**Teaching About Invasive Species**

**Columbia Basin Environmental Education Network**

**ISCBC / CSISS Workshop**

**Follow-up Activity List and Contact Information**

Saturday May 28, 2016 Revelstoke, BC

 

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***Greetings all!***

Here is a list of the activities that we discussed during the workshop, as well as the ones that Robyn, Laura and Sue did at our outdoor session. Please feel free to contact us with questions or comments. We will be revising the Powerpoint presentation in the coming weeks and will make it available asap. Many thanks again for your interest and participation!

**1. Warm-up Activity: From Here / From Away**

– found in the ISCBC Education Activities & Teacher Resources guide: <http://bcinvasives.ca/documents/Education_Teacher_Resources_FINAL_06-02-2014.pdf>

**2. Paint Chip Walk, Sensory Warm-up Circle, Group Management Tips** – found in the Wild BC resource “Get Outdoors!” - along with many other excellent resources, grants for school field trips and workshops.

<http://hctfeducation.ca/wildbc/>

**3. Outdoor Station Component**

Laura’s Activities:

**Plant Press Activity:**

Take various leaves, flowers, whole plants to "press" back in the classroom between paper and textbooks. Identify species using the little green book (given out), invasives reporting app or online resources (e.g. "E-Flora"). Laminate plant samples with labels to serve as records/outreach tools. Identify the different parts of the plant as well, and compare different leaves, stems, flowers, etc.

Take participants on a “plant walk” to identify native species, invasive species, and First Nations traditional use plants.

Robyn’s Activities:

**Vectors of Spread:** Activity from Teaching About Invasive Species – Green Teacher book

(excellent magazine and series of books)

http://greenteacher.com– great resources

**1. Clean Drain Dry:** with two "washbasin/Lakes", plastic boats, scrubbers, local wildlife show participants how to properly clean all plants/mud from boats, drain all water, and dry thoroughly to prevent the spread of aquatic invasives

**Don't Let It Loose:** build on the above and introduce a larger, more competitive invasive wildlife (ie American bullfrog) that eats native animals to discuss not letting aquarium pets loose into the environment.

**2. Play Clean Go:** with boot brushes, horses/atvs/boots in the mud ( basin of dirt / mud to demonstrate – use peppercorns, poppy seeds, etc as seeds) to demonstrate cleaning equipment/animals/ourselves to prevent the spread of invasive seeds in mud/soil

**BurDog:** A dog stuffed animal covered in burrs (Burdock) to demonstrate seed spread, impacts of invasives on animals and proper disposal of seeds into the garbage

**3. Relay Game** - do all the above in a relay "olympic" style

**4. Invasive Tag**: like Virus tag or Blob Tag - name the "It" person an "invasive species" (e.g. American bullfrog, Scotch broom) and the others are "native species" that once tagged become "It/Invasive" - talk about how fast invasive species spread.

**5. IPads/IPhone Apps** for identifying invasives - [www.reportinvasives.ca](http://www.reportinvasives.ca/) to download the "Report Invasives" or "Report a weed" Apps that include lots of photos of invasives to identify

Sue’s Activities:

**1. Mapping Invasive Species:**

Using transects (50 m tape, rope) and quadrants made of metre sticks, hoola hoops

***See attached Activity description***

Other Online Resources

**Invasive Species Council of BC:** [**http://www.bcinvasives.ca**](http://www.bcinvasives.caMaking)

**Columbia Shuswap Invasive Species Society (CSISS)** **columbiashuswapinvasives.org**

**CSISS Educator Resources:** [**http://columbiashuswapinvasives.org/teachers-and-educators/**](http://columbiashuswapinvasives.org/teachers-and-educators/)

**Canadian Wildlife Federation: Encyclopedia of Invasives; activities:** [**http://cwf-fcf.org/en/discover-wildlife/resources/**](http://cwf-fcf.org/en/discover-wildlife/resources/)

[**Invasives on the Move: K – 12 curriculum;**](http://www.bcinvasives.caMaking) Oregon Natural Resources Education Program (ONREP)[**http://www.weedinvasion.org**](http://www.bcinvasives.caMaking)

[**Making**](http://www.bcinvasives.caMaking) **Waves Protecting Ontario’s Aquatic Habitat:** [**http://www.invadingspecies.com**](http://www.invadingspecies.com)

•**Grade 4 curriculum kit, Grade 6: Biodiversity Challenge! , Compendium of outreach resources:**

[**Center for Invasive Species Management: Montana – good list of resources:**](http://www.weedcenter.org/education/k-12.html)

[**http://www.weedcenter.org/education/k-12.html**](http://www.weedcenter.org/education/k-12.html)

**Citizen Science Handbook: Invaders of Texas** [**http://www.texasinvasives.org/invaders/toolkit.php**](http://www.texasinvasives.org/invaders/toolkit.php)

**Biodiversity Education & Awareness Network:** [**http://biodiversityeducation.ca/formal/**](http://biodiversityeducation.ca/formal/)

**Community Stewardship Projects on Exotic Aquatic Species:** Booklet of activities and community stewardship projects Sea Grant [**http://www.iisgcp.org/edu/cr/index.html**](http://www.iisgcp.org/edu/cr/index.html)**.**

**ESCAPE: Exotic Species Compendium of Activities to Protect the Ecosystem : www.iisgcp.org/edu/escape/index.html.**

##  Mapping Invasives in your Schoolground /Community

## Secondary (Grades 9 – 12) Activity

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Background: Students research and develop a class field guide to native and non-native plants in their area, do a survey using transects of the school grounds or a nearby park, and map existing species. Provide links to provincial mechanisms for reporting invasives, and framework and resources to develop a plan to remove / contain them. Include restoration plans: provide links to best management practices and resources for each province; e.g. Naturescaping, Nature Canada, CWF.

**Teaching/Learning Strategies:**

1. Using the class-made fact sheets and invasive plant field guides, students take a class trip –around the school yard, local neighbourhood/wooded area or a conservation area. Review safety precautions with students. (e.g. If they find Giant Hogweed, do not touch it.)
2. Provide students with a map of the area. As an extension, students could also be asked to create their own map.
3. Ask students to explore the area to see if there are any invasive plants.
4. Have students mark on their maps where they find any plants they believe to be invasive using their fact sheets and/or reference guide. Students can draw or take pictures of the species they find.
5. Back in the classroom students should make final touches to their map to illustrate what invasive species they have found and where.

**Objectives: It is expected that the student will:**

* Conduct field investigations using an established monitoring protocol (quadrat study or transect lines)
* Demonstrate knowledge of common plants and animals that inhabit the area.
* Become skilled in distinguishing between some native and non-native species.
* Use appropriate procedures to maintain safety for themselves and the habitat they are studying
* Interpret and communicate their findings using written and graphic forms
* Examine interrelationships among living things.
* Assess the positive and negative impacts of alien species on native wildlife and habitat.
* Map the major features of their schoolyard or another survey site.

**Time Required:**

1 class prior to field site visit for background information and up to 3 hours for quadrat study; follow-up classroom debrief and synthesis

**Setting:**

Classroom and outdoor session (school grounds or nearby park)

**Key Words:** Ecosystems (Communities, Populations, Species), Monitoring, quadrat study, transect line, invasive, alien, native

**Materials:** 25m tape measure, quadrat frames with legs or 2m lengths of rope for each group (see info) clipboards with pencils, rulers, species ID guides, student field sheet (on waterproof paper if needed), hand lens, cameras, knitting needles (or pointers)

**Skills:** Investigation, Observation, Measurement, Assessment, Analysis, Description, Classification, Drawing, Synthesis

**Activity Background:**

Monitoring of plant life - both native and non-native - can be done several ways: using a method called a ***quadrat study***. A quadrat study is a method to look at what kinds of plants, live in an area and how abundant they are. It also can demonstrate how a specific site compares to other sites in a region. Most importantly, these studies can be done over time, and the data compiled and analyzed to reveal changes to the biological composition of an area. This information can be invaluable to scientists, weed managers, and concerned citizens.

Alternately, a simpler method is to use a transect line without the quadrat frames – using a 2m piece of rope placed perpendicular to the transect line. Both methods generate information about the kinds of plant species found in an area and their relative abundance.

Established protocols help ensure that weed managers collect accurate and consistent data when conducting a weed inventory. Students will learn how to follow a protocol properly and collect accurate data by setting up a transect line. This lesson is ideal for students who wish to collect specific weed location information without using a GPS receiver.

Weed managers need to know the locations of specific weeds, whether the weeds are spreading, and the effectiveness of weed management practices. Inventories help provide this information.

There are different types of inventories. Sometimes, an inventory covers a large area in a broad sweep. Other inventories provide detailed information about a small area. Regardless of the type of inventory, it is imperative that information collected during the inventory be accurate and reliable. To ensure the reliability of information, weed managers follow strict protocols or procedures when collecting information during inventories. (For more information about protocols, see the lesson Practicing Protocols.) This lesson focuses on the following protocols:

**Setting up a transect line**

– A transect line is a straight line laid out randomly or systematically within a study area. One or more transect lines may be set up within a study area. Before setting up a transect line, determine the length of the line. The line length often depends on the size of the study area. Weed managers often divide the area along the transect line into small plots and observe and record plants that occur within the plots.

Conducting weed stem counts

– By counting the number of live weed stems within a plot, weed managers can estimate the density of weeds in a study area.

**Preparation**

If necessary, help students learn to identify weeds. (Before beginning the Activity, students should have the ability to identify noxious weeds in their study area.)

Discuss the importance of following protocols when conducting a weed inventory.

Discuss transect lines and weed stem counts.

Explain that students will set up a transect line outdoors, count the number of live weed stems in plots along the transect line, and estimate the population of weeds, based on their stem counts.

Give each student a copy of the Inventory Protocol worksheet.

Divide students into teams, with at least three students per team.

Assign each team a transect bearing of 120, 240, or 360 degrees.

Ask students to follow the instructions, set up the transect line, establish plots along the line, and count live weed stems.

**Procedure/Steps**

***Before the Field Day:***

1. Brainstorm with students what they know about the plants that live in their region. List as many native and non-native plants as possible
2. Have students write a list of questions down / pair share with another student, combine questions, then make a class list of questions on the board.
3. Have students select a plant and gather information about it (optional).

***Field Day:***

Review the transect/quadrat study and field safety protocols with students (see student field sheet)

1. At your field site, place students in groups of three along a transect line (the 25m tape measure) every 5 meters with their field equipment (quadrat or 2m rope; hand lens; clipboard/paper/pencil, camera, plant field guides). The transect line should be placed perpendicular to a central point. If you do not have enough participants to complete all stations at once, spread them out evenly over the area to be surveyed.
2. If using the length of rope instead of the quadrat, students should place a piece of rope perpendicular to the 25m tape measure every 5m as their study area.
3. Once students are in place, the data can be recorded. This is best done with 3 people: one to record, one to count and one to consult field guides to help identify the plants. Using the field sheet as a guide, students then identify and count each plant that they can see in each section of the quadrat or along the length of rope. If they can’t identify a plant, they can draw it and/or photograph it – noting where it was found. Be sure that each study area (@5 m.; 10m.; etc.) is numbered and noted on the data sheet.
4. Back at the classroom, re-create your transect line on a large sheet of paper or on the board, drawing the plants that live in the area. Note species abundance and compare the transects. Have students look for plant communities: which plants/animals tend to live together? Which ones are predominant?

**Evaluation:**

Have students:

* determine percentages of each native and non-native plant found at the different quadrat sites (0,5,10,15,20 m. etc) and graph the results;
* develop an invasive species removal plan, complete with research on the best ways to remove invasives, safety precautions, and the best plants to use in restoring the site.

**Conclusion and Evaluation**

Conclude the lesson when students have finished taking a stem count of noxious weeds. Evaluate students by observing students as they complete the field work, asking pertinent questions to determine students’ level of understanding, and determining if students estimated the population density correctly.

Prior to the field trip, prepare an observation sheet that will help students inventory a few examples of the following items:

* Native species: What indigenous animals and plants are present? Are there any rare or endangered species?
* Alien species: What invasive or naturalized life forms are present? Where are they located and how much space do they occupy?
* Interrelationships: Is there evidence of interaction among species? Are there signs of predation or competition between native and non-native life forms?
* Positive impacts: How do alien species appear to be benefiting other animals and plants? For example, are pollinating insects drawn to purple loosestrife and flowering-rush?
* Negative impacts: What harmful effects can be attributed to exotic life forms? Look for signs of monocultures (plant communities dominated by a single species) and native animals and plants that are crowded out of their homes.
* Habitat elements: Are there natural food sources, like fruits, seeds, and nectar? Is there a river, marsh or other source of water? Can wildlife find shelter in places like rock piles, thickets, tree hollows, and submerged logs? Is there space to grow and multiply?

During the field trip, have the students work in pairs or small groups to gather data and complete the observation sheet. If they are outdoors, they should sketch a map of the survey site - including borders, habitat elements, native and alien animals and plants, evidence of positive and negative impacts, plus human components, like fences, buildings, and parking lots - on a sheet of graph paper.

Following the field trip, ask each pair or group to prepare a report summarizing their findings. Have them share their observations with the rest of the class, compare maps of the site, ask questions to clarify each other's findings, and discuss any differences of opinion concerning the presence and environmental impacts of alien species.

**Extensions**

Each student can research a single alien species observed in your region in depth and write a short paper on its origins, how it got here, when it arrived, and how it helps or harms native wildlife and habitat.

This lesson adapted from Rangeland Vegetation Inventory Field Lab Manual, by Juley Hankins and Karen Launchbaugh, University of Idaho Department of Rangeland Ecology and Management, Moscow, Idaho 83844-1135.

<http://www.idrange.org/educators/FieldLab-Manual.pdf>

and CWF Activity: Alien Impacts – Assess the Mess

## Incorporating IPad Technology into the mapping exercise.

Objectives for this mapping exercise can be expanded using simple mapping Applications that are available online for a very nominal cost (less than $20).

Technology can collect data to help create the map of your school ground or park. GPS apps can collect the following types of data:

* Point: Examples include single plants for features that are best captured using a single symbol like a pin or triangle.
* Line: Trails and roads can be walked and their length calculated using the GSP app. This information can be used to create a more accurate map and features.
* Polygons: Patches of invasive plants, playground structures and buildings can be mapped using the polygon feature. The surface area of these features can be recorded with the help of the technology.
\*\*Note: More expensive apps might be necessary to capture polygon feature information like area.
* Photographs can be taken with the device of the features to create a visual record of the status of the features. This is very helpful when used for invasive plant infestations. An overview photo showing nearby landmarks helps to locate the infestation site in the future. A close-up photograph of the infestation will allow students to monitor changes to the plant site. Photo monitoring can be a very useful and easy scientific method to use. It can be incorporated into the transect method above.
* Data Export: the majority of the apps can export the data via email or social media. The information can be exported and opened on Google Earth as an easy and accessible way to view your data. Google Earth is free to download and easy to use.

This mapping exercise can be adjusted to any age or grade depending on the amount of information the students can collect. Ipads can be used to simply locate a feature. Using Google Earth, Google Satellite or the GPS Kit app, a student can locate his/her position on the school yard. The imagery could then be used to identify features to map on paper.