

Assessing Blackfoot Wetlands

Objectives

Student will learn which habitat characteristics are important to swans. They will learn how biologists analyze data to determine if a wetland is suitable for swan reintroduction and swan nesting. They will learn how some wetlands in the Blackfoot Valley meet these suitability criteria.

Method

Students use data from the Blackfoot Valley Wetland Habitat Suitability Data to analyze individual wetlands. They summarize their findings and give an assessment to the rest of their class on whether the wetland is suitable for nesting and whether they would recommend it as a release site.

Materials

- Swan Habitat Criteria List (copy for each student or pair/group)
- Blackfoot Valley Wetland Habitat Suitability Data (copy for each student or pair/group)
- Wetlands Summary Chart

Background Information

Trumpeter Swans inhabit lakes, ponds, large rivers, and coastal bays. Their most important habitat requirements are open water with adequate room to take off (approximately 100 meters), access to food (mostly aquatic vegetation), shallow, stable levels of unpolluted fresh water, a muskrat house, island, or other structure for the nest site, appropriate plant species for building nests, and low human disturbance.

Trumpeter Swans forage in water and, especially in winter, on land. Plant material makes up most of their diet. Adults eat stems, leaves, and roots of aquatic plants, switching to upland grasses and waste grain in the winter. Newly hatched cygnets feed mainly on aquatic insects and crustaceans. At about

Grade level: 4-8

Subject Areas: Biology, math, writing

Duration: 1-2 hours

Topics: Habitat use, writing skills, chart reading, data analysis

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

5 weeks of age, their diet changes to include more vegetation. The tubers of duck potato and sago pondweed are important foods for Trumpeter Swans. Trumpeters use their strong webbed feet to dig into the pond or lake bottom for roots, shoots, and tubers, and then plunge their heads and necks underwater to eat what they've dug up. In deeper water, they tip up completely to

snap off the leaves and stems of plants growing underwater. Their heads and necks are often stained a rusty color from feeding in ferrous (containing iron) waters.

Nests are usually located near shore, on small islands, on muskrat and beaver lodges, or on floating vegetation. The nest is a low mound of plant matter several feet across, with a depression in the middle. It is usually made of cattails, sedges, and/or rushes. The nest may be reused from year to year. To identify the best sites for swan reintroduction in the Blackfoot, as well as to assess whether there is even enough appropriate habitat to support a population of swans, 71 wetlands in the upper Blackfoot Valley were surveyed in 2004. Data on the wetland characteristics deemed most important to swans (see Swan Habitat Criteria List) were collected and analyzed, and each wetland was assessed as both a release site and as potential nesting habitat.

Out of the 71 sites surveyed, 27 were determined to be suitable for nesting, and 9 of these were selected for release sites. Hazards that existed at the time of the survey at some of these 9 sites were mitigated (e.g., fences moved or removed) before release.

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. Tell them that this is exactly what biologists have done in order to figure out what places in the Blackfoot (and other areas) would be good swan habitat, and they have used this information to select the sites for releasing swans in the reintroduction program. Give them the copies of the **Swan Habitat Criteria List**. Tell them that this list was developed from studies of habitat that swans already use in other places. Go through the list together and make sure they understand the criteria and terms used.
3. Hand out the **Blackfoot Valley Wetland Habitat Suitability Data**. Explain that these are the actual data collected by biologists from the University of Montana and the US Fish and Wildlife Service in 2004 in order to assess Trumpeter Swan habitat suitability in the Blackfoot. Tell them that 71 sites were surveyed, and they have the data for just a portion of these.
4. Assign one or more wetland number to each student or group (You don't necessarily have to assess every wetland; select whatever number works well for your class size and time limits. However, you do want students to get a sense of

5. You may want to have students make a scale of what is good for trumpeter swans and what is bad. With their chart, the students can cross off any wetlands that are considered bad for a release or place an x on the scale of where they think a particular wetland would fall along the gradient of poor/good. Example:

Good Quality Wetland-----x-----Poor Quality Wetland

6. After they are finished, have each student give their report and recommendations for each site. Discussions might include the following:

- a. Did you have enough information to make a solid conclusion? If not, what more would you like to know?
- b. Did you consider some characteristics more important than others? Which ones?
- c. Do you think any wetland surveyed will be “perfect” for swan release and/or nesting? Why or why not?
- d. As a class, can you pick the 3 “best” sites of all the ones you analyzed to recommend for release sites? What criteria did you use? What was your priority/ranking system?

You can then let them compare what they concluded with the conclusions of the biologists by handing out the **Wetlands Summary Chart**. They may be surprised that some sites with fences or power lines in them were chosen. Explain that if a site had very good habitat otherwise, landowners and the U.S. Fish and Wildlife Service worked together to move or remove fences or otherwise make them safer for swans. For example, reflective markers have been hung from some power lines to make them more visible to swans.

Extensions

Have your students visit the Trumpeter Swan Decision Support System website at MSU (<http://swan.msu.montana.edu/cygnnet/>). This website (still in development phase) allows you to answer a series of questions about a wetland

and the program advises the user about whether the wetland is appropriate swan nesting habitat or not.

Swan Habitat Criteria List

- Wetlands should be ice-free by mid-April at the latest.
- Wetland should have at least 100 meters of open water.
- Wetlands with highly irregular shorelines are preferred.
- Wetlands should be semi-permanent or permanent.
- Wetlands can be 1-400+ ha. Smaller ponds are suitable only when they are part of a larger wetland complex.
- Water should **not** be acidic, stagnant, or highly eutrophic (having so much plant life, such as algae, that oxygen is in short supply).
- Wetland should offer multiple potential nest sites, and at least some of these should be away from the shoreline. Potential nest sites include small to medium sized natural or man-made islands, beaver dams or houses, muskrat houses, water <1 m deep where swans can pile up aquatic vegetation, man-made floating nest platforms. Swans will also nest on shorelines but generally this is not ideal because of increased potential for predation.
- Water levels should be stable, or changes predictable (e.g. slow draw down due to evapotranspiration). Rapid changes due to flooding or draw down are not acceptable.
- Wetland should have a sufficient amount of suitable submergent plants (those growing completely under the water, such as pondweed, aquatic buttercup, etc.) for foraging.
- Mean water depth should be less than 1.2 meters.
- Disturbance should be minimal, or at least predictable, and should occur no closer than 100 meters to the nest site.
- Wetlands should not be crossed by fences, power lines, or other flight obstructions.
- Wetlands should be free of lead and other pollutants.

Blackfoot Valley Wetland Habitat Suitability Data

Site #	Type ¹	Size (ha) ²	% open water	Length open water (m)	Ave. Water Depth (m)	Water pH	Ice-off Date	Power-lines	Fences	Hunting	Other ³	% with forage ⁴	% with nest veg ⁵	# of islands	# of beaver/muskrat houses
26	Semi-perm	38.34	65	>152.4	0.98298	8.5	3/15-4/1	none	minor	no		75	40	4+	1
22	Perm	11.48	90	>91.44	2.286	8.0	4/1-4/15	across	minor	no	road	5	5	0	0
4	Perm	8.11	98	>152.4	1.143	10.5	4/1-4/15	adjacent	0	high	hwy	10	2	0	0
23	Semi-perm	22.05	35	91.44	0.508	8.1	3/15-4/1	none	major	no		75	50	1	5+
5	Semi-perm	14.82	60	>152.4	0.508	9.9	4/1-4/15	adjacent	0	high	hwy	50	40	1	5
42	Semi-perm	6.45	90	<15.24	0.3556	7.9	4/1-4/15	adjacent	0	low	pivot	5	10	0	0
57	Semi-perm	11.50	90	>152.4	1.4986	8.5	4/1-4/15	none	major	medium		60	10	1	1
59	Semi-perm	8.65	5	>152.4	1.50	7.0	4/1-4/15	none	0	low		45	10	0	0
29	Perm	3.83	40	>91.44	1.1684	9.3	4/1-4/15	adjacent	0	no	Hwy, houses	70	25	3	0
63	Semi-perm	2.47	90	>91.44	2.74	7.3	4/1-4/15	none	0	low	houses	50	10	1	0
55	Semi-perm	1.652	85	91.44	1.524	10.3	3/15-4/1	adjacent	0	no		50	15	0	0
19	Semi-perm	10.90	80	>152.4	0.4064	10.5	4/1-4/15	none	0	medium		90	20	2	0

¹Perm= Permanent, Semi-perm=semi-permanent, Seas=Seasonal

² Area of wetland in hectares

³ Other sources of disturbance, etc. are noted

⁴ % of wetland with suitable submergent vegetation

⁵ % of wetland with suitable emergent vegetation for nesting (sedges, rushes, and/or cattails)

Wetlands Summary Chart

Site #	Pros	Cons	Nesting Site?	Release site?
26	Good submergents, pH, islands, open water, irregular coastline	Fence issues	Yes	Yes
22	Open water	Deep, very little submergents, many human disturbances	No	No
4		Basic pH, few emergents or submergents, main powerline, near highway 200	No	No
23	Good pH, depth, submergents, irregular coastline	Fence across wetland	Yes	Yes
5	Good amount of submergents, emergents, irregular coastline, islands, beaver/muskrat lodges	Basic pH, near Hwy 200	Yes	Yes
42	Pivot, channels in wetland, few submergents, powerline issues		No	No
57	Beaver dam, island, good submergents	Fence issues, deep in middle	Yes	Yes
59	Good pH, coastline, little disturbance	Deep in places	Yes	No
29	Islands, good submergents *This was the site selected by the wild swans who nested in the valley in 2000.	High levels of disturbance	Yes	Yes
63	Good submergents, irregular coastline, good pH	Very deep at center, low amount of emergents	Yes	No
55	Good emergents, open water	Basic pH, some disturbance	Yes	No
19	Good depth, islands, coastline, submergents	Basic pH	Yes	Yes