 7	July 7	July 8	August 8	31

Appendix D: Resource Needs Assessment & Skills Inventory

Resource (Skills & Knowledge) Needs Acquisition Plan:

Several skills and knowledge are essential for the project "KCA (Kenora Chiefs Advisory)" to achieve all objectives and deliverables to the highest quality standards. The project partners provide most of the skill and knowledge needs, as shown in the resource (skills and knowledge) needs assessment, but one additional expert will need to be contracted to develop a geographical map.

Resource (Skills & Knowledge) Needs Assessment:

Activity / Task	Quantity	Skill / Knowledge Requirement	Team Member (Name)	Contract (Name/Company)	Approximate Cost ($/Time)
List all scientific names	7 days	Plant Identification Apps + Google Search	Nawrin		1 week
Compile coordinate points	7 days	GPS Tracker	Nawrin		1 week
Take photos of the observed plants	7 days	Photography skill	Nawrin		1 week
Summary report	30 days	Literature review	Nawrin		1 month
PDF map	30 days	GIS expert	GIS expert		1 month
PDF booklet	30 days	Documentation of plant biodiversity	Nawrin		1 month

Skills & Knowledge Inventory of Team / Partner / Volunteers:

Person	Job Title	Skills/Training	Years	Education
Nawrin	Project Manager/Student	Qualitative Research + Data Analysis Computer + Microsoft Office Organizational Skills		Masters in plant science
GIS expert	GIS expert	Professional training in GIS, GPS, and remote sensing software packages		
Iain Davidson-Hunt	Project Team Member / Advisor	Knowledge of Practicum Process Plant Science Qualitative Research		Ph.D. NREM (2003) M.N.R.M. (1995) B.Sc. Crop Science (1988)

Resource Needs (Materials, Supplies & Equipment) and Procurement Plan:

A significant portion of the project can be completed using the project manager and Advisor's equipment, which includes a personal laptop with all essential programs (Word, Excel, and PowerPoint), a cell phone, an internet connection, and access to UofM libraries for research. The following techniques will be used to obtain additional materials, supplies, and equipment that are not previously owned:

1. Plant Identification apps subscription- A membership to PictureThis and iNaturalist will be acquired from their respective websites by the project manager as they are available to anyone who pays for a membership.
2. GIS software packages- GIS expert will be hired and paid by the project manager to use GIS software packages to produce the PDF map of the KCA Youth and Family Wellness Camp.
3. Accommodation and transportation cost for the data collection and review- Stipend from Advisor.

Resource Needs (Materials, Supplies & Equipment) Assessment:

Activity / Task	**Quantity**	**Materials/Supplies/Equipment**	**Available/Procure**	**Approximate Cost ($/Time)**
Data collection	30 days	(Transportation, Accommodation)	Procure	CAD 2300
List all scientific names	7 days	(Phone, Internet, Plant Identification apps, Computer)	Available or procure	CAD 50
Compile coordinate points	7 days	(GPS tracker)	Available	
Photos of plants	7 days	(Phone, Digital Camera, Internet)	Available	
Summary report	30 days	(Computer, Internet, Phone)	Available	
PDF map	30 days	(Computer, Internet, GIS software package)	Procure	CAD 400
PDF booklet	30 days	(Computer, Internet)	Available	

Appendix E: Managing Relationships – Details

The parties concerned with this project's success and those who will be impacted by its results, whether favorable or bad, are listed in this document. It starts by considering people who are directly responsible for the project or those who are crucial to the success of research processes. The document then considers stakeholders outside of the project who are interested in the result because it has some impact on them or their company. The third section discusses how to manage relationships best during the project by addressing the mechanisms, timing, and frequency of expected communication channels. The audience for marketing after project completion, intended to generate interest and funds for framework implementation, is identified in the fourth and final part of the Managing Relationships document.

CONSIDERATIONS FOR ENGAGEMENT WITH YOUR ADVISOR, COMMITTEE, FUNDER, PARTNER, AND TEAM

Name or Office	Nature of Interest	Type of Engagement Needed
Iain Davidson-Hunt	As a co-manager and advisor, Iain committed his time, expertise, and resources to this project. Iain has a personal stake in the project's success because he was a direct participant in its planning.	- Sharing of Project Documents - Each project document must be approved for the final IPP to be complete and of the highest caliber. - Email - Regular and continuous contact is required. To ensure that the project timeline is proceeding as anticipated and that difficulties, complaints, and questions are promptly addressed, all communications on the project can be conducted by email. - Data - Iain will verify and provide input for all data and analysis, and he will also be kept informed of all research efforts throughout the project. - Advisor - As the project advisor, Iain needs updates on the project's development, research activities, report writing, participation in research questions, etc., which means he has to be aware of whatever the project manager (Nawrin) is aware of.

Melissa Payne	Melissa has contributed time, knowledge of the project site, and her name to this initiative as a partner. Melissa is interested in the project since it might benefit the KCA Youth and Family Wellness Camp's members and visitors, including Melissa.	- Email - Regular communication is required to ensure that all project committee members are informed of project development and respond to queries and/or concerns. - Partner - Although Melissa is the project partner, she isn't in charge of ensuring all tasks are finished on schedule. Instead, she needs to get regular reports on the project's status. The project's advancement will also need signatures after several milestones to ensure her satisfaction with the results. - Deliverables - All completed deliverables must be given to Melissa for evaluation and approval before finishing and getting a final copy.
NRI practicum Committee Member	This individual is directly interested in seeing that their efforts are not pointless because they contribute time, expertise, and resources as a committee member throughout the project. Since their name and reputation are on the line as committee members, they have a genuine incentive for a successful and satisfying result.	- Integrated Project Plan - A copy of the IPP will be given to the committee members for evaluation, comment, and approval. - Email - The member will be included in all project communications through email to inform them of project developments. - Data & Research - As a professional in their area, this committee member will be engaged in developing research questions and checking the correctness of the data.

EXTERNAL INTERESTED PARTY REGISTER

Interested Party	Why they Care	What they Seek from Us	What we Seek from Them	Implications for Managing the Relationships
KCA Youth and Family Wellness Camp members	The KCA Youth and Family Wellness Camp members are interested in facilitating and taking part in research since a positive outcome of this project might benefit their community members.	- An opportunity to remark on deliverables. - A copy of the completed booklet that includes a map showing the observed plant biodiversity at the KCA Youth and Family Wellness Camp. - Responses to queries and concerns during the project. - Information that may be utilized by KCA staff to develop other products and services relevant to the programming they deliver at the Camp. - Suggestions on the follow-up projects that can lead from this project; for example, incorporating the nutrient content of the detected plant species from existing literature could be a similar	- Information and understanding about the project location and the patches chosen and accepted by the KCA members. - Participation in online meetings and workshops in person. - Honest and open reactions to deliverables and reports. - Assistance with internal transportation while evaluating the data that has been gathered.	- Email correspondence when Necessary (to schedule meetings, address questions and/or concerns, deliver reports, etc.). - Recognition of milestones and appreciation for their involvement.

		project that can be undertaken as a parallel or follow up project.		

MANAGING RELATIONSHIPS - PLANNING ELEMENTS

Interested Party with whom you need to Engage	Purposes	Mechanism and Fitness	Timing	Responsibility
Iain Davidson-Hunt	- Project decisions - Latest information about project status, issues, challenges, milestones, and data - Project Management - Analysis of Data - Approvals of documents - Approval of Deliverables - Information/advice	- Email – convenient and professional communication, preserves threads in case further conversation is necessary. - Phone – Convenient and quick in case communication is urgent - Zoom – Work on project documents, data analysis, longer discussions regarding project, feedback and suggestion.	- Weekly - More constant if needed	- Project Manager
Melissa Payne	- Project decisions - Latest information about project status, issues, challenges, milestones, and data - Project Management - Approvals of documents - Approval of Deliverables - Information/advice	- Email – convenient and professional communication, preserves threads in case further conversation is necessary. - Phone – Convenient and quick in case	- Bi-weekly - More constant if needed.	- Project Manager

		communication is urgent - Zoom – Work on project documents, data analysis, longer discussions regarding project, feedback and suggestion.		
NRI practicum Committee member	Latest information about project status, issues, challenges, milestones, and data - Project Management - Approvals of documents - Approval of Deliverables - Information/advice	- Email – convenient and professional communication, preserves threads in case further conversation is necessary. - Phone – Convenient and quick in case communication is urgent. - Zoom – Work on project documents, data analysis, longer discussions regarding project, feedback and suggestion.	- Bi-weekly - More constant if needed	- Project Manager
GIS Expert	-Analysis of data. -Information/advice -Suggestion and feedback	- Email – convenient and professional communication, preserves threads in case further conversation is necessary. - Phone – Convenient	-Weekly - More constant if needed.	- Project Manager - GIS expert.

		and quick in case communication is urgent. - Zoom – Work on project documents, data analysis, longer discussions regarding project, feedback and suggestion.		

PRODUCT/SERVICE PROMOTION PLAN

What is the overall Goal of the Project?

Summarize the observed plant biodiversity of the KCA Youth and Family Camp. This project will provide resources to support the staff in developing products and services to educate youth and family wellness Camp users and visitors about the existing flora. All the information collected through this project will be compiled in a PDF booklet and a PDF map which will eventually help to shorten the time that elders spend searching for plants at the camp and will spare them from navigating difficult terrains.

Why the Promotion Plan is Needed – What is it intended to achieve?

The promotion plan will acquaint the members of KCA Youth and Family Wellness Camp with how to provide a guide to navigate inside the Camp with the help of the PDF map and the PDF booklet.

Intended Audience(s)

Members of KCA Youth Camp.

Key Messages

1. The project's research findings.
2. Why and how the results will benefit the KCA Youth and Family Wellness Camp and its visitors.
3. How to use the draft of the booklet and the map to navigate inside the KCA Youth and Family Wellness Camp.

Suggested Communication Vehicles with reasons for choices

1**.** KCA Youth and Family Wellness Camp social media- Easy to reach a large portion of local citizens, can act as a networking platform for
individual posting, affordable advertising for promotion. https://www.facebook.com/kenorachiefs https://www.kenorachiefs.org/about-us/
2. A workshop on the KCA Youth and Family Wellness Camp because it is a comparatively more accessible and straightforward approach to communicating with the audience.

Timing in relation to project stage or activities

The workshop will be arranged during the revision of the final draft of the booklet so that suggestions and feedback can be gathered from the audience.

Other?

Appendix F: Risk Management – Details

For the KCA Youth and Wellness Family Camp Plant Biodiversity project, the following comprehensive risk analysis has been developed. A thorough list of potential risks related to this project's deliverables, schedules, contractual or hired work, impacted parties, and the essential documentation is presented at the beginning of the risk management plan. The risks are listed in a "Probability and Impact Matrix," where risk probability and impact are carefully assessed on the provided scale to determine the most important risks to the project. The magnitude of each risk is ranked according to its likelihood of occurrence in a Risk Register that the project manager uses to keep track of risks as they develop throughout the course of the project. In this project, each risk with a higher probability has a corresponding response plan listed in the last table.

PROBABILITY AND IMPACT MATRIX

A list of the project's recognized risks for success, completion, and quality is indicated in the table below. Risks are identified as having an impact on or being influenced by one or more of the following: Budget, personnel, or a schedule. The probability and impact scores of the identified risks are multiplied to provide an overall risk score. The next table addresses those that received the highest overall score (values in bold in the Risk Score column), and those will also be given a response plan as specified in the third table.

Very Low 0.05 Low 0.20 Medium 0.40 High 0.60 Very High 0.80

Risk Description	Probability	Impact	Risk Score
Schedule- The project manager may not be available to initiate work on the draft of the booklet until compiling all the information, which could take up to May 2023, and this could affect the timing of the project.	0.10	0.60	0.06
Personnel- Unable to acquire sufficient GIS capacity.	0.40	0.80	**0.32**
Schedule- The completion of the PDF map could be delayed and, the timing of the project needs to be adjusted to accommodate.	0.20	0.60	0.12

RISK REGISTER

The following table is the Risk Register, created using the top highest scoring project risk identified in the first table of this document: Probability and Impact Matrix. It identifies if and where the associated risk response plan is, who owns the risk, and the status of the risk (Pending, In Progress, Dealt With).

Risk	Response Plan Created?	Location of Response Plan	Risk Owner	Status
Personnel- Unable to acquire sufficient GIS capacity.	Y	Risk Response Plan (Table 3 of this document)	Project Manager (Nawrin)	Pending

RISK RESPONSE PLAN

The following table is the Risk Response Plan which addresses the top scoring risk from the Probability and Impact Matrix and the Risk Register. The Risk Response Plan addresses the response strategy (Escalate, Accept, Avoid, Transfer, Mitigate) and the details of associated strategy.

Risk	Response Strategy	Response Details
Personnel – Unable to acquire sufficient GIS capacity.	Avoid	To avoid this risk, it will be made sure that the job advertisements identify needed competencies clearly.
	Avoid	To avoid this risk, the job advertisement will be published in different social media platform early in the 2023, and the interested applicants will be communicated as early as possible so that the right candidate can be

		selected before the deadline of the hiring of GIS expert.
	Mitigate	To mitigate this risk, the selected candidate will be asked during interview to provide their availability to work on the project along with the start and finish date.
	Mitigate	To mitigate this risk, a job offer will be circulated among NRI students, and one competent student will be identified as a backup GIS expert, who has sufficient training and available to do the job.
	Accept	If no competent candidate is identified, or the hired person is not available when contracted to do the job, the pre-selected student from NRI will be hired to produce the map.

Appendix G: Budget Details

Appendix G: Budget Details
The table below details an exhaustive list of all activities required to successfully complete this project with the highest level of quality. The estimated costs are those most likely and are calculated from careful planning of project progression. The listed costs are accurate at the time of planning and have single or subscription costs. Project costs are supported in part by funding from the University of Manitoba Graduate Fellowship (UMGF).

Resource Group	**Activity / Task**	**Associated Cost**	**Total**
Travel	Data collection	Transportation	CAD 300
		Accommodation	CAD 2000
Equipment and supplies	List all scientific names	Plant Identification apps	CAD 50
		Internet	CAD 50
Personnel	PDF map	GIS expert salary	CAD 400
Unknown		Unknown	CAD 200
		Total	CAD 3000