Credit: Allison Shelley for EDUimages.

Activity 5: Community Mapping

After making observations about different community characteristics, students brainstorm a list of community features that might benefit or harm the Southern Residents. In small groups, students create a neighborhood map and identify local issues that might affect the Southern Residents. The class then identifies ways that the schoolyard and/or community can be improved to benefit the Southern Residents, their prey, and their habitat.

Key Student Questions

- What are characteristics of a healthy schoolyard and/or community?
- How could features of our schoolyard and/or community harm the Southern Residents?
- How can we improve our schoolyard and/or community to benefit the Southern Residents?

Key National Standards

NGSS

- ESS3.C: Human Impacts on Earth Systems

C3

- D2.Geo.3.6-8.

Keywords

Community—A group of people that share some commonality, often based on where they live, what they do, a shared social characteristic, or shared interests.

Map—A drawing of a particular area such as a city, a country, or a continent, showing its main features as they would appear if you looked at them from above.

Schoolyard—The area next to or surrounding a school where students typically play.

Preparation

1. Use Google Earth, My Maps, or your favorite mapping tool and zoom in on your desired area of study (i.e., schoolyard and/or surrounding community).
2. Divide the map into sections to accommodate groups of 3-4. The areas of study can be scaled to the amount of time available.

   Option: If students need extra supervision, the entire class can study the same area. Individual students or small groups can be assigned to look for different elements within the area of study.
3. Label each section with a number or letter.

Introduction

1. Ask students to create a t-chart with the headings Beneficial and Harmful.
2. Project Slide 1 of the *Beneficial or Harmful?* Slide deck.
3. On their t-charts, have students list items that might benefit or harm the Southern Residents, salmon, or waterways. Ask students to include the corresponding photo number next to their examples.

Required Materials

- ☐ **Slide deck:** *Beneficial or Harmful?*
  Project the presentation or print the slides for a gallery walk
- ☐ **Map:** A digital map of the schoolyard and/or surrounding community
- ☐ **Kraft or poster paper**
  1 large sheet per group of 3-4
- ☐ **Markers or colored pencils**
  1 set per group of 3-4
- ☐ **Driving Question Poster** from Activity 1

Optional Materials

- ☐ Cameras or cell phones
- ☐ Magazines for collaging
- ☐ **Map Key**
  Pg 60-63
  1 per group of 3-4
- ☐ **Chaperones**
  1 per group of 3-4

4. Ask for a few volunteers to share their observations.
5. For a more robust discussion, walk students through the remainder of the slides or conduct a gallery walk with printed slides. For students with a solid grasp of the issues or classes short on time, this step can be omitted.
6. Lead a short discussion using one or more of the following prompts:
   - How did the images make you feel?
   - How does the community around our school compare?

Activity I

1. In popcorn format, have students share different purposes of maps and map keys. Encourage students to think about non-traditional maps, such as climate, resource, time zone, and hazard maps.

   Option: Display examples of different maps, such as the Air Quality Flag Program, Sea Level Rise Viewer, or Natural Hazards Viewer.
2. Tell the class they will be creating a map of their schoolyard and/or community to identify attributes that might benefit or harm the Southern Residents, their prey, and their habit.
3. Break students into groups of 3-4.
4. Give each group a piece of butcher paper and a set of markers or colored pencils.
5. Project the map and assign each group an area of study.
6. Give each group a few minutes to sketch a rough perimeter of their assigned area. The perimeters do not need to be highly accurate but should define the group's area of study and highlight major physical features.
7. Tell the class that once they are outside, they will note potentially beneficial and harmful characteristics on their map. This should simply be a rough sketch. Groups will have additional time to work on their maps once they return to the classroom.
8. Students may bring along their t-chart from the introduction to help identify beneficial and harmful characteristics. For groups that might need additional support, provide a hard copy of the Map Key.
9. If desired, give each group a camera or cell phone to take pictures of the characteristics they are recording.
10. Each group may assign roles such as navigator, photographer, mapmaker, key reader, timekeeper, etc.
11. Explain any safety precautions and boundaries before heading outside.
12. Let the class know how long they will have to complete their map.
13. Once outside, monitor the groups as they collect information and draw their maps.
14. After their designated time, call the students back to the classroom.
15. Give groups time to finish up their drawings.
16. Give each group a few minutes to explain what they discovered and show their maps to the rest of the class. As groups are presenting, make a note of the beneficial and harmful features on the board.
17. Ask for a few students to share their observations about the process and the presentations.

Activity II

1. Have each group pick one problem from their map that they feel is most pressing. This might include increasing a positive feature or minimizing a negative feature.

2. Ask groups to brainstorm or research at least three solutions to this problem.
3. Give each group a few minutes to share their issue and potential solutions.
4. After each presentation, ask the rest of the class:
   - What they like about the proposed solutions.
   - To identify any potential problems with the proposed solutions.
5. After all of the groups have presented, do a fist to five poll about the following questions:
   - Is it possible for our class to make a difference on these issues?
   - Is it possible for our class to implement any of these solutions?
6. Let the class know that even though the Southern Residents are facing many large-scale and pressing issues, there are many ways that kids are making a big difference. At the end of this unit, students will have the opportunity to share what they have learned and to implement a solution that will help the Southern Residents.

   Option: Display positive news headlines about youth making change.

Driving Question

Review the list of questions from Activity 1. Cross off any questions that were answered in today's activity. Add additional questions that may have arisen.

Discussion Questions

1. How is our schoolyard/community connected to the Southern Residents?
2. How can we strengthen the beneficial aspects of our schoolyard/community?
3. How can we minimize the harmful aspects of our schoolyard/community?
4. As a class, how can we drive positive changes in our school and greater community?
5. How do improvements for the Southern Residents benefit our greater community?

Extension

Environmental justice is the fair treatment and meaningful involvement of all people with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. We need environmental justice because people of color and low-income communities are disproportionately exposed to pollutants. Students can use the EPA's environmental justice mapping and screening tool (EJSCREEN) to identify and better understand environmental and health burdens in their communities. These issues can then be added to the students' maps.

Additional Resources

Asphalt to Ecosystems
Green Schoolyards America

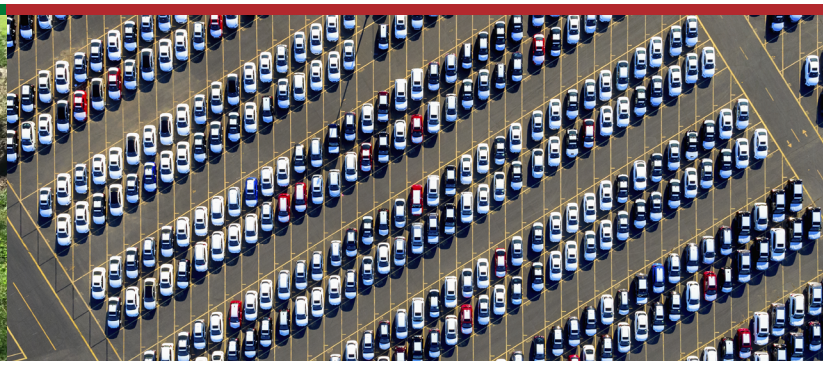
Community, Culture, and the Environment: A Guide to Understanding a Sense of Place U.S. EPA

Greening Schoolyards
Children and Nature Network

A Watershed Approach to Education
Stroud Water Research Center

Map Key

Category: **Groundcover**



Beneficial Features

Forests and Parks

When rain falls in undeveloped areas, the water is absorbed and filtered by soil and plants. Trees and plants also help anchor soil, reducing erosion. In turn, this makes flooding and landslides less severe.

Gardens and Urban Farms

Gardens and urban farms provide communities with local, healthy food options and they help reduce erosion and urban runoff.

Rain Gardens

These special sidewalks, roads, and parking lots allow water to pass through pores and enter the ground. This reduces runoff and helps filter pollutants.

Permeable Pavement

These special sidewalks, roads, and parking lots allow water to pass through pores and enter the ground. This reduces runoff and helps filter pollutants.

Bioswales

Bioswales are landscape features that collect polluted stormwater runoff, soak it into the ground, and filter out pollution. They are similar to rain gardens but capture more runoff coming from larger areas, such as roofs, streets, and parking lots. They have layers of engineered soil and gravel, pipes, and drains to help handle runoff from bigger storms.

Harmful Features

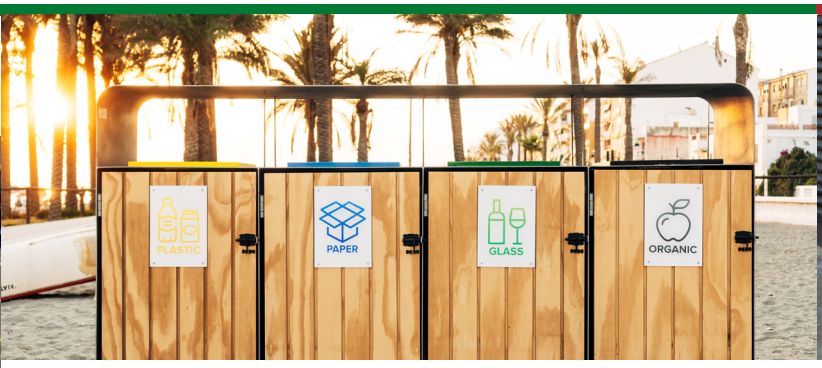
Pavement and Parking Lots

Stormwater runoff is a major cause of water pollution. When rain falls on roofs, streets, and parking lots, the water cannot soak into the ground as it should. Runoff carries trash, bacteria, heavy metals, and other pollutants into storm drains and it is eventually discharged into nearby waterways.

Lawns

When pesticides and fertilizers are used on lawns, they runoff into local waterways. They can harm aquatic life and cause harmful algae blooms. Gasoline-powered lawn mowers and leaf blowers are a major source of air pollution, noise pollution, and gasoline leaks.

Category: **Waste**



Beneficial Features

Compost, Recycling, and Trash Bins

When people have easy access to waste disposal, they are more likely to do the right thing. It is important for waste bins to have lids so that the trash does not blow away and animals cannot easily get inside and carry away the trash.

Pet Waste Stations

Stations with pet waste bags and trash cans help remind pet owners to pick up after their pets.

Hazardous Waste Collection

Facilities that collect hazardous waste, such as batteries, paints, and fertilizers, properly dispose of this waste. This means that it is less likely to contaminate soil and water.

Harmful Features

Litter

When litter makes its way into waterways, it becomes marine debris. Marine debris can tangle animals and cause them to suffocate, starve, and/or drown.

Cigarette Butts

Cigarette butts are the most abundant form of plastic waste in the world. Chemicals that leach from cigarette butts can be lethal to aquatic species.

Pet Waste

Pet waste contains parasites and bacteria, which can make people and animals sick. It also contains phosphorus and nitrogen. When too many of these nutrients are carried into waterways, they can cause harmful algae blooms and sicken aquatic species.

Hazardous Waste

Batteries, paints, pesticides, and certain light bulbs can contain hazardous ingredients and require special disposal. When these items are dumped illegally, they can leach pollutants into soil and water.

Category: Pollution

Beneficial Features

Storm Drain Reminders

People often assume that storm drains lead to wastewater treatment plants. Instead, most lead to waterways. Some clubs, individuals, and communities have installed "no dumping" reminders next to storm drains. This helps remind people that litter and pollutants that enter storm drains can end up in our waterways.

Harmful Features

Point Source Pollution

Some factories, sewage treatment plants, farms, and other industries discharge pollutants directly into waterways. Some of the chemicals discharged are harmless, but others are toxic to people and wildlife.

Category: Water Use

Beneficial Features

Commercial Car Washes

Commercial car washes use less water than washing a car by hand. The water is also treated before it is discharged. This means that oil, heavy metals, and other harsh chemicals that come off the car do not go into storm drains.

Drip Irrigation and Spot Watering

Drip irrigation and watering plants by hand uses much less water than sprinklers. When we conserve water, we leave more water for salmon—the Southern Residents' favorite food.

Rain Barrels

Rain barrels capture water from a roof and hold it watering plants. Rain barrels conserve water, reduce flooding, protect waterways from erosion, and keep pollutants from entering waterways.

Harmful Features

Washing Cars by Hand

Washing cards by hand wastes a lot of water. The water becomes contaminated with oil, heavy metals, and other harsh chemicals. From your driveway, this water often flows untreated directly into waterways where it can harm and kill aquatic life.

Sprinklers

Sprinklers are a very inefficient way to water, and can waste 300 gallons of water an hour. Wasting water means there is less available in streams and rivers for salmon.

Leaky Hoses, Faucets, and Irrigation Systems

In a single household, leaky hoses, faucets, and irrigation systems can waste thousands of gallons of water each year.

Category: Transportation

Beneficial Features

Bike Lanes and Parking

Bike lanes, bike rentals, and plenty of bike parking helps encourage people to bike to work or school. This translates into fewer people driving.

Safe Sidewalks

When people feel safe walking, they are more likely to do so.

Public transportation and carpooling networks

When more people take public transportation or carpool, there are fewer cars on the road.

Support for Hybrid and Electric Vehicles

Hybrids and electric vehicles produce less emissions over their lifetime than conventional (internal combustion engine) vehicles. When communities support these vehicles through tax incentives and charging stations, they can help more people make the switch from conventional vehicles.

Harmful Features

Single Occupancy Vehicles

Vehicles leave oil, antifreeze, grease, and heavy metals on streets, where they wash into waterways. When people drive alone, they create more air and water pollution than if they had biked, walked, carpooled, or used public transportation.

Smogy Vehicles

Some vehicles, such as SUVs, trucks, and sports cars, emit more pollutants than others. The pollutants eventually fall back to the earth and are transported by runoff and groundwater into waterways.

Leaky Vehicles

Oil and other vehicle fluids from cars are toxic. When it rains, stormwater runoff carries these fluids into our waterways. The toxic mix can kill salmon and bioaccumulate in the Southern Residents.