

### What is an ecosystem?

An **ecosystem** consists of all living things (animals, plants, fungi, bacteria, and other microorganisms) that interact with each other and the environment in which they live (air, water, and soil).

- Ecosystems can range from tiny to large: a drop of pond water, rotting log, river, patch of old growth forest, and a range of mountains can all be considered ecosystems. Small ones can fit inside larger ones, and boundaries tend to overlap with neighbouring ecosystems. e.g.- a rotting log can be found in a cottonwood forest which is growing there because there is a river next to it.
- Resource managers are moving away from managing landscapes for only one or two species (e.g.- creating lots of browse for deer and moose after logging), to addressing the needs of the broader ecosystem (e.g.- making sure there is habitat available for most wild creatures in an area).
- To aid in research, management and communication of ecosystems in B.C. a biogeoclimatic (BGC) ecosystem classification system has been developed. The system uses climate, soil, vegetation to group ecosystems at regional and local levels. Fourteen large ecological zones are recognized in B.C. In the Columbia Basin the following BGC's are represented: Interior Cedar Hemlock, Interior Douglas-fir, Ponderosa Pine, Montane Spruce, Engelmann Spruce-Subalpine Fir and Alpine Tundra.
- Ecosystems are constantly changing affected by natural disturbances such as fire, insect attack, wind storms, landslides or logging. Disturbance can return an ecosystem to its beginning. Succession involves changes in plants, animals and conditions as the new ecosystem develops from infancy to mature and old age.

### Grassland Ecosystem

a.k.a. field, meadow, prairie (North America), pampas (South America), steppe (Europe and Asia), savanna (Africa).

Where **grasslands** exist is determined by the amount of rainfall. If rainfall accumulation is less than 25 cm (10 inches) a desert exists. Over 101 cm (40 inches) of precipitation and forests thrive. Grasslands grow between the range of 26-100 cm (21-40 inches). Where there is more moisture trees can encroach onto the grassland. Where it is drier, forests retreat before advancing grasslands. Grass species outnumber other types of plant life within a grassland.

- The landscape of grassland can be best described as flat with sandy, gravelly, or rocky soil. In this type of soil water drains quickly down to plant roots before it evaporates.
- The pristine, natural unaltered sea of native grasslands that greeted European settlers to Canada has essentially vanished.
- Grasslands of the Columbia Basin historically depended on fire, a natural disturbance important for recycling nutrients and killing tree seedlings. Without fire, trees march into open grasslands (encroachment) or take hold in open forested stands eventually creating a closed canopy forest (ingrowth).



wildsight

## Classroom with Outdoors

---

### Engaging Ecosystem Experience

- Grasslands of the Columbia Basin are among the most threatened ecosystems in our region, in fact more so than temperate old-growth forests. Surprisingly less than 1% of B.C. grasslands has protective status and is contained within Park boundaries in British Columbia.

### **Where to find grasslands in the Columbia Basin?**

Grasslands occur in the southerly and eastern parts of the Columbia Basin typically in dry open areas at low elevations above the Columbia and Kootenay Rivers. Although more common in the Rocky Mountain Trench, remnant grasslands are found in the West Kootenays at places like Syringa Provincial Park. In the Columbia Basin grasslands typically form the understory of open forested stands in the Ponderosa Pine and Interior Douglas-fir biogeoclimatic zones.

### **Indicators of Healthy Forests**

To determine the health of grasslands requires ground level examination. Few relic grasslands exist in a natural state in the Columbia Basin. Holding ponds for the Columbia River Treaty dams flooded some 560 lineal kilometers of valley bottom, some of which was highly productive grassland habitat. The following characteristics help determine the health of a grassland.

### **I: Grassland Characteristics**

Are there:

- Obvious presence of the classic clumps of bunchgrass species like Rough fescue, Idaho fescue and Bluebunch wheatgrass. Within the clump you should see an accumulation of dead stems and leaves from previous years' growth but not so much that the plant gets choked out in the centre.
- When forested, the stand should appear 'open in nature' with lots of sunlight reaching the forest floor. There may be some dense clumps of trees. Some areas will have no trees at all.
- An absence of tree encroachment onto the grassland, primarily Douglas-fir seedlings.
- Few exposed soil areas. Ground covered by lichen and low growing plants that act to retain soil and moisture.
- Absence of noxious weeds such as knapweed, salsify (goat's beard), sulfur cinquefoil, ox-eye daisy and toadflax. Minimal presence of weedy species such as dandelion, foxtail barley and black medic (clover).
- A variety of native grass, flowers and shrub species.



**wildsight**

---

# **Classroom with Outdoors**

---

## **Engaging Ecosystem Experience**

# wildsight – Teacher Backgrounder

## Grassland Ecosystem

### II: Associated Plants and Animals

Grasslands provide habitat for a large number of species, many which are now rare or endangered. In fact, most of the vertebrate species at risk in BC are found in grasslands. e.g. – American Badger, Long-billed Curlew, Vesper Sparrow. Animals and plants have special adaptations and requirements for living in grasslands.

<b>Plants</b>	Three pronged aven	*Ferruginous hawk
Ponderosa pine	Sreading phlox	Hairy woodpecker
Western larch	Brown-eyed Susan	*Long-billed curlew
Douglas-fir	Sockeye psora scale lichen	**Vesper sparrow
Antelope-brush or Bitterbrush	Pixie-cup lichen	*Bobolink
Saskatoon	Green Old Man's Beard	<b>Mammals</b>
Snowbrush	<b>Reptiles and Amphibians</b>	Deer mouse
Bluebunch wheatgrass	* Great Basin spadefoot toad	Columbian ground squirrel
Rough fescue	Western toad	Northern pocket gopher
Idaho fescue	*Western painted turtle	**American badger
Pinegrass	<b>Birds</b>	Cougar
Pasture sage	*Swainson's hawk	Coyote
Kinnickinnik	Red-tailed hawk	Mule deer
Rocky Mountain juniper	*Turkey vulture	White-tailed deer
Wildrose	*Prairie falcon	Rocky Mountain elk
Arrow leaved balsamroot	Golden eagle	*Rocky Mountain bighorn sheep
Yarrow	American kestrel	**Northern myotis
Prairie crocus	Wild turkey	
Mariposa lily	Great-horned owl	

\*Rarity ranked as: \*Blue or \*\*Red listed in B.C.



wildsight

## Classroom with Outdoors

### Engaging Ecosystem Experience

### III: Some Examples of Animal Adaptations

- **American badgers** are among the largest member of the weasel family and are well adapted for their grassland home. Long claws and short, strong legs are highly specialized for digging after prey and securing protective dens. The badger is named for the distinct facial black “badges” on each cheek. Solitary by nature, badgers are active mostly at night traveling a large geographic area in search of their favorite food - burrowing animals like ground squirrels and pocket gophers. Badgers help control rodent populations eating 2-3 ground squirrels a day! But when hungry, they will eat a variety of foods such as turtle or bird eggs, carrion (dead animals), insects, birds and muskrats. American badgers were added to the endangered list in B.C. in 2000. Loss of suitable habitat for badgers has greatly affected the populations. Historically badgers were trapped for their fur or shot as nuisance animals. Ranchers feared livestock could step in their holes and break a leg. Flooding to create reservoirs like Lake Koocanusa has destroyed valuable badger habitat. In addition forest encroachment and ingrowth is reducing grassland habitat in the Columbia Basin. The greatest risk to badgers is their small population, which is spread thinly over the region making them vulnerable to extirpation regionally and provincially.
- **Long-billed curlew** – The grassland seems like an unlikely place to see Long-billed curlews, Canada’s largest shorebird with very long slender legs and down curved bill. After migrating from their winter home in the Southern US and Guatemala in late April, Long-billed Curlews build their nest in short to mid-grass prairie close to wetter areas where there is an abundant supply of invertebrate prey and good grazing. They are known to use the same territory year after year. Chicks born in June have a high mortality and reproduction is low making this species vulnerable. Use of pesticides in breeding areas contributes to species low reproduction and eggshell thinning as a result of lethal residues. Hunting in the late 1800’s and early 1900’s decimated numbers and forced the protection of this bird under the federal Migratory Birds Convention Act of 1917. Human activities continue to reduce suitable habitat for this unique and elusive grassland bird.
- **Rocky Mountain elk** or ‘wapiti’ are grazing animals commonly seen in a herd. They spend their summers in higher elevation forests and alpine habitats but move into valley bottom grasslands to overwinter where grasses are abundant and there is less snow accumulation. Elk depend on these varied habitats within a close geographic area. With the loss of productive grasslands elk have become a nuisance to farmers when they feed on domestic livestock winter food supply. In some winters over the past decade local organizations have had to organize feeding programs to prevent elk from starving. What elk need is quality habitat not handouts!
- **Western Meadowlark** sing the signature sound of the grassland and can be heard in the Columbia Basin in the last part of March, marking the arrival of spring. Meadowlarks occupy large grassy open areas with elevated singing perches (trees, shrubs, fence rows or tall forbs). These birds nest on the ground sometimes under the dead litter at the base of bunchgrasses. They are highly specialized and prefer treeless habitats with mostly grasses, some forbs and no barren ground. Western meadowlarks forage in the low grass for larvae, beetles, spiders, grasshoppers in July and some seeds. Conversion of native grasslands to hayfields and crops precipitated the decline of this colourful bird with its yellow breast and obvious black V across the chest. A shift to undisturbed grassland has seen populations increase in some areas.



- **Vesper Sparrow** is a grass-loving bird and one of the lead singers in the prairie chorus singing mostly in the evening. Occupying dry, sparsely vegetated sites they are sensitive to habitat fragmentation and are found in highest densities on unmowed, ungrazed and unburned areas. Vesper Sparrows require some fairly tall woody vegetation for singing and courting making open-forested grassland ideal habitat. They can be seen foraging on the ground for both animals and plant material. Vesper Sparrow began declining as agricultural land-use intensified and when grassland was taken over by forests thereby decreasing nesting habitat. Another factor contributing to the decline of this grassland bird is reproduction failure because of high rates of nest predation and parasitism.

### Threats to Grasslands

- **Agricultural Practices** – People have not been kind to grasslands. Drought gripped most of the North American west in the 1930's. To make matters worse, poor farming practices and over grazed pastures exposed the soil. Great windstorms whipped up the soil burying land and even buildings. Ranches and farms failed and many people were destitute during the period known as the "Great Depression". Intensive agricultural practices still continue without adequately resting the land. Overgrazing or grazing at the wrong time of year is still common practice in grasslands.
- **Off Road Vehicles** – Dirt bikes, ATV's and 4 wheel drives scar the delicate skin of the grassland. These tire scars can remain visible for decades. Wagon wheel ruts from the historic Kalispell Trail used in the 1880's between Kalispell and Fort Steel in the East Kootenays are still visible today. Vehicles traveling over sensitive grasslands increase soil erosion and soil compaction which leads to increased surface water run-off and makes the area more susceptible to noxious weed or 'weedy' species infestation.
- **Human development** is the biggest threat to grasslands. Plows, harrows and bulldozers cut huge swaths as native grasslands are replaced with crops, vineyards, golf courses, highways, pastures, urban housing developments, and gravel pits.
- **Noxious weeds** are invading grasslands throughout the Columbia Basin at an unprecedented rate. These alien invaders are a serious risk to grasslands. Introduced to the region by humans, these non-native plants have no insect predators or plant pathogens that help keep them in check. Humans spread noxious weed seeds in the undercarriage of vehicles, on mountain bike tires and even the treads of our shoes. Other methods of distribution include wind, water, livestock and wildlife. Spotted Knapweed, Sulfur Cinquefoil, Dalmation Toadflax, Hound's Tongue, Blueweed, Ox-eye Daisy, St. John's Wort – are all aggressive weeds that can outcompete native vegetation thereby reducing forage for wildlife and livestock.
- **Lack of wildfire** – Effective fire suppression since the 1940's has led to the ingrowth and encroachment of trees into grasslands. Without regular fire cycles to kill seedlings and shrubs, forests encroach onto grasslands. For instance, in the Premier Lake area from 1952 to 1991 grasslands were reduced from covering 25% of the area to just 5% due to forest in-growth - in just 40 years!



## Grassland Stewardship

- Get involved monitoring noxious weeds in your community. For more information check Ministry of Forests web site at: <http://www.for.gov.bc.ca/hfp/noxweeds>. To report noxious weed infestation call your local office for the BC Ministry of Forests.
- Drive vehicles only on designated roads and keep all motorized vehicles (dirt bikes, ATV's) off native grasslands.
- If you live in an area that was historically grassland, replant your own backyard with native plants. Contact Naturescape BC at 1-800-387-9853.
- Educate yourself about grasslands. Watch out for local clubs and organizations (Naturalist groups, Rod and Gun Club, Elk Foundation) that raise public awareness and provide funds for research and restoration activities. Become a member of these groups or get involved with their projects.
- Tread lightly when walking in native grassland. Ensure your activities do not harm or damage these fragile areas.
- Support controlled prescribed burns in your area that are restoring native grasslands.
- Get involved in the Land Conservancy "Grassland Stewardship Program" by calling (250) 427-1974.
- If you see anyone damaging a protected grassland call 1-800-663-WILD Ministry of Environment Tip Line.



**wildsight**

## Classroom with Outdoors

---

## Engaging Ecosystem Experience

## References for Further Research

### **Biomes of the World: Grasslands**

By Edward R. Ricciuti. Published by Benchmark Books, Marshall Cavendish Corporation, Tarrytown, New York, 1996.

Available through your local library or inter-library loan.

*From the Biomes of the World series. General information on grasslands throughout the world. Good resource for grades 4-7.*

### **From Bulrush to Bunchgrass – A Stewardship Program on Wetlands and Grasslands of the Rocky Mountain Trench**

Produced by Osprey Communications at Box 2757, Invermere, BC or email at [osprey@rockies.net](mailto:osprey@rockies.net). 1999.

This is a four page newspaper leaflet.

*The Stewardship Program is a one-day field workshop including understanding of grassland ecology, monitoring habitats, stewardship initiatives and legislation protecting grasslands*

### **Grasses of the Columbia Basin of British Columbia**

By Heather Stewart and Richard J. Hebda. Prepared for the B.C. Ministry of Forests and the Royal B.C. Museum. Published by the Province of B.C. 2000.

*Copies may be obtained from Crown Publications at (250) 386-4636 or*

*[Http://www.crownpub.bc.ca](http://www.crownpub.bc.ca)*

### **Plants of Southern Interior British Columbia**

By Roberta Parish, Ray Coupe and Dennis Lloyd. Published by Lone Pine Publishing, Vancouver, B.C. 1996.

*This plant guide book describes the common plants of this region. This reference helps to identify plants but also includes information on human uses of plants and other interesting facts.*

### **The Wheatgrass Mechanism**

By Don Gayton. Fifth House Publishers, Saskatoon, Saskatchewan, 1992.

*A blend of science and imagination examining the landscape of Western Canada. Don works for the Nelson Forest District as a Range Specialist. Borrow on interlibrary loan from your local library.*



**wildsight**

---

# Classroom with Outdoors

---

## Engaging Ecosystem Experience