

# EXPLORING BIODIVERSITY

## IN FISH CREEK PROVINCIAL PARK

A Field Study for Division 3 & 4  
Students

FISH CREEK  
ENVIRONMENTAL LEARNING CENTRE

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[www.Fish-Creek.org](http://www.Fish-Creek.org)



# Introduction

Exploring Biodiversity is a full-day field study directed by park staff. The field study is designed to cover a portion of the requirements for Grade 9 - 11 Science examining elements of biodiversity.

Fish Creek Provincial Park is one of Canada’s largest urban provincial parks, stretching from the western edge of the city to the Bow River. The park has a strong vision within its visitor services program plan to support and foster environmental and cultural education.

Alberta Parks acknowledges that Fish Creek Provincial Park is part of the traditional territory of Treaty 7 region in Southern Alberta, which includes the Blackfoot Confederacy (comprising Siksika, Piikani and Kainai First Nations), the Tsuut’ina First Nation, and the Stoney Nakoda First Nation. The City of Calgary is also home to Metis Nation of Alberta, Region III.

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# Before the Visit

## PREPARATION

*What to bring and what to leave behind: A few suggestions.*

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It is most important that you, your students and your volunteers/chaperons know and understand that your field study will be an “OUTDOOR” experience. We will have a classroom as a home base over the course of the day, but most of our time will be out in the park. With this in mind, it is important that everyone attending the field study is prepared. Weather conditions can change quickly, we will be moving throughout the park on foot over a variety of trails and off-trail areas, and working with a variety of field equipment.



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## What to Leave Behind

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- Laptops, earbuds, games etc.
- Designer clothing – we will be doing field work, getting dirty

## What to Bring

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- Extra clothing (rain gear, warm layers)
- Boots, insulated and waterproof if the weather calls for it
- Food and water for the day (there are no microwaves, coffee shops, vending machines, etc. on-site or close by)
- Cellphones (to take photos or for timing activities, but otherwise off)
- Camera, binoculars (optional)
- Student Data sheets, Pencils and clipboards.

## VOCABULARY AND DEFINITIONS

The following is a list of terms and definitions you and your students should be familiar with before your field study.

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**Abiotic features** - when studying a habitat or natural area these features refer to all things that were/ are lifeless - soil, rock, air sun, water.

**Biological diversity** - or biodiversity means the variability among living organisms from all sources including, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems (from the Alberta Biodiversity Monitoring Institute [www.abmi.ca](http://www.abmi.ca) ).

**Biotic features** - when studying a habitat or natural area these features refer to all things that are alive or at one time were alive (includes dead things).

**Extinct species** - a species that no longer exists.

**Extirpated species** - a species that no longer exists in Canada, but exists elsewhere in the world.

**Fauna** - The animal life of a region (or time).

**Flora** - The plant life of a region (or time).

**Invasive species** - a species capable of asserting itself in communities where it did not naturally occur; usually a species not native to the area (from the Alberta Biodiversity Monitoring Institute [www.abmi.ca](http://www.abmi.ca)).

**Niche** - all of the relationships that exist between an organism and its environment, how an organism lives, an organism's role in the environment.

**Species** - a group of organisms that are morphologically similar and are capable of interbreeding and producing viable offspring.

## FISH CREEK PROVINCIAL PARK: Key Messages

Please review and be sure everyone understands the following information before your visit the park.

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- Our vision: Alberta's parks inspire people to discover, value, protect, and enjoy the natural world and the benefits it provides for current and future generations.
- Alberta Parks acknowledges that Fish Creek Provincial Park is part of the traditional territory of Treaty 7 region in Southern Alberta, which includes the Blackfoot Confederacy (comprising Siksika, Piikani and Kainai First Nations), the Tsuut'ina First Nation, and the Stoney Nakoda First Nation. The City of Calgary is also home to Metis Nation of Alberta, Region III.
- Alberta's parks and protected areas belong to all Albertans and contain many different natural landscapes that are home to numerous plant and animal species as well as significant cultural and historic resources. The province's network of parks and protected areas helps to ensure that Alberta's natural and cultural heritage is preserved for future generations.
- There are a wide variety of visitors and users of our parks. Everyone must respect and share the park and its facilities and resources.
- Stay on designated trails while moving through the park and participating in group activities. Staying on designated trails reduces impact to the natural habitats of the park. Please share the trail with other users.
- Feeding wildlife is prohibited. The park's ecosystems provide all the food and habitat wildlife require for their basic needs. Feeding wildlife can cause wildlife to associate humans with food. Quietly observe wildlife from a safe and comfortable distance so as not to disturb them or put them or you at risk.
- Everything in the park – living and non-living is protected. Students are welcome to share their discoveries, but must remember to leave everything as they found it. Do not remove anything natural from the park.
- Litter must be placed in garbage cans or packed out.
- Use only designated fire pits. The collecting and burning of park vegetation is not permitted. You must ensure fires are fully extinguished before leaving them.



## PRE-FIELD TRIP ACTIVITIES

*The following activities will help students to build initial knowledge and understandings for the field study.*

### Diversity Within Your Class

This activity will see students create a series of charts to define the diverse characteristics of their class. It is a way of demonstrating characteristics of biodiversity.

Ask your students to consider their classmates and think about things that are similar amongst them and different amongst them. You may want to start by simply asking and discussing physically observable characteristics such as:

- Gender
- Eye colour
- Hair colour
- Height
- Ethnicity (please be sensitive to how this is discussed)

You can expand the discussion to include other definable characteristics:

- Neighbourhoods they live in
- Clubs they belong to
- Favourite music
- Favourite school subject
- Pets, cat or dog or something more exotic

Using any combination of characters you define ask students to create pie charts or bar graphs to illustrate how many of their classmates fall into certain defined groups. The more combinations you ask for the more diversity may be demonstrated.

Ask your students to identify those characteristics that are most common in the class and those that are the most unique.

This can then lead to or support further discussing the definitions of biodiversity (diversity of species, diversity of ecosystems, genetic diversity).

### Dichotomous What?

A dichotomous key is a tool biologists use to identify organisms. It is based on observing physical characteristics and following a simple process of elimination. A fun and easy way to demonstrate how they work is to have students create a key to identify a classmate.

Ask students to secretly pick an individual in the class. They will create a series of statements to describe observable, physical characteristics that will see the individual they selected put into smaller and smaller subsets of the entire class until the individual is the sole member of a final subset.

It is important that students understand characteristics must be easily observed, well defined and ones that are relatively permanent. Examples are gender, eye colour, hair colour, height. Ethnicity can be used, but caution must be exercised in instructing to ensure nothing can be viewed as offensive or demeaning.

Characteristics that cannot be easily observed or defined should be avoided particularly if they may be defined differently by different observers.

Students should be challenged to create a description utilizing the fewest number of defining characteristics as possible.

An example:

Group - your class of 30 students.

The individual is "Gerald" a male who is tall with blue eyes.

Subset 1: the student is -

A) Male

B) Female

Subset 2: The student is -

A) Taller than me -

B) Shorter than me

Subset 3: The student has -

A) Blue Eyes

B) Eyes that are not blue

The student has Blue eyes

The student is the only MALE – TALLER THAN ME – WITH BLUE EYES, so the student is – "Gerald".

# Your Day In The Field

## SCHEDULE

The following outdoor field trip activities are curriculum-connected and intended to connect learning in an experiential way to the natural world.

### Program Start and End

The field study is covered in a 4 – 5 hour time frame, but can be modified to fit other schedules. A typical time frame is 9:30 a.m. to 2:00 p.m.

Groups are dropped off at the Fish Creek Environmental Learning Centre (see map in appendices). Park staff will meet and direct your group to your classroom base for the day.

### What to Expect

The major portion of your field study will be doing quadrat, transect and point count surveys. Students will be collecting information on flora and fauna, features of the developed or built park infrastructure and the effects of park visitation on the biodiversity of the park.

**Please ensure that each student has a copy of the “Data Forms” (Pages 9-25)** and that you have students separated into working groups. You can have a maximum of six groups of students.

### Field Trip at a Glance

<b>Park and Field Study Introduction – Classroom (60 minutes)</b>	Introduction to Fish Creek and the provincial park system, park rules and behavioural expectations for the day. Review the day’s agenda including field study procedures and field equipment. Review dichotomous keys /ID of trees and shrubs.
<b>Washroom/Snack Break (10-15 minutes)</b>	
<b>Quadrat/Transect/Point Count Survey (60 – 90 minutes)</b>	Students examining flora and fauna of the park in the Aspen Parkland ecosystem.
<b>LUNCH BREAK (30 minutes)</b>	
<b>Point Count/Transect/Park Infrastructure Inventory (60 – 90 minutes)</b>	Students examine flora and fauna in the Spruce forest ecosystem. Class visits the main day-use area to complete their data collection on park use and infrastructure inventory.
<b>Return to the Learning Centre for Program Wrap-up</b>	Historic photo analysis activity (time permitting). Groups share and discuss their Shannon Terrace re-design ideas. Review data collected. Questions from students

# FIELD TRIP ACTIVITY SUMMARY

The following outdoor field trip activities are curriculum-connected and intended to connect learning in an experiential way to the natural world.

## 1 Introduction



**Activity Summary:**

- Students are introduced to Fish Creek and the provincial park system.
- Discuss park rules and behavioural expectations for the day
- Review the day’s agenda
- Review field study procedures, data to be collected, data sheets, and field equipment
- Review dichotomous keys and identification of trees and shrubs
- Review point count and transect procedures
- Historic photo analysis activity – student groups examine a series of air photos of the Fish Creek valley and are asked to answer questions around land use and development (optional activity based on time available, may be done after lunch or as part of conclusion).

## 2 Quadrat/Transect/Point Count Survey

**Activity Summary:**

Students will examine flora and fauna of the park visiting two different ecosystems and collect information on:

- Trees and shrubs
- Birds
- Mammals and other wildlife
- Abiotic features including temperature, slope and aspect

Students will utilize “Point Counts”, “Line Transects” and “Quadrats” as sampling techniques.

## 3 Infrastructure Inventory

**Activity Summary:**

Students will do a built infrastructure inventory of the Day Use Area. They will record data on:

- Human activity
- Visitor use
- Park infrastructure inventory
- A unique element - Garter Snake hibernaculum discussion lead by park staff
- A “New” design for Shannon Terrace (Classroom activity)
- “Aliens Among Us” Group game about invasive species (optional activity if time permits. Game description also included in appendix).

# EXPLORING BIODIVERSITY

## IN FISH CREEK PROVINCIAL PARK

A Field Study for Division 3 & 4  
Students

### STUDENT DATA FORMS

[www.Fish-Creek.org](http://www.Fish-Creek.org)



Name: \_\_\_\_\_

Date: \_\_\_\_\_

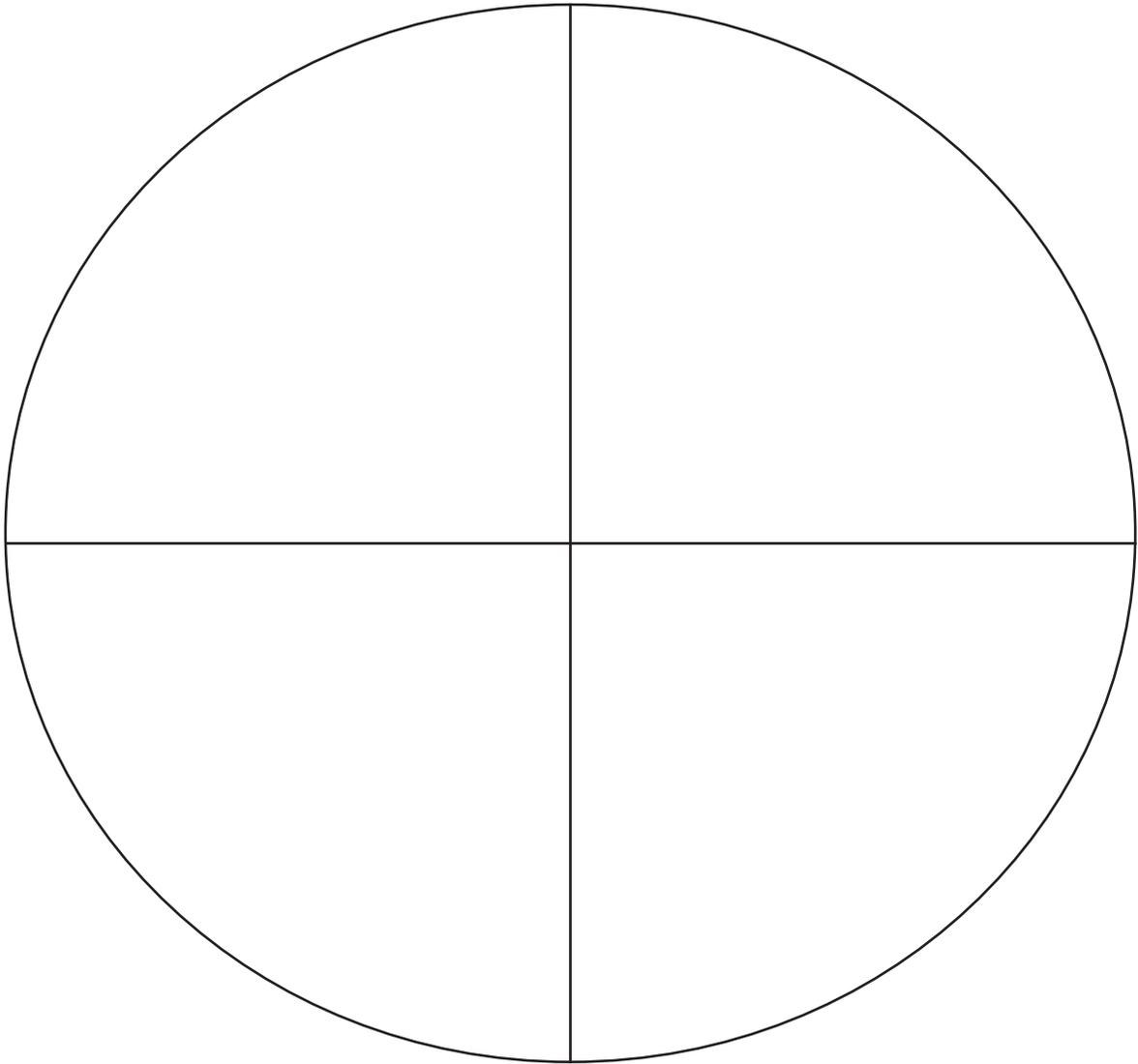
Group Members: \_\_\_\_\_

\_\_\_\_\_

# Birds: Aspen Parkland

## POINT COUNTS

Pick a spot within the study area and conduct a silent count recording your observations in the circular chart. Use a separate symbol for each separate/different species observed.



<b>Total Number of Birds Observed</b>	<b>Total Number of Species Observed</b>

# Trees and Shrubs: Aspen Parkland

## DIVERSITY OF AND WITHIN SPECIES

- Using the tape measure provided lay out a 3 m x 3 m quadrat for your group to work in.
- Identify all trees and shrubs within your 3 m x 3 m quadrat using the supplied plant key and information sheets.

Common Name	Scientific Name	# of Individuals

- Pick 5 individuals of the same species within your quadrat and fill in the chart below.

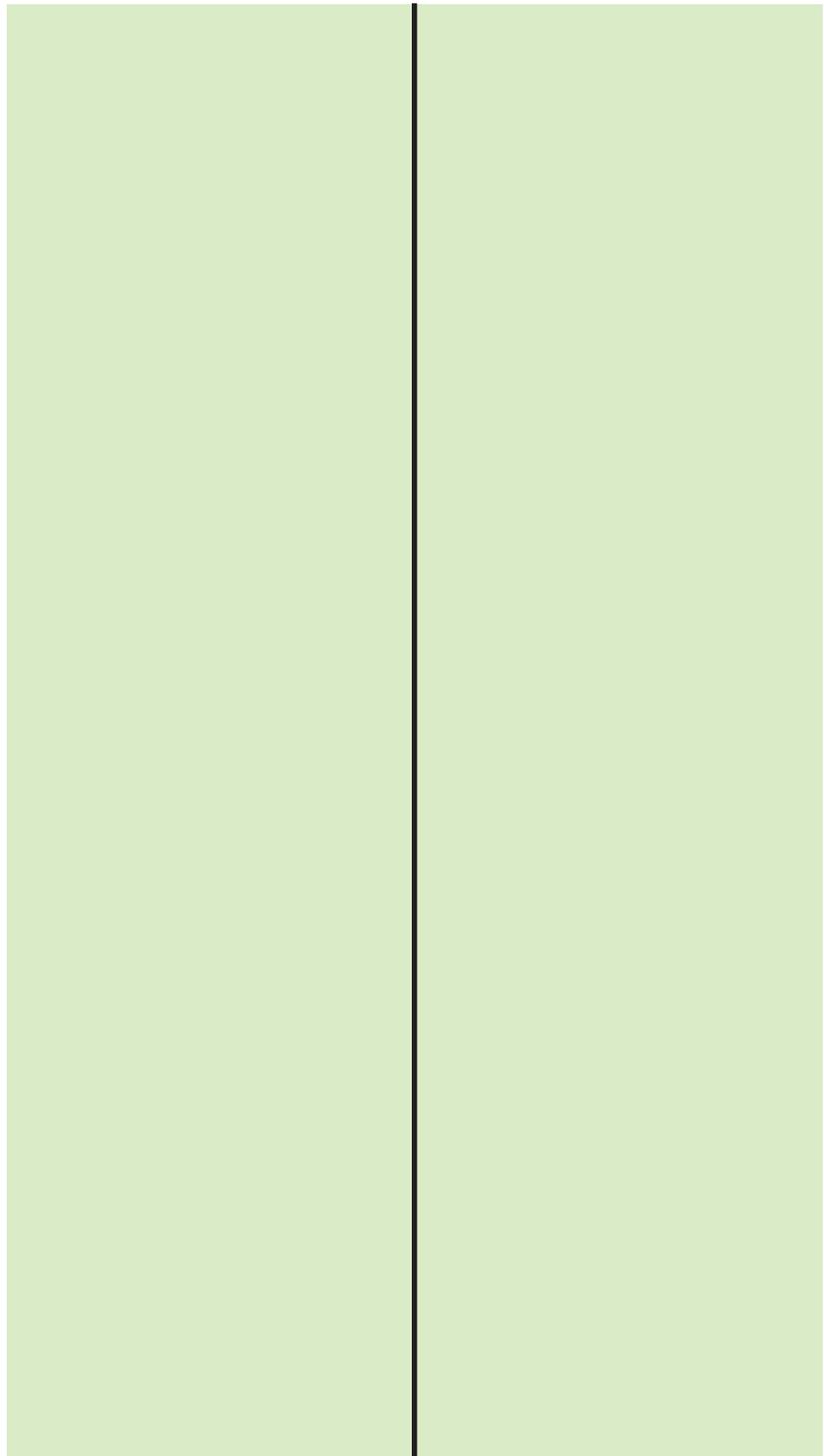
Similar Characteristics	Dissimilar Characteristics	Evidence of Interactions

# Wildlife: Aspen Parkland

## LINE TRANSECT

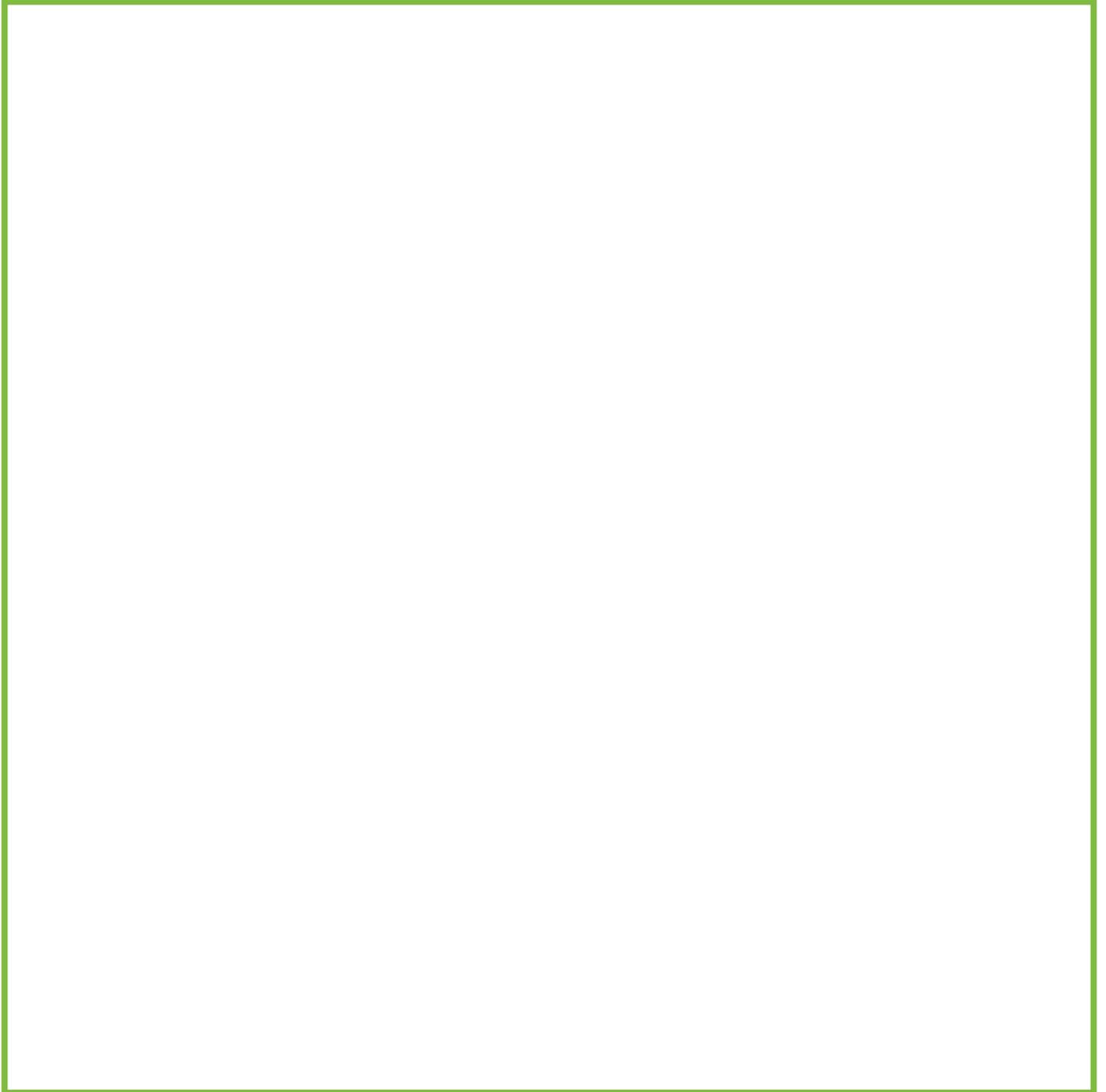
Walk the full length of the line transect recording all evidence of wildlife approximately 1 metre on both sides of the transect. Also record any wildlife species observed outside the transect area in the space provided.

<b>Total # of Wildlife Species Observed</b>
<b>Wildlife Observed That Was Not Within the Transect Location</b>



## Evidence of Animals and Insects

In the square below sketch and label all evidence of animal (bird, mammal, insect) activity in your quadrat. Include as much detail and information as possible.



## ABIOTIC DATA: ASPEN PARKLAND

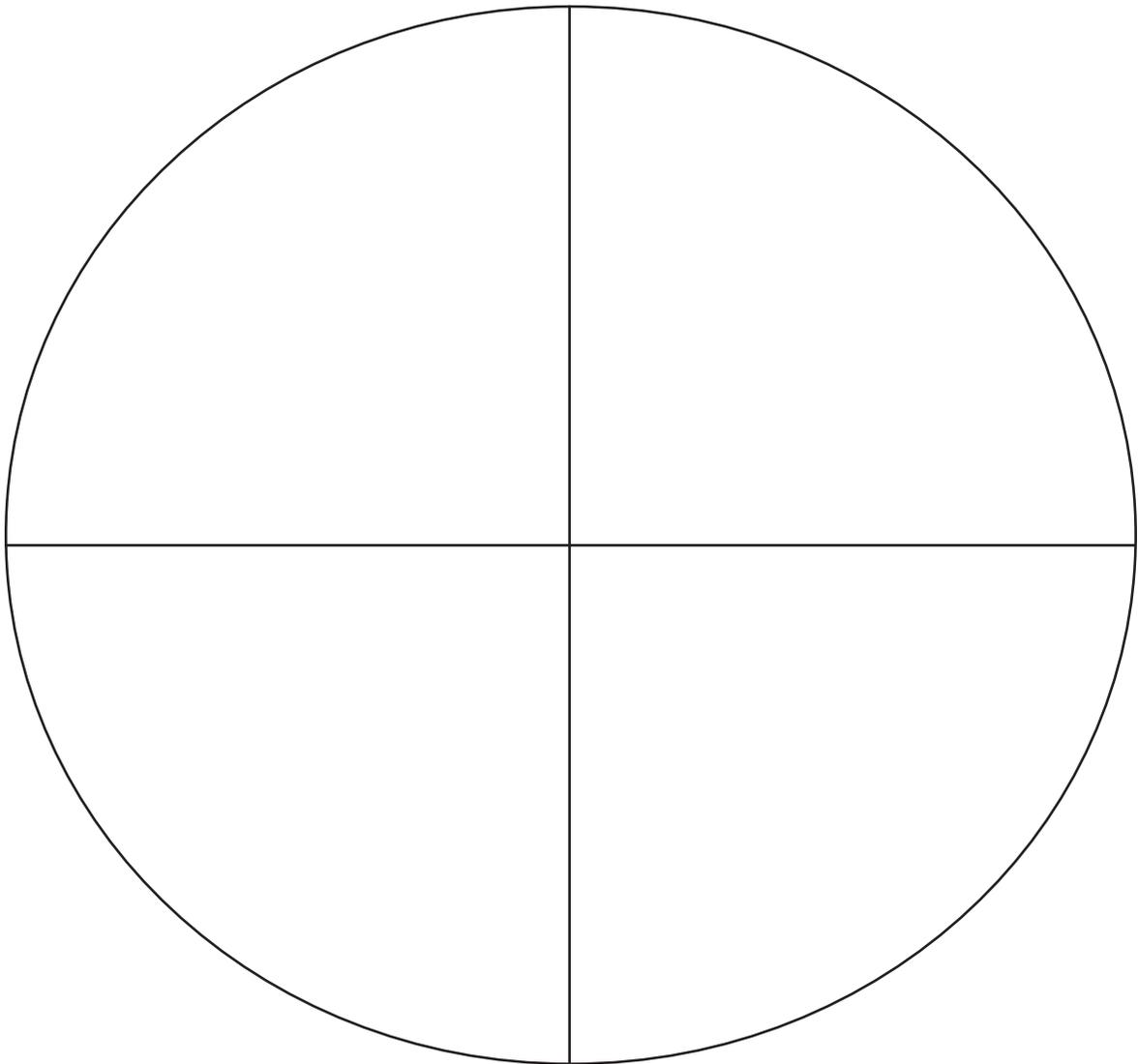
Sample #	1	2	3	Average
<b>Air Temp.</b> Two Metres Above Ground				
<b>Air Temp.</b> One Metre Above Ground				
<b>Air Temp.</b> Ground Level				

<b>Wind</b> (Slight, Moderate, Strong)	
<b>Slope</b> (Slight, Moderate, Steep)	
<b>Aspect</b> (Direction of Slope)	

# Birds: Spruce Forest

## POINT COUNTS

Pick a spot within the study area and conduct a silent count recording your observations in the circular chart. Use a separate symbol for each separate/different species observed.



<b>Total Number of Birds Observed</b>	<b>Total Number of Species Observed</b>

# Trees and Shrubs: Spruce Forest

## DIVERSITY OF AND WITHIN SPECIES

- 1 Using the tape measure provided lay out a 3 m x 3 m quadrat for your group to work in.
- 2 Identify all trees and shrubs within your 3 m x 3 m quadrat using the supplied plant key and information sheets.

Common Name	Scientific Name	# of Individuals

- 3 Pick 5 individuals of the same species within your quadrat and fill in the chart below.

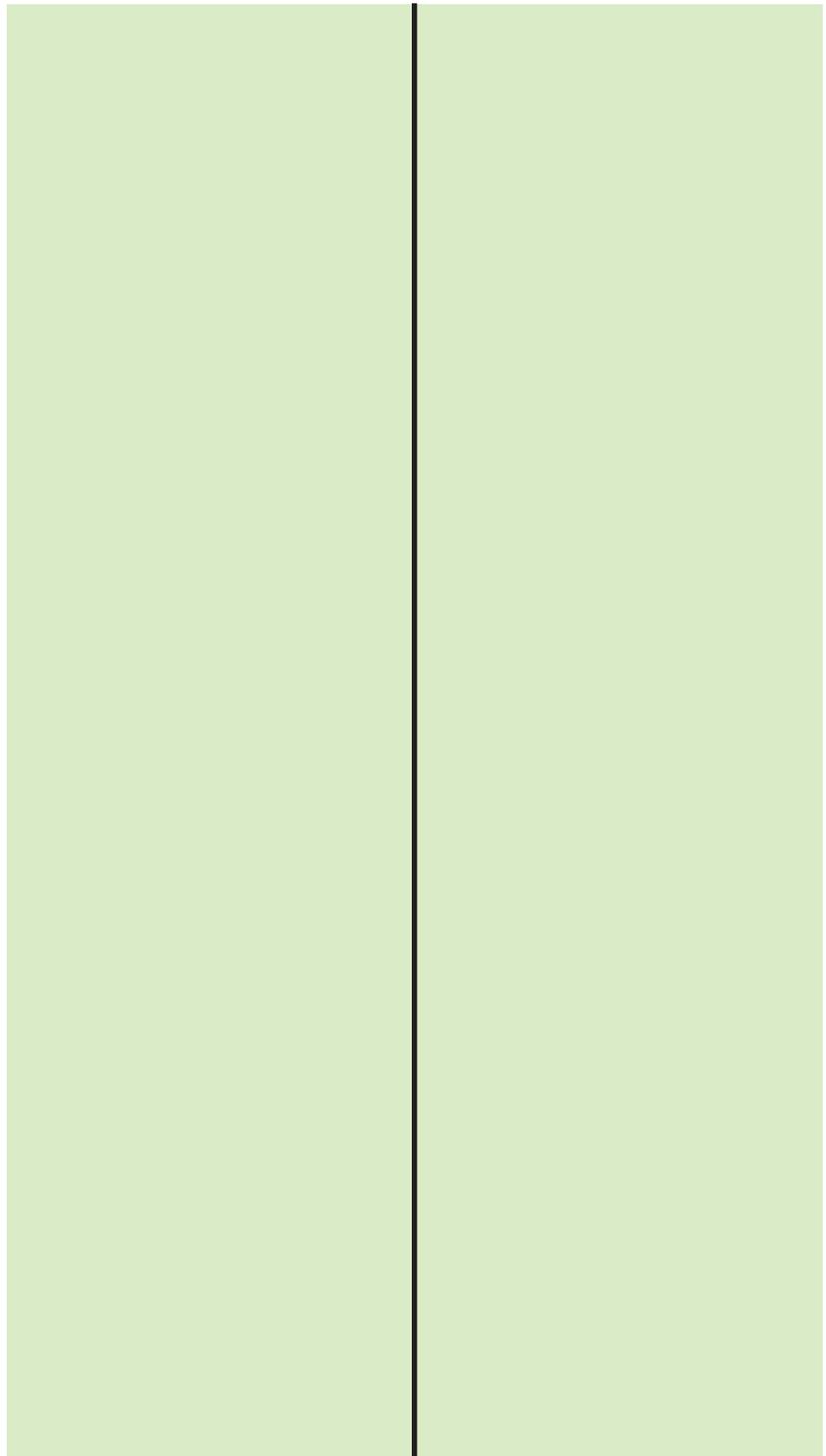
Similar Characteristics	Dissimilar Characteristics	Evidence of Interactions

# Wildlife: Spruce Forest

## LINE TRANSECT

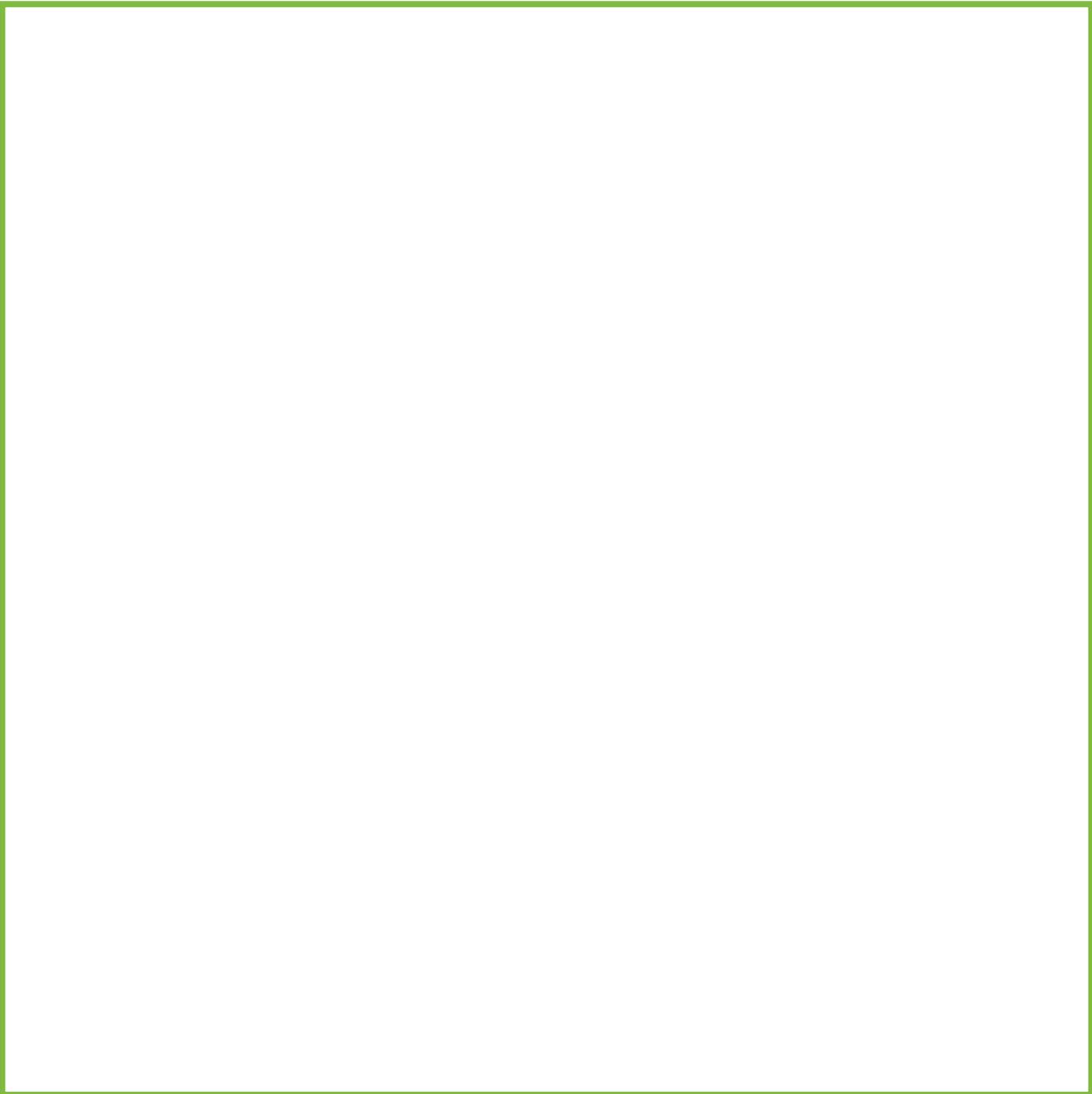
Walk the full length of the line transect recording all evidence of wildlife approximately 1 metre on both sides of the transect. Also record any wildlife species observed outside the transect area in the space provided.

<b>Total # of Wildlife Species Observed</b>
<b>Wildlife Observed That Was Not Within the Transect Location</b>



## Evidence of Animals and Insects

In the square below sketch and label all evidence of animal (bird, mammal, insect) activity in your quadrat. Include as much detail and information as possible.



## ABIOTIC DATA: SPRUCE/BOREAL FOREST

Sample #	1	2	3	Average
<b>Air Temp.</b> Two Metres Above Ground				
<b>Air Temp.</b> One Metre Above Ground				
<b>Air Temp.</b> Ground Level				

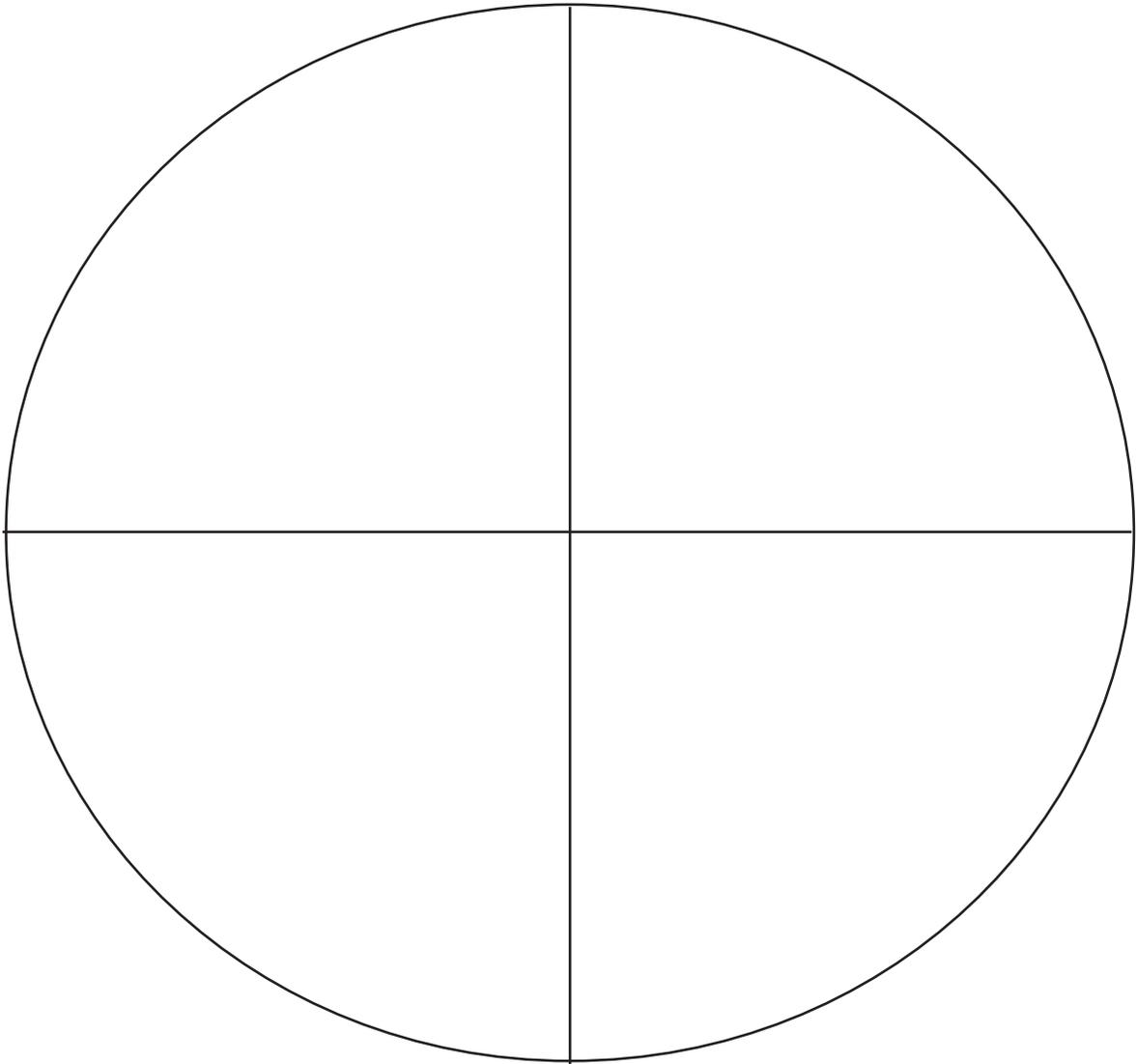
<b>Wind</b> (Slight, Moderate, Strong)	
<b>Slope</b> (Slight, Moderate, Steep)	
<b>Aspect</b> (Direction of Slope)	



# Human Activity

## POINT COUNTS

Pick a spot within the study area and conduct a silent count recording your observations in the circular chart. Use a separate symbol for each separate/different sound/activity observed.



Total Number of Activities Observed	Number of Different/Distinct Activities Observed

# Human Activity

## SUMMARY

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<b>Total Number of Activities in Point Count.</b>	<b>Number of Different/Distinct Activities Observed in Point Count.</b>

What impacts could these observed activities have on the biodiversity of the park?

What are some possibilities for reducing these impacts within the park?

# Park Infrastructure

## INVENTORY

*In order for visitors to be able to access and use the park there must be certain built elements provided for visitors within the park.*

From where you got off the bus to the study areas you visited and everything in-between record all the built elements you observed and used in the park..

The picnic table chart below has some ideas for you to consider, but be sure to list any not included.

Parking lots:	Buildings (Type/Purpose):	Picnic tables:		
			Roads:	Fire pits:
			Pathways (Gravel, paved, dirt):	
			Bridges:	Signage:

# Park Infrastructure

## GROUP PROJECT

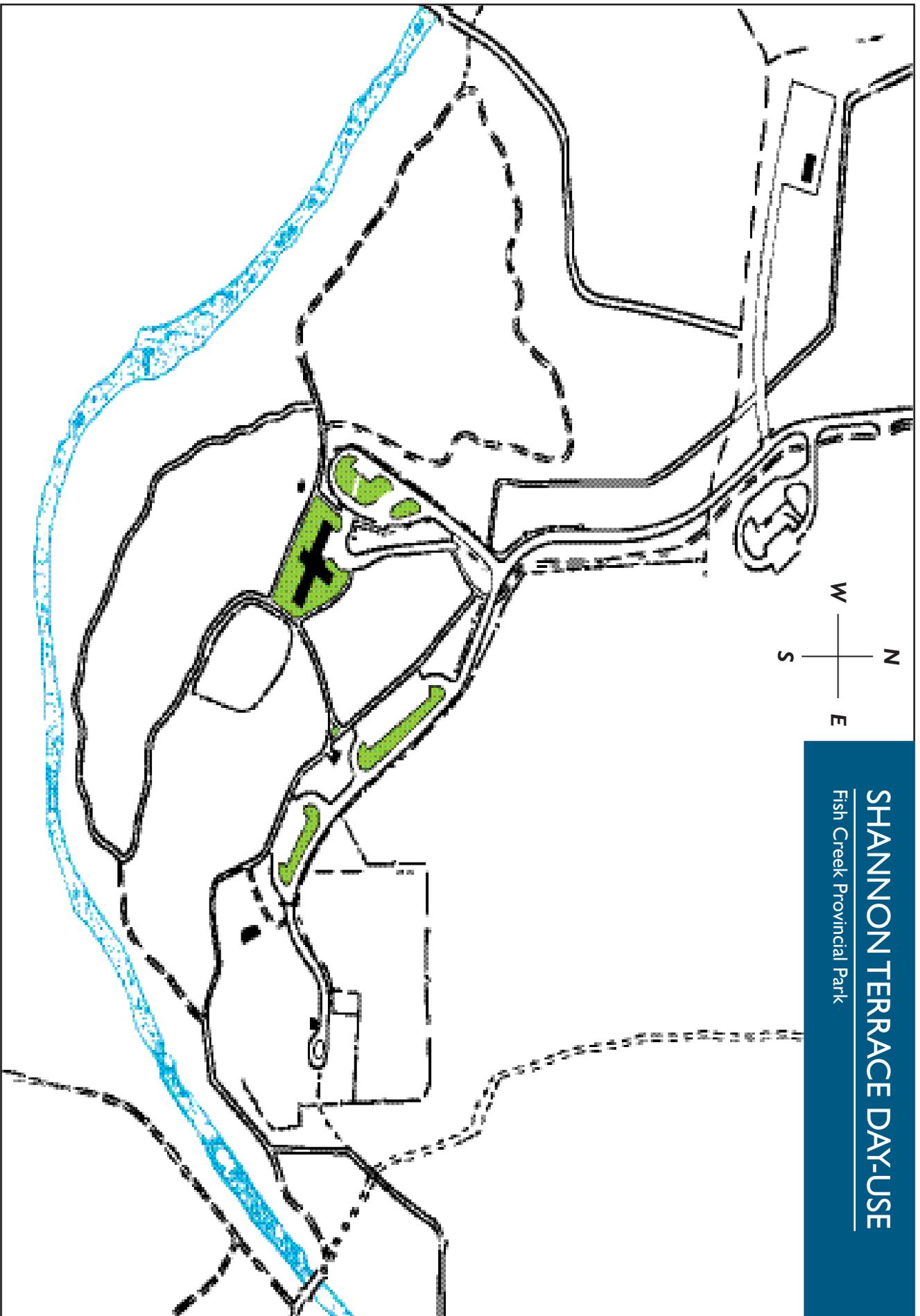
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1 Consider all built elements (infrastructure) group members have observed and recorded and discuss the following:

- Purpose or use
- Materials used
- Benefit to visitors
- Benefit to park wildlife/plant life
- Possible effects on park biodiversity

2 Working with your group and taking into account the above considerations how you would redesign the Shannon Terrace Day Use Area if you could. Include your group ideas on the attached map.

- What new infrastructure would you add?
- What existing infrastructure would you retire or get rid of?
- What existing infrastructure would you upgrade?
- What existing infrastructure would you keep?



# SHANNON TERRACE DAY-USE

Fish Creek Provincial Park

# Appendix

## THE MAMMALS OF FISH CREEK PROVINCIAL PARK

The list below is most likely incomplete as it is probably missing some of the smaller species of shrews, bats and rodents. Only further research and observations will complete the list.

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\* = Species that could be in the park, but have not been officially recorded.

\*\* = Species recorded in the park, but are only occasional visitors or extremely rare.

### **DEER FAMILY**

Mule Deer – *Odocoileus hemionus*

White-tailed Deer – *Odocoileus virginianus*

Moose\*\* – *Alces alces*,

### **CAT FAMILY**

Cougar, Mountain Lion\*\* – *Felis concolor*

Canada Lynx\*\* – *Lynx Canadensis*

Bobcat – *Lynx rufus*

### **SKUNK FAMILY**

Striped Skunk – *Mephitis mephitis*

### **WEASEL FAMILY**

Short-tailed Weasel – *Mustela erminea*

Least Weasel – *Mustela nivalis*

Long-tailed Weasel – *Mustela frenata*

American Mink\*\* – *Mustela vison*

American Badger\*\* – *Taxidea taxus*

### **RACCOON FAMILY**

Common Raccoon\*\* – *Procyon lotor*

### **BEAR FAMILY**

Black Bear\*\* – *Ursus americanus*

### **DOG FAMILY**

Coyote – *Canis latrans*

Red Fox\*\* – *Vulpes vulpes*

### **PORCUPINE FAMILY**

Common Porcupine – *Erethizon dorsatum*

### **MOUSE FAMILY**

Deer Mouse – *Peromyscus maniculatus*

House Mouse – *Mus musculus*

Southern Red-backed Vole – *Clethrionomys gapperi*

Meadow Vole – *Microtis pennsylvanicus*

Common Muskrat – *Ondatra zibethicus*

### **BEAVER FAMILY**

American Beaver – *Castor Canadensis*

### **POCKET GOPHER FAMILY**

Northern Pocket Gopher – *Thomomys talpoides*

### **SQUIRREL FAMILY**

Least Chipmunk\*\* – *Tamias minimus*

Richardson's Ground Squirrel – *Spermophilus richardsonii*

Eastern Grey Squirrel – *Sciurus carolinensis*

Red Squirrel – *Tamiasciurus hudsonicus*

## MAMMALS OF FISH CREEK PROVINCIAL PARK CONT'

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### **HARE FAMILY**

Snowshoe Hare/Varying Hare – *Lepus americanus*

White-tailed Prairie Hare/White-tailed Jackrabbit – *Lepus townsendii*

### **BAT FAMILY**

Little Brown Bat – *Myotis lucifugus*

Long-eared Bat\* – *Myotis evotis*

Hoary Bat\* – *Lasiurus cinereus*

Silver-haired Bat – *Lasionycteris noctivagans*

Big Brown Bat – *Eptesicus fuscus*

### **SHREW FAMILY**

Pygmy Shrew\* – *Sorex hoyi*

Masked Shrew – *Sorex cinereus*

Dusky Shrew\* – *Sorex monticolus*

Common Water Shrew – *Sorex palustris*

## BIRDS OF FISH CREEK PROVINCIAL PARK

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Check our website for a checklist

<https://www.albertaparks.ca/media/3235/FCPPBirdsandChecklistDec2007.pdf>

## REPTILES & AMPHIBIANS OF FISH CREEK PROVINCIAL PARK

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### **Amphibians**

Boreal Chorus Frog - *Pseudacris maculata*

Wood Frog - *Rana sylvatica*

Tiger Salamander - *Ambystoma tigrinum*

Northern Leopard Frog<sup>⌘</sup> - *Rana pipiens*

⌘These amphibians have historically been noted as occurring in the park however, have not been recorded in recent years and it is not known for certain if they still reside in the park.

### **Reptiles**

Wandering Garter Snake - *Thamnophis elegans*

Red Sided Garter Snake - *Thamnophis sirtalis*

Both species of snake make use of a hibernaculum site located adjacent to the Environmental Learning Centre at the west end of the park.

# ALIENS AMONG US - INVASIVE SPECIES GAME

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## Introduction:

This is a game to help students understand the basic impacts of invasive alien species (weeds) in a natural area. It involves a discussion of basic habitat requirements, vectors of introduction and possible control measures. With this in mind it is important that students have background knowledge/understanding of:

- common invasive alien plant species – weeds
- vectors of introduction and spread
- control measures, mechanical/physical, chemical, biological
- habitat, impacts of introduction of alien species to an environment

The game is meant as a way to galvanize knowledge/understanding or to gauge where students are at in their understanding of the concepts and how they relate to other areas of science curriculums (biodiversity, ecosystem health, forest health, etc.)

The game is played in an open area with room to move around. The game consists of several rounds or stages, but very few props with students acting as native plants and invasive species.

## Equipment:

- Rope – 20 to 30 m
- Tent Pegs – optional
- Large outdoor area or gymnasium space – enough room for entire group to move around freely

## Set-up:

- Lay out rope in a long oval shape ( peg down if you like)
- Divide group in two (2/3 and 1/3)
- One group will start as Native Plants (2/3) and one group will start as Invaders (1/3)
- Natives are inside the rope boundary, Invaders outside the rope boundary

Set up a game area with rope and tent pegs. Split class into two groups – Natives (2/3) and Invaders (1/3). Game area should not be too large and have a long/thin profile instead of a robust wide profile. Explain to the group that the area bounded by the rope is a natural area inhabited by native species that is being impacted by invasive species. Each round of the game will introduce new issues for the native species and the invaders.

The object of the game is for invaders moving around the outside of the game area to tag the Natives inside the game area, if tagged, Natives move outside and become invaders. Natives must stay an arm length away from all other Natives, so must have arms held out all the time. Invaders can lean into the game area, but cannot step on or over the boundary line.

## Round 1

Have students play this tag game for a short time. A few natives should get tagged. If no natives get tagged shrink the game area.

## Round 2

Introduce some sort of physical disturbance to the natural area – game area. Explain it is a new road, subdivision development, utility corridor, etc. This disturbance will nearly bisect the game area allowing

## ALIENS AMONG US - INVASIVE SPECIES GAME

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more access to the invaders. Shift or move part of the rope to change the overall shape creating a constricted portion to the natural area it represents.

Have students resume the tag game. More Natives should be tagged and become Invaders.

### Round 3

Explain that spring rains and runoff have created a great deal of erosion on the disturbed area. Expand the disturbed area, shrinking again the boundaries of the natural area- game area. Again shift or move the rope to restrict or shrink it further. This should allow even easier access to the invaders and lead to more Natives being tagged.

Let students play tag for a period until almost no Natives are left, when almost all the natives are gone end the round.

### **Conclusion**

Discuss with the students the effects of invader species. What happened in our Game?

Discuss Nuisance, Noxious and Restricted weeds.

Discuss invasive alien species vs. alien species

Ask students how the effects of the invasion as seen in the game could be reduced or reversed. Could they come up with another round of the game that would see Invader number reduced and Native numbers increased? Discuss control measures and ideas for a Round 4 - The Natives Fight Back.

### Possible Round 4

Reverse the tag rolls and have Natives tagging Invaders and invaders moving “INTO” the natural area. You have to have a reason for this to happen e.g. “a concerned group organized and held a weed pull event in the area”.

Invaders cannot move more than one step away from the boundary line and Natives can't step out of the roped boundary.

### Round 5

Rehabilitate the disturbed area and increase the size of the natural area. Allow Native to continue to pursue and tag Invaders.

### Round 6

Make up your own scenario or have students create a scenario to play out.

# Access Map - Fish Creek Environmental Learning Centre

13931 Woodpath Road SW, Calgary, Alberta



## DIRECTIONS

### From Anderson Rd SW heading west:

- Follow signs to Tsuut'ina Trail and follow exit onto Buffalo Run Blvd
- Follow Buffalo Run Blvd past the gas bar and Costco complex to 130 Ave SW
- Heading east through two traffic circles to continue onto 130 Ave SW
- Turn right onto Woodpath Rd SW and follow road straight into the park

### From south of 130 Ave SW on northbound Tsuut'ina Trail:

- Take the 130 Ave SW exit and keep right at top of ramp onto eastbound 130 Ave SW
- Turn right on Woodpath Rd SW and follow road straight into the park

**NOTE**

- Park speed limit is 30 km/hr
- Please use parking lots adjacent to the picnic area and walk to the Centre along the paved path
- Do not leave valuables in your vehicle

