

# Boreal Species at Risk Lesson Kit

## Teacher Introduction

The boreal forest is a complex ecosystem that we live in. It supports a unique variety of plants and animals specific to this ecosystem including ourselves. There must be a balance in what we use from the land and how we interact with other organisms to ensure the health of the boreal forest for future populations.

The boreal forest is a vast wilderness that contains many renewable and non-renewable resources that we use today. Our presence in the boreal forest has steadily increased as our country's population expands and we explore and consume natural resources. One renewable resource we utilize is the trees. Trees provide us shelter, food, furniture and paper to name a few. As we try to manage the boreal forest and its numerous resources we must be conscious of the impact to native plants and animals. This lesson is about boreal wildlife species whose populations are at risk of diminishing or disappearing from the boreal forest. Let's explore the reasons behind the population changes and what the government's plans are to mitigate this.

### Icons to help identify curriculum connections



### Curriculum Connections

- Social 10-1 Unit 3: Perspectives on Globalization  
To what extent does globalization contribute to sustainable prosperity for all people? Explore multiple perspectives regarding the relationship among people, the land and globalization. Evaluate actions and policies associated with globalization that impact the environment
- Social 10-2 Unit 3: Living in a Globalizing World  
To what extent should we embrace globalization? Does globalization contribute to sustainable prosperity for all people? Recognize and appreciate impacts of globalization on the interdependent relationships among the economy, people and the environment. Analyze the impact of actions and policies associated with globalization on the environment.
- Science Grade 7 Unit A: Interactions and Ecosystems  
How do human activities affect ecosystems? What methods can we use to observe and monitor changes in ecosystems and assess the impacts of our actions?
- Science Grade 9 Unit A: Biological Diversity  
What is biological diversity? By what processes do diverse living things pass on their characteristics to future generations? What impact does human activity have on biological diversity?
- Science 14 Unit D: Investigating Matter and Energy in the Environment  
How is human activity influencing the natural flow of matter and energy in the biosphere? Should humans as a species be concerned about the effects of their activities on other species and the environment?
- Science 20 Unit D: Changes in Living Systems  
Analyze and describe the adaptation of organisms to their environments, factors limiting natural populations and evolutionary change in an ecological context.
- Biology 20 Unit B: Ecosystems and Population Change  
What are the major biotic and abiotic characteristics that distinguish aquatic and terrestrial ecosystems? What data would one need to collect in a field study to illustrate the major abiotic characteristics and

diversity of organisms? What mechanisms are involved in the change of populations over time? In what ways do humans apply their knowledge of ecosystems to assess and limit the impact of human activities?

- **Biology 30** Unit D: Population and Community Dynamics  
How does one determine if populations are changing over time? In what ways may individual members of a population interact with one another or with members of a different population? What quantitative measures indicate that populations change over time? What role does society play in managing wildlife populations?

## Lesson Details

**Time required:** The estimated minimum time required is 80 minutes; this will be broken into two parts. There is a take home portion for student research and presentation preparation. The first section is to introduce the topic of Species at Risk and the student case study. The second part is the student presentations to the class, group discussion and use of the board game. Teacher preparation time is estimated at 15-30 minutes. This includes time to read the background information, review the introduction video and become familiar with the topic and its relation to your curriculum.

**Resource requirements:** Internet access, smart board or computers to view video, print materials, game board and pieces.

The LSFES ([www.lsfes.org](http://www.lsfes.org)) and the LSLBO ([www.lslbo.org](http://www.lslbo.org)) can you provide the full lesson kit with materials or you can download and print the kit components separately from either website.

This lesson kit is split into multiple components. Each component will help reinforce the basic ideas surrounding Species at Risk and our interactions with them.

## Kit Components:

1. **Video** – The 5 minute video provides an introduction to what Species at Risk are and how they are classified. It touches on the process of how a species becomes classified and the Government Acts regulating species management. <https://www.powtoon.com/online-presentation/dbHTYgNgDIZ/sara-intro/>  
The video web link provided can be viewed on any computer device or on a smart board if available. This video should be viewed first.
2. **Student Handout** – This introduction handout reiterates the topics discussed on the video such as the Species at Risk Act, the Alberta Wildlife Act, the Species at Risk classifications and processes to protect species. This handout is a reference sheet for the student.
3. **Case Study Assignment** – The assignment is outlined in the video and student handout. This checklist is a breakdown of the research components that are to be included in the student case study presentation.
4. **Fact Sheets** – Provided are fact sheets for 6 preselected boreal Species at Risk. Each species has a unique interaction with the boreal forest in Alberta, its classification or the species class. The fact sheets provide a quick introduction of the 6 suggested species. The students are to complete a more in depth case study of one Species at Risk in the boreal forest. You can choose to provide these species selections and sheets to your students to speed up the lesson. These are only suggestions, any boreal species can be chosen to research.
5. **Class Discussion Questions** – After the presentations we suggest a group discussion to reinforce the topic and management concerns of boreal Species at Risk. We have provided opening questions that can help direct class discussions and focus in on the specific curriculum topics.
6. **Survive or Perish Board Game** – The game we have created is the boreal Species at Risk version of the classic board game "Snakes and Ladders". The student follows along the numbered squares encountering "snakes" (waterfalls) and "ladders" (vines) to reach the ultimate goal, survival. The board game helps the students identify with the Northern Leopard Frog and the perils of living in the boreal forest as a threatened species. It is a fun approach to reinforce how our actions or inaction can affect the survival of other wildlife species.

## Lesson Part 1

- Estimated time 30-40 minutes
- Introduce the topic of Species at Risk in the boreal forest. Watch the 5 minute video provided. <https://www.powtoon.com/online-presentation/dbHTYgNgDIZ/sara-intro/>
- Class case studies:  
Option 1: Split the class into 6 groups. Each group is assigned one of the pre-selected species. Handout the student introduction that includes the assignment details and the accompanying fact sheets. The fact sheets are a starting point for research and introduction to their species and its classification.  
Option2: You can choose to have the students do individual, pair or group case studies. Have them select a boreal Species at Risk for their presentation.
- Students are to research and develop a presentation for the class on their Species at Risk. Select a due date for the presentations.

## Lesson Part 2

- Estimated time 40-80 minutes
- Case study presentations from the student groups.
- Group discussion about species management. Use opening questions provided to assist in directing discussions and critical thinking.
- Northern Leopard Frog "Survive or Perish" Game. This quick and easy game shows the obstacles that this species faces daily to survive and reproduce. This game is for 2-6 people and takes 10-20 minutes.
- Wrap up the topic highlighting the different regulations that help the security and recovery of a species at risk and how human interactions can adversely affect or benefit a species.

## Student Assignment

Students can work individually or be divided into pairs or six small groups for this assignment. The students will research and present information on a current Species at Risk in the boreal forest. The students are to present a case study of their species to the class in a 3-5 minute presentation (verbal presentation, poster, slide show or a video).

Optional: We have chosen 6 Species at Risk that showcase the boreal region and various limiting factors. A one page summary is provided for each species to get you started. The species are Little Brown Bat, Canada Warbler, Woodland Caribou, Northern Leopard Frog, Wolverine and the Arctic Grayling.

### Minimum topics to be covered for each case study:

1. Species name
2. Provincial and national status
3. Physical description of the species
4. Range or habitat
5. Factors affecting their status
6. Consequence of their disappearance
7. Current research being done and any interesting findings
8. What is being done to help your species population?
9. Other interesting facts
10. Optional Question– Science20 – Calculate your species population growth rate over time and present it in a graph.

Images and maps should be included in the presentation.

## Class Discussions – “Balancing the Boreal”

This is a class activity where students measure the social, environmental and economic impact of management decisions. (i.e. What are the real benefits and costs of their decisions?) Possible answers are in italics.

### 1. What can we do here in Alberta if what is causing a species population decline is not within our country's borders?



- *We can ensure that the species is able to access what it requires to live and thrive in its habitat when in our country, such as the case with migratory birds and fish.*
- *We can lobby our government and the government where the issue is to make changes and protect the species and its habitat.*
- *We can educate those in the other country about the limiting factors for that species. This will assist in its protection and recovery.*
- *Social media is one way we can reach across the miles to learn and interact with people from all over the world.*

### 2. Should we try to save every species? If yes, at what cost (economically, environmentally, financially)?



- *Every species has the right to exist. However more information may be needed to objectively make this decision.*
- *What is the cost to society for the loss of this species? Biodiversity. Is this species key in the food chain?*
- *What is the dollar cost to society to try to save this species? Job loss. Closure of areas. Excessive funding of research, protection and enforcement.*
- *Is the species at the end of its habitat range or is it thriving in other areas? Perhaps the loss is marginal if it is at the end of its habitat and is secure in other areas.*
- *What mechanisms are involved in the change of populations over time? Can the limiting factor's effects be reversed in a timely fashion to ensure survival? Very low population numbers, scale of the problem etc.*

### 3. What is the impact of a species no longer existing? Is the extinction local or global?



- *Will the species loss affect another species survival? Such as the need for bees to pollinate flowers.*
- *There will be repercussions of a species lost in the local biotic cycle. (Food source, nutrient cycle, life cycle etc.)*

### 4. Do the regulations and laws do enough to help save a species?



- *This may require a further look at the related Acts and other Acts such as the Fisheries Act and Migratory Bird Convention Act.*
- *Can we balance sustainable development with proper management of the wildlife species? There are always costs be it economic (jobs), environmental (habitat loss or loss of species) or social (community and global responsibility). Each factor must be weighed to determine a sustainable management solution.*
- *There has been success in the reestablishment and survival of a species in their habitat. Examples are the Trumpeter Swan and Wood Bison. There have also been failures with the recent extirpation of the Greater Prairie Chicken in Alberta.*

### 5. Can one person or class make a difference to a species survival?



- *We can educate people about a species status and its need for protection.*
- *We can assist in research and population tracking to get the most accurate information.*
- *We can lobby our government to review the species and the limiting factors for species at risk classification and management strategies.*

### 6. Can you explain the difference between a provincial and federal species at risk listing?



- *A federal Species at Risk listing is governed by the Species at Risk Act (SARA). There are national regulations that must be followed when a species is listed. COSEWIC is an independent body that reviews and requests a species listing federally.*
- *A provincial Species at Risk listing is governed by Alberta's Wildlife Act. There are different parameters and regulations that are specific to Alberta's Wildlife Act. This act handles more than just species at risk.*

- A species may have a different listing federally and provincially. A species may be classified federally because of the low population numbers or habitat constraints across the country but they might be in a secure state in a particular province or zone.
- SARA applies on federal lands (e.g., national parks), but Alberta's Wildlife Act is still the dominant legislation for management of species at risk on private lands and public lands under provincial jurisdiction. There are several federal/provincial committees in place to ensure a cooperative approach for the management of species at risk.

**7. What are some of the challenges that land managers face today when planning for the forest? For example, how does a Forester manage for timber and animals when they are planning their harvesting operations?**



- Can we adequately manage for all forest values? We have a greater understanding of the relationships between elements in nature and inventory of the forest. The information technology that is used to predict and track forest values is extensive and is only getting better. This allows managers to use the best information available locally and regionally to make their decisions.
- There are provincial and federal laws that govern all industry's actions. The forest industry is managed by regulated professionals so that responsible, informed decisions are being made about the forest.

**8. What are some of the abiotic and biotic factors that affect a species population?**



- Abiotic factors: soil, relative humidity, moisture, ambient temperature, sunlight, nutrients, oxygen
- Biotic factors: competitors, predators and parasites
- Explain how limiting factors influence organism distribution and range.

**9. What data would you need to collect in a field study?**



- You would need to collect many different parameters such as habitat (type of plants, water source, etc.), climate (temperature, moisture etc.), presence/ absence, actual sample of a specimen, disturbances.
- What relationships should you investigate between wildlife and its environment to hypothesize the cause of a species population decline? Examples: Life cycles, food sources, breeding grounds, habitat connectivity, restrictions to travel, invasive species, introduced diseases or predators, ecosystem changes.
- Is data collected at one point in time enough to base a management decision on? Often season, weather or life cycles may influence the data you collect on certain species. Managers have to have a broad overview of the situation and the limiting factors of a Species at Risk. The data sets used in their analysis must be over multiple years to get a clearer picture of the population trends and environmental changes over time.
- Are there specific items you would need to collect for your species? How would you access data from other locations or countries such as in the case of a migratory bird? Will the information be reliable and accurate?

## Survive or Perish Board Game

- Estimated time 10-20 minutes per game
- Board games can be borrowed from the LSFES (780-849-8627) or the LSLBO (780-849-8240). Or you can download and print the game on two 11"x17" sheets. If you print the game you will need a dice or spinner and 4-6 player tokens per game.
- The game is suitable for ages over 12. Two to four players per game is optimal but up to 6 can play at one time.
- Players navigate the board to try to get to square #100 to win and survive for another day.
- There are more waterfalls ("snakes") to represent the increased pressures a species at risk faces to survive. This game reinforces the different limiting factors the Northern Leopard Frog encounters.

## Directory of Internet Research Resources

- Committee on the Status of Endangered Wildlife in Canada - [www.cosewic.gc.ca](http://www.cosewic.gc.ca)
- Alberta Environment and Sustainable Resource Development - [esrd.alberta.ca/fish-wildlife/species-at-risk/](http://esrd.alberta.ca/fish-wildlife/species-at-risk/)
- Species at Risk Public Registry - [www.sararegistry.gc.ca](http://www.sararegistry.gc.ca)
- Hinterland Who's Who - [www.hww.ca](http://www.hww.ca)