

## The Travels of the Swans

### Objectives

Students will learn how to track swan movements using Satellite Telemetry Data and Google Earth. They will learn how swans use the landscape during migration and overwintering.

### Method

Students use satellite telemetry data from the Blackfoot Valley Swan Project to track and plot swan locations. They determine distances moved and create habitat use records based on swan locations.

### Materials

- Class map with latitudes and longitudes on it
- Push pins and paper tags to mark locations on map

### Background Information

Scientists have attached tiny transmitters to wild animals for years, tracking their radio signals with receivers nearby on the ground. Now they track wildlife ranging over much wider areas with receivers high above the ground. A receiver in an orbiting space satellite can pick up signals from a transmitter attached to an animal. Even if the animal is out of sight over the horizon from a tracker on the ground, a satellite high in space still can hear the transmitter and repeat its signal down to trackers on the ground.

To track a swan or another animal on the ground or in the air, scientists attach a small radio transmitter to the animal. The transmitter sends an electronic signal to a special section of a National Oceanic and Atmospheric Administration (NOAA) weather satellite known as the ARGOS Data Collection System. As the NOAA weather satellite flies along its orbit above an animal's location, the ARGOS system on board the satellite receives and stores the data. Later, as the NOAA satellite passes over a ground station, ARGOS downlinks the information

to the ground station. The downlinked data from the tracked animal go to the wildlife researchers.

The data tell the location of the animal when the signal was transmitted. Other kinds of information also may be transmitted. For instance, the data might include the local temperature where the animal is. Some

**Grade level:** 5-8

**Subject Areas:** Biology, math, geography, technology

**Duration:** 1-2 hours

**Topics:** Latitude and longitude, mapping, animal migration, wildlife ecology

**National/Montana Science Standards:** A, C, E, F / 1, 3,

transmitters have a motion-activated switch. As the animal changes positions, the switch is turned on or off by the motion. If the switch is off in one message and on in another, researchers assume the bird or animal is active. If the switch stays on or off, researchers assume the animal or bird is inactive.

Individual animal locations can also be recorded and monitored by manually entering information from sightings into a Geographical Information System or other types of maps.

The Blackfoot Challenge Adopt-A-Swan website at <http://blackfootchallenge.org/SwanProject/index.php> has swan locations that can be accessed simply with a click on the map. When a swan location is clicked, a pop-up bubble provides information on the swan's number, the date it was sighted, the lat-longs, and even the behavior of the swan at the time of the observation.

### **Procedure**

1. Begin by asking your students to think about what kind of habitat needs swans have. Can they brainstorm a list of habitat characteristics that would be important to swans? List those traits on the board.
2. Create a profile of their swan with the following information:
  - a. Swan I.D. (collar) number
  - b. Satellite radio number (if it has one)
  - c. Age
  - d. Gender
  - e. Date of release
  - f. Location of release
3. When your students log onto the Adopt A Swan website they will be able to select the swan they are tracking and bring up it's last reported location. Students can write down the latitude and longitude from the website for the swan's location and then find the same location on your class map with the lat/longs. You can mark the location with a pushpin with a tag attached with the day's date.
4. Have your students summarize the swan's movement since the last location. As a class or individually, discuss:
  - a. How far (if at all) did it travel? What was its rate of travel?
  - b. What kind of habitat is it using? Give as much detail as possible: open field, pond, river, wetland, etc.

- c. Based on what you know about Trumpeter Swan biology, why is it in the present location?
  - d. How close is it to human activity or structures?
  - e. When and to where do you predict it will move next?
5. Each week or so you may want to have your students summarize and report on the information they have recorded about the swan.

### **Extensions**

- Visit other animal tracking sites on the internet to learn about and compare migration and movements.
- Have your students come up with individual or group research questions about swan movements and/or habitat use that they can try to answer using the information they are collecting. Questions to help them get started may include:
  - Do swans prefer to use lakes or wetlands of a certain size?
  - Do swans use different types of habitats in different seasons?
  - Do swans of different ages use different types of habitat?
  - Do migrating swans travel during certain types of weather?
  - Do swans remain in one type of habitat any longer than others?