Summary: Students learn about invasive plants and their effects on bird habitat. Their understanding is applied through a service learning project in which they restore a natural area for healthy bird habitat.

Time: 1 hour
(Note: This activity can be structured for longer periods of time, such as a full day event or an ongoing class or school project)

Grade Level: 4th - 12th

Goals
- To provide practice for students in local stewardship and environmentally sustainable behavior
- To provide tangible examples of ecological relationships
- To encourage students to think about human and personal connections to the local environment
- To foster positive attitudes toward wildlife and natural environments through hands-on experience

Learner Objectives
Students will . . .
- Students will remove invasive species along the trail
- Students will discuss the ways seeds are transported and review adaptations.
- Students will discuss steps that encourage songbird habitat
- Students will learn to identify two invasive species in their local area

Note: This lesson is intended to be adapted to individual class projects and according the selected area for habitat restoration

Materials
- gloves
- trowels
- pruners
- flags to delineate focus area
- potting soil
- watering can
- laminated photos of non-native species. In southern Oregon, some examples include Himalayan blackberry, Spotted Knapweed, Yellow Star Thistle and Medusahead.
  - If planting native plants: native seeds/plants, shovels, watering hose

Making a Bird-iful Habitat

Oregon State Standards
Science
4.1
4.2
5.1
5.2
6.1
6.2
7.1
7.2
8.1
8.2
H.1
H.2

Common Core Standards
SL.4.1
SL.5.1
SL.6.1
SL.7.1
SL.8.1
SL.9.1
SL.10.1
SL.11.1
SL.12.1

Vocabulary
- Native species
- Non-native
- Invasive plant
- Competition
- Community
- Seed dispersal
- Vegetative propagation

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Background Information

Native Plants and Ecological Relationships

A native species is indigenous or has become naturalized to a certain region over a long period of time. Native plants have evolved with other living organisms in an area and native animals and plants can come to depend on each other. For example, animals can feed on plants and in so doing they can pollinate the plant or disperse the plant’s seeds. An ecological community refers to all the populations and all their interactions in a certain geographical area. In most cases, native plants have adapted to living in a certain ecological community over thousands, or even millions, of years. Older land plants including mosses and liverworts are estimated to have evolved over 400 million years ago, while younger flowering plants evolved over 100 million years ago. During the time that these plants have existed on earth, they have developed and adapted specific relationships with other plants and animals in their community.

Competition is one driver of change in the development of ecological relationships within a community. Ecological competition is an interaction between species in which the presence of one species limits the fitness of the other. Competition results when a limited supply of a resource (such as water, food, space) is used by two or more species. Various aspects of a plant species’ biology, such as ability to obtain nutrients or reproduce, can affect the fitness of other species.

Seed dispersal: the process by which seeds move and are spread to new areas. There are many different seed dispersal “methods” that are used by plants, including:
- floating seeds: seeds such as coconuts can float across bodies of water until they land in a suitable place to grow
- wind carried: seeds may be light or have fluffy parts that allow wind to carry them great distances
- animal disperse: seeds may be prickly and have the ability to be carried on the fur of a mammal, or they may be eaten by an animal such as a bird and be excreted in a new location
- bursting: seeds may be contained in a pod, as in peas, and when opened the seeds burst forth

Vegetative reproduction: a process that some plants can undergo, in which a plant reproduces asexually. For instance, instead of reproducing through seeds or spores, the plant is able to grow new shoots from existing stems or leaves.

Himalayan blackberry is a prime example of a plant that can vegetatively reproduce and therefore has a strong competitive advantage over native plants. This plant is able to reproduce from deeply growing roots and vines. New shoots can propagate from even root fragments and stem cuttings, making it very difficult to eradicate.
Background Information continued

Non-native Species

Although ecological changes due to competition are natural and species relationships are always evolving, humans can interfere with this process. In the past few hundred years humans have introduced numerous species into new communities. **Non-native plants** evolved in another part of the world and have been transported to a new community or ecosystem. Many times a species in a new ecosystem will not survive, but if conditions are favorable for the non-native species (e.g., lack of competitors or predators) then the non-native species may flourish and out-compete native species. If a non-native species has an advantage in obtaining resources and significantly displaces native species it can be referred to as an **invasive species**.

**Tips for a bird friendly habitat:** Although human impacts on natural ecosystems often have negative effects, humans also have the opportunity to restore and promote healthy habitats for wildlife. (modified from PRBO “Biedify your yard” available http://www.prbo.org/cms/docs/edu/Backyard_bah.pdf)

- **Provide Nesting and Cover Sites**
  - Native vegetation provides the best protection for breeding birds. Planting a variety of native shrubs and trees in multi-species clumps provides the most nest sites with the best cover.

- **Create Structural Diversity**
  - A structurally diverse habitat is one that has plants growing at different heights and different assemblages. This provides birds with many places to build nests and find food. It also provides adult and young birds with excellent concealment from predators.

- **Plantings that Mimic Natural Configurations**
  - A) Planting native species in a mosaic design - where species are overlapped and grown in clumps - mimics natural plant communities and, therefore, provides good nesting habitat for birds. This offers more choices for birds to build nests, find food, while offering sufficient cover for birds traveling to and from nests.
  - B) Leave Dead Trees or Dead Limbs
    - This provides habitat for cavity (tree hole) nesting species such as woodpeckers, bluebirds, nuthatches, chickadees, American Kestrel, and Oak Titmouse. Overall, natural cavities provide better nest sites than bird boxes.
  - C) Leave Brush Piles and Grass Clippings
    - Brush and grass piles provide shelter, nesting material, foraging grounds, and even nesting sites for birds.

- **Reduce Introduced Predators or unnaturally high populations of native predators**
  - The most common neighborhood predator is the non-native, domestic cat. Researchers estimate that over 2.4 billion birds are killed annually by domestic and feral cats in the United States. Native predators, such as raccoons, skunks, rats, and jays, can also negatively impact birds.
Background Information continued

Human activities are responsible for sustaining higher than natural numbers of these predators which negatively affect nesting songbirds. You can help with these simple actions:

- Eliminate outdoor sources of food such as pet food dishes, compost piles, uncovered garbage cans
- Cover compost piles or use covered worm bins
- Use bird feeders that exclude jays and squirrels. Many of these types of feeders can be found at wildlife stores.
- Keep cats indoors. Especially during the breeding season when vulnerable young birds are just out of the nest. Bells on collars are not enough.
- Mow Smart: Many songbirds nest close to the ground in grasses and ‘weedy’ areas. Critical nesting habitat and even nests are often destroyed unknowingly through mowing and other routine yard maintenance. Set aside “no-mow” areas of your land, this will provide nest sites and shelter for several bird species, especially goldfinches, buntings, quail, and towhees.
- Do not mow native tree saplings and shrubs. Even poison oak, a native shrub, has high value for birds and other wildlife.
- Declare Your Land a Bird Sanctuary
- Designate areas of your land “bird-friendly” with these actions:
  - Minimize human disturbance during the breeding season (mid-March through August). Some common disturbances may include, vegetation clearing, construction, spraying, and pet activity.
  - Create networks of suitable habitat. Connecting habitat patches is valuable to birds and other wildlife. Work with neighbors and local conservancies to create a network of “bird sanctuaries” in your community.
- Learn the Birds on Your Land
  - Buy a field guide and binoculars!
  - Take a workshop or join a bird walk in your area.

Get to know your local habitats

It is important to observe and research an area to understand how the habitat is used by various species. Drastic changes to a habitat can sometimes have adverse effects on particular species, even if it is a beneficial change such as eradication of a non-native plant species. For instance, in many areas of Oregon, Himalayan Blackberry is an invasive species that will completely cover riparian areas and prevent growth of other native plants along streams. Though the growth of Himalayan Blackberry has significantly altered natural habitats, some bird species have become accustomed to feeding on its berries, or using its dense brush for cover. When removing a non-native species in such cases, it is important to replace it with native plants that can provide similar habitat resources.
Procedure

1. Discuss background information with the students

2. Tell the students what the goal is for today:
Our goal today is to help prevent the spread of these non-native plant seeds. Today we will be working to remove non-native, invasive plants to make more room for native plants. Address any concerns about cutting plants and not honoring “Leave No Trace” practices. Today you are working on a restoration project. You will work to restore this area to a more natural state by removing non-natives.

(If you plan to plant native plants in this area, tell students that by planting native plants it will help prevent non-native plants from regenerating in the area)

3. Safety talk- Make students aware of any hazards at your side (dead snags, uneven ground, roads). All students should pay attention to where they are walking during the activities. We will be using tools throughout the activity to clear invasive plants. Students should be very careful with tools: do not point them toward other students, place shovels or rakes so they will not get stepped upon etc. Also, we want them all returned to the gear area after use, so we do not leave anything behind.

4. Show students an example of how to identify and properly remove the particular species of invasive plant.
   For example Meadow Knapweed: Tall stalk with flower (seeds on top) Small rounded leaves at the base, try pulling up one or two to show roots. Stress the importance of removing the seed stalks and the leaves/roots.
   For example Himalayan Blackberry: While wearing work gloves and/or using a shovel, remove as much of the root system as possible. When removing the roots, you will eventually come across a burl that may be harder to remove (this may be a good time get adult-assistance). Clean up all fragments of plant parts, because they are able to regrow.

5. If planting native plants: show students an example of how to properly plant (see tips on following page or ask your local nursery or plant supplier for tips according to the plant species).

6. Divide students into small groups of 2-3 and assign tasks or areas to work: pulling invasive plants, planting native plants, clearing trail, removing trash etc...
General procedure for planting a small tree or shrub:

1) Dig a hole that is about 2-3 times as wide as the plant’s root ball
2) Gently loosen the root ball and place in the hole and place some soil back in the hole so that the plant stands upright
3) Soak the soil with water and continue to backfill the hole with the soil that was dug for the hole. The soil level should be pressed down and level with the top of the root ball.
4) Cover the ground surrounding the plant with a few inches of mulch.
5) If necessary, protect the base of the tree from weed trimmers by cutting a 2 liter plastic bottle into a cylinder or protect the foliage from deer with wire fencing.
6) Set up a plan to maintain care for the plant especially during the first few years of growth.

Hand out tools, discuss boundaries for the project. Show student the focus area they will be covering. You may also wish to split them into working groups for cooperation and team building.

Recipe for an interpretive trail “from scratch”

1) Choose a pathway to make a trail. Things to consider when selecting a path: environmental sensitivity of the area, safety for the trail users, landmarks to feature.
2) Contact and secure permission from owner of the property where the trail is located whether it is private, or owned by state of local governments.
3) Decide whether you want to use signage, brochures or other communication form to express information about the trail.
4) Research the area for the interpretive trail: history, geography, ecology, etc... Walk the trail and note sights of interest, interesting geologic formations or plants. For deeper information, walk the trail during different times of the year. Seek experts (botanists, geologists, ornithologists, historians, etc.) and anyone that is familiar with the local area to provide specific information.
5) Create your signage, You may also want to place a suggestion box near the trailhead for comments, criticisms and observations from other hikers.
Conclusion
1. Ask students to reflect on what they learned and their experience:
   A) What plant did we remove?
   B) How will this help the native bird species?
   C) Was this project successful? How can we measure our success?
   D) What can you do in your area to help birds?

Link to KBO lessons
• **Birds and Meadow Conservation:** Through this activity, students will learn about the importance of meadow restoration and conservation efforts being made in the Rogue-Siskiyou National Forest through studying the distribution of species along a forest/edge/meadow gradient.

Further Resources
• Community Works Institute
  [http://communityworksinstitute.org/cwpublications/index.html](http://communityworksinstitute.org/cwpublications/index.html)


Literature Cited

## Klamath-Siskiyou plants: Native and Non-Native

### Native Grassland Plant List for Sections of Klamath-Siskiyou Bioregion
- Lemmon’s stipa
- Small-leaf bentgrass
- California brome
- Woodland bromegrass
- Dense sedge
- Clustered field sedge
- California oatgrass
- Annual hairgrass
- Slender hairgrass
- Needle spikerush
- Blue wildrye
- Squirreltail
- California fescue
- Western fescue
- Meadow barley
- Foxtail barley
- Wiregrass
- Common toad rush
- Colorado rush
- Bog rush
- Mexican rush
- Nevada sedge
- Spreading rush
- Junegrass
- Beardless wildrye
- Common woodrush
- Onion grass
- Bearded melicgrass
- Purple needlegrass
- Sandberg bluegrass
- Pacific fescue

### Common Invasive Plant Species of the Klamath-Siskiyou Bioregion
- Medusahead
- Venentana
- Rush skeletonweed
- Spikeweed
- Hungarian brome
- Leafy spurge
- Canada thistle
- St. John’s Wort
- Tansy ragwort
- Evergreen blackberry
- Scotch brome
- False brome

### Non-native plant
- **Yellow star-thistle**
  - Cut out: Non-native plant species ID cards

### Non-native plant
- **Spotted Knapweed**

### Non-native plant
- **Himalayan blackberry**

### Non-native plant
- **Cheatgrass**
How You Can Create a Bird Habitat Garden:

- Plant native plants in mixed species clumps
- Create an understory using native grasses, shrubs, and forbs
- Leave dead or dying trees in your yard
- Avoid mowing, disking, spraying, brush clearing and building activities from mid-April-July in the Klamath-Siskiyou region.
- Reduce predators – keep cats indoors and eliminate outdoor sources of food which attract rats, opossums, skunks, foxes, and jays, all are nest predators eating eggs and young!
- Discourage non-native predators such as House Sparrows and European Starlings – take down nest boxes being used by these species (for more on safe nest boxes see our nest box handout)
- Leave brush piles and pruning debris through the winter to encourage quail and winter sparrows; Golden-crowned and Fox Sparrows.
- Use only selective bird feeders, those that exclude jays, cowbirds, starlings, and crows. For more information see our bird feeding handout.

What Birds Need For Successful Nesting and Survival:

- **Native Plants** — Birds rely on native plants for safe nesting and feeding habitat.
- **Habitat Structure** — Good bird habitat has a mixture of native plants growing at different heights to create habitat structure.
- **Healthy Understory** — Most songbirds nest on or near the ground among native forbs and shrubs.
- **Dead Trees** — Snags and dead trees provide woodpeckers and other cavity nesting birds with essential nesting habitat and insects to feed their young.
- **No Disturbance** — Mowing, brush clearing, and habitat restoration during the nesting season (mid-April-July) causes nests to fail.

### Oak Savannah

**Grasses**
- *Elymus glaucus* blue wildrye
- *Elymus elymoides* squirreltail
- *Festuca idahoensis* Idaho fescue
- *Koelaria macrantha* junegrass
- *Psuedoregnaria spicata* bluebunch wheatgrass

**Herbs**
- *Achillea millefolium* yarrow
- *Amsinckia menisii* fiddleneck
- *Camassia quamash* camas
- *Cynoglossum grande* hounds tongue
- *Castilleja spp.* paintbrush
- *Clarkia purpurea* farewell spring
- *Delphinium menziesii* larkspur
- *Lomatium utriculatum* miniature lupine
- *Lupinus bicolor* popcorn flower
- *Plagiobothrys ssp.* mule’s ears

**Trees**
- *Quercus garriana* OR white oak
- *Quercus kellogii* CA black oak

**Riparian Shrubs**
- *Prunus virginiana* chokecherry
- *Ribes spp.* wild currant
- *Rosa californica* CA wild rose
- *Rubus spp.* thimbelberry
- *Sambucus spp.* elderberry
- *Symphocarpus spp.* snowberry

**Trees**
- *Cercocarpus betuloides* birch leaf mtn. mohogany
- *Populus trichocarpa* black cottonwood willows

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### Pine-Oak-Madrone/Mixed Conifer

**Herbs**
- *Aquilegia formosa* columbine
- *Iris chrysocephala* yellow iris
- *Iris innominata* Siskiyou iris
- *Lilium columbianum* tiger lily
- *Phlox adsurgens* woodland phlox
- *Polystichum munitum* sword fern
- *Trillium ovatum* trillium

**Shrubs**
- *Amelancier utahensis* serviceberry
- *Berberis aquifolium* Oregon grape
- *Ceanothus spp.* Oregon grape
- *Holodiscus discolor* oceanspray
- *Kalmiopsis leachiana* kalmiopsis
- *Lonicera ciliosa* honesuckle
- *Philadelphus lewisii* mock orange
- *Ribes sanguineum* flowering currant
- *Sambucus mexicana* blue elderberry
- *Symphiorocarpus alba* snowberry

**Trees**
- *Acer glabrum* Douglas maple
- *Arbutus menziesii* madrone
- *Calocedrus decurrens* incense cedar
- *Lithocarpus desiflorus* tan oak
- *Pinus ponderosa* ponderosa pine
- *Psuedosuga menziesii* Douglas Fir
- *Quercus kellogii* CA black oak
- *Umbellularia califonica* CA bay laurel

### Chaparral

**Shrubs and Trees**
- *Amelanchier utahensis* serviceberry
- *Arctostaphylos spp.* manzanita
- *Ceanothus cuneatus* buckbrush
- *Cercis occidentalis* redbud
- *Cercocarpus betuloides* mtn. mohogany
- *Rhamus californica* CA coffeeberry

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When choosing to landscape for birds and other wildlife, look around your neighborhood and try to re-create the habitats in the surrounding open spaces.

The plants listed here are examples of native plants by habitat type of the common habitat types in the Klamath-Siskiyou region.

**Additional Resources:**
- Klamath Bird Observatory
  www.klamathbird.org
- Plant Oregon
  www.plantoregon.com
- Oregon Native Plant Society
  www.npsoregon.org
- Rogue Valley Audubon Society
  www.roguevalleyaudubon.org
- North Mountain Park Nature Center
  www.northmountainpark.org/
- National Wildlife Federation
  www.nwf.org

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