

3. Discuss with students how their organism or element relates to other parts of the food web. Each student should be aware of what their element needs to survive, and what other organisms or elements rely on it for survival.
4. Arrange students in a large circle, arms distance apart.
5. Hand the spool of string to the sun and instruct the sun to say “I am the sun, and plants need me in order to live.” The sun should then hand the spool of string to a plant. For example, the sun might hand the spool to a willow.
6. As the web begins, no one is allowed to throw the string or pass it without the complete attention of the other class members. Explain that one organism (or non-living element) must “interact” with another by first stating the relationship between the two, and then by passing the spool of string to the next person in the food web. For example, the willow would say “I am a willow (a producer), and I am eaten by moose.” The receiving organism (or non-living thing) should then wrap the spool of string **loosely** around a finger, and continues the web. **Remind students not to pull on the string!** Review the rules of the game until each student understands the procedure.
7. Continue until all the students are holding the string at least once. Get as many “interactions” as possible, so that there will be a net of string connecting the students.
8. Reinforce the concept that all living and non-living things are connected, as has just been demonstrated. Ask the students to predict what would happen if one organism or non-living thing was removed from the web. Pick one member of the web, (for example, a salmon) and ask students to identify other web members that would be affected if this animal disappeared. Reinforce that each member of the web is connected and cannot leave without affecting every other part of the ecosystem.

Variation: Have students think up of and assign themselves local organisms or non-living elements that fit within their category.

Extensions:

1. After the web has been established, instruct one of the migratory animals (for example, bird, salmon, caribou) to move. The entire web will need to move or be modified in order to survive. What are the closest connecting elements to migratory animals? While the class is still attached in the web, discuss what happens in real ecosystems when migratory animals move away. What about animals that hibernate in winter? How are other members of the ecosystem affected? What happens if pollution occurs in a part of the ecosystem? What if the population of one element grows too large for the ecosystem to support?
2. Simulate an environmental disaster once the web has been set up. Show how toxins, like oil or lead, can be passed by consumers through an ecosystem until most members have been affected.

Evaluation:

1. Have each student list all possible relationships for their element.

References:

Adapted from “Spinning a Yarn About Ecosystems,” Alaska’s Ecology, Alaska Department of Fish and Game, Juneau, Alaska, 1995.

LIST OF ELEMENT CARDS (These are examples for each category; there are many more.)

1. NON-LIVING THINGS

sun
water
minerals

2. PRODUCERS

willow shrub
spruce tree
grasses/sedges
flowers
lichens

3. HERBIVORES

snowshoe hare
grouse
boreal chickadee
red squirrel
grizzly bear
moose
caribou
ground squirrel
dall sheep
three-toed woodpecker
aquatic invertebrates (e.g. water fleas,
fresh-water shrimp)

4. CARNIVORES

boreal chickadee
grizzly bear
bald eagle
wolf
lynx
coyote
golden eagle
spiders
three-toed woodpecker
dragon flies
salmon

5. DETRITIVORES

beetles
flies
fungi

SWAN IDENTIFICATION

Species		
Bill Colour and Shape		
Head Profile		
Head and Neck Movement		
Size		
Voice		



Swan & Goose

IDentification

It's Important to Know

Reports from wildlife watchers and sportsmen will help the biologists monitor the recovery of trumpeter swans (*Cygnus buccinator*). Positive identification is essential, as trumpeters often mix with flocks of the relatively common tundra (whistling) swans (*C. columbianus*) throughout their migration and winter range. Distinguishing trumpeters from tundra is not easy, but it is possible by paying close attention to a few distinctive characteristics.

The mute swan (*C. alba*) is an introduced Eurasian species that occurs in North American avicultural collections and in the wild primarily along the east coast, Great Lakes and in other limited areas of the United States and Western British Columbia. It is included here for clarification in those areas where it occurs with our native trumpeter and tundra swans.



Some of the best ways to spot differences between the five species are calls; an absolute method of species identification.

Trumpeter: resonant, sonorous, loud, low-pitched, bugle like call.

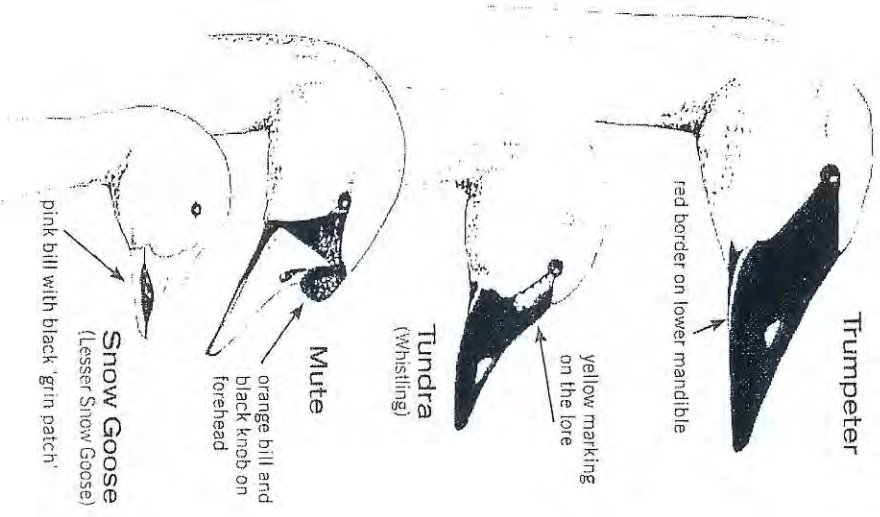
Tundra: high pitched often quavering oo-oo-oo accentuated in the middle; or who, who-ho; woo-oo-woo; or who-y/ho.

Mute: generally silent but not 'mute'; hissing sounds are common and occasional snorting noises.

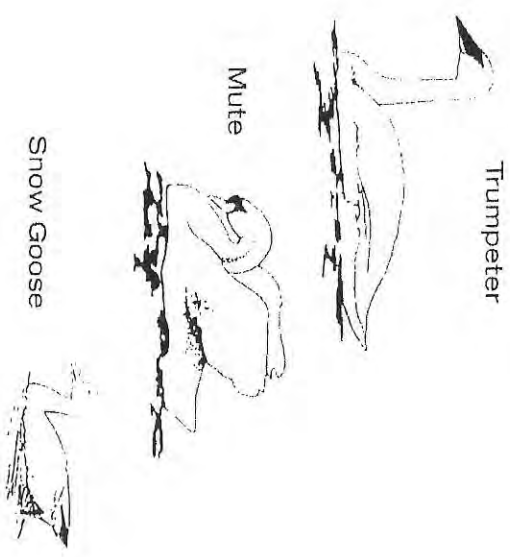
Canada Geese: Ha-lonk, ha-lonk

Snow geese: high pitched awu-unk, awu-unk and kuk, kuk, kuk

Head Profiles



Trumpeters. afloat, on shore, resting, or in a mild state of alertness, generally have the neck kinked back at the base so that it appears to rise from the forepart of the back forming a reverse angular C-shape (swimming swan) rather than from the very front of the body as in tundra swans. When in a state of alertness, trumpeters hold their bodies at an angle as compared to tundra's which are held horizontal (standing swan). In general, body postures of trumpeters are angular and tundra postures are curved or round. Mutes generally hold the neck curved gracefully and bill pointed somewhat downward. Wings may be arched over back giving a bulky appearance. Also, note size comparison — especially the length of neck — between swans and geese. See flying, standing, and swimming graphics throughout this brochure.

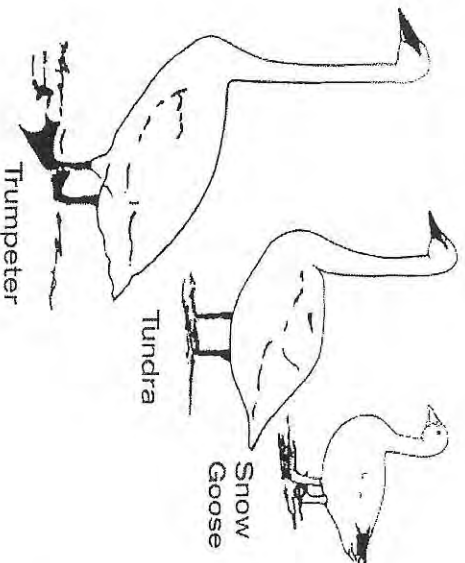


Proportions of the neck to body length

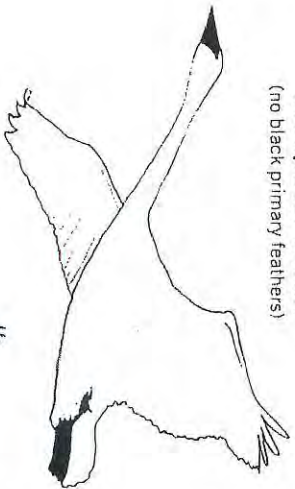
Trumpeter swans have longer necks in proportion to their body lengths than do tundras. There is no standard ratio formula, but this is a noticeable characteristic when the birds are either standing or swimming. It is not reliable in flight.

Size Information

	Wing Span	Weight	Length
Trumpeter	84-96 in.	21-30 lbs.	60 in.
Tundra	72-80 in.	13-18 lbs.	52 in.
Mute	82-94 in.	20-30 lbs.	57 in.
Snow Goose	36-44 in.	4-6 lbs.	27 in.



Trumpeter Swan (no black primary feathers)



Snow Goose (black primary feathers, short neck)



Flight Profiles and Takeoff Behavior

Trumpeter swans, following the takeoff run and just as they become airborne, will pull their necks into a shallow "S" curve. This is seen only for a very brief time during their first wing beats to stay airborne.

Tundra swans hold their necks straight the entire time of the takeoff run and initial flight. This characteristic applies to both land and water takeoffs.

Trumpeter swans may be the last birds in a mixed flock to take off. They may stay up to one or more minutes longer than the tundra swans. This happens when trumpeter and tundra swans occur together but are not entirely intermingled (trumpeters remain at one end of the flock as a group). This is a subtle characteristic for separating trumpeters from tundras and must be used in conjunction with other identification methods.

Note the differences in size and color between swans and snow geese. *Swans* are large all-white (adult) or gray (juvenile) birds with a wing span of 6 to 8 feet. *Snow geese* of all ages have black wing tips and a wing span of about 3 feet.

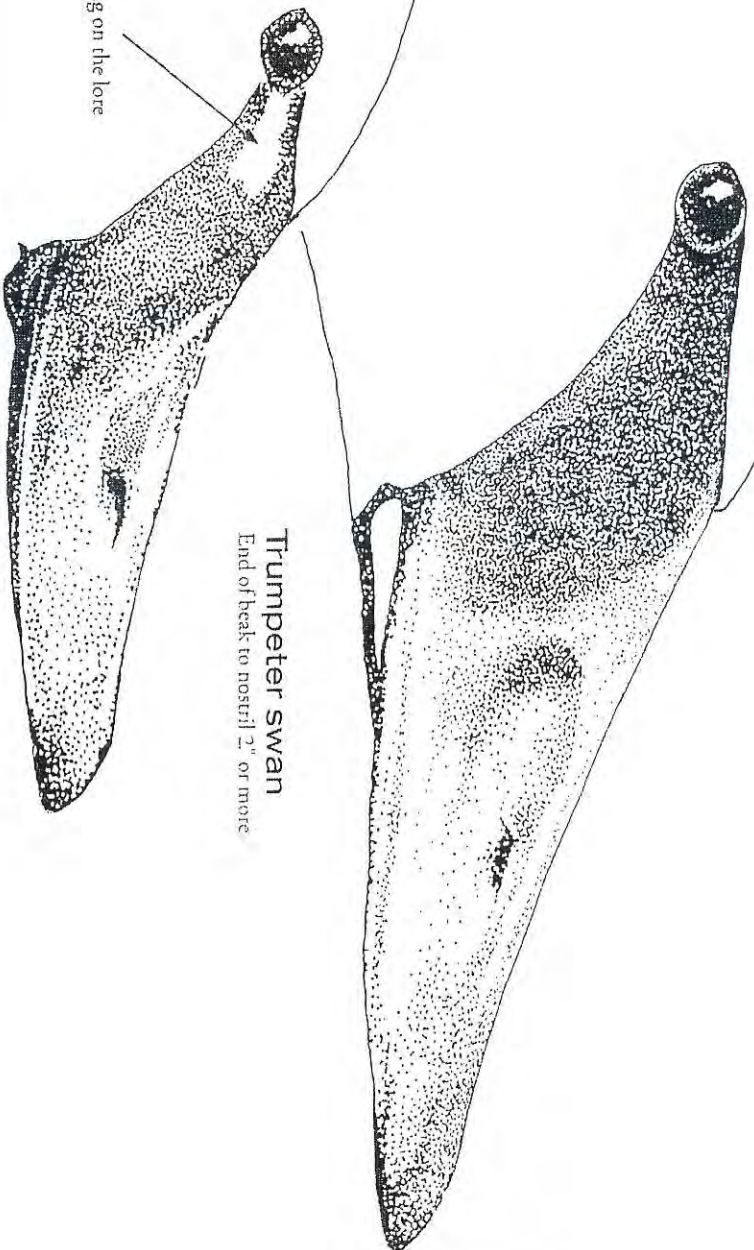
Canada Goose—black neck and head with a white cheek patch; dark body in varying shades of gray-brown with the rear legs being white. The tail is black. They have a short neck, and a flight pattern similar to snow geese.

IMPORTANT! Some trumpeter swans are marked with identifying neck bands. Please note the collar color and number or letters as well as date and location.

Please report swan sightings to the appropriate contacts listed below:

US Fish & Wildlife Service – DMBM
 Marty Druel • 911 NE 11th Ave. • Portland, OR 98232
 • phone: 503-231-6163 marty_druel@fws.gov
 The Trumpeter Swan Society – WA Field Office
 Martha Jordan • 914 - 164th St. SE • MBO 272 •
 Mill Creek, WA 98012 • phone: 425-787-0258
 www.swansociety.org swaninfo@swansociety.org

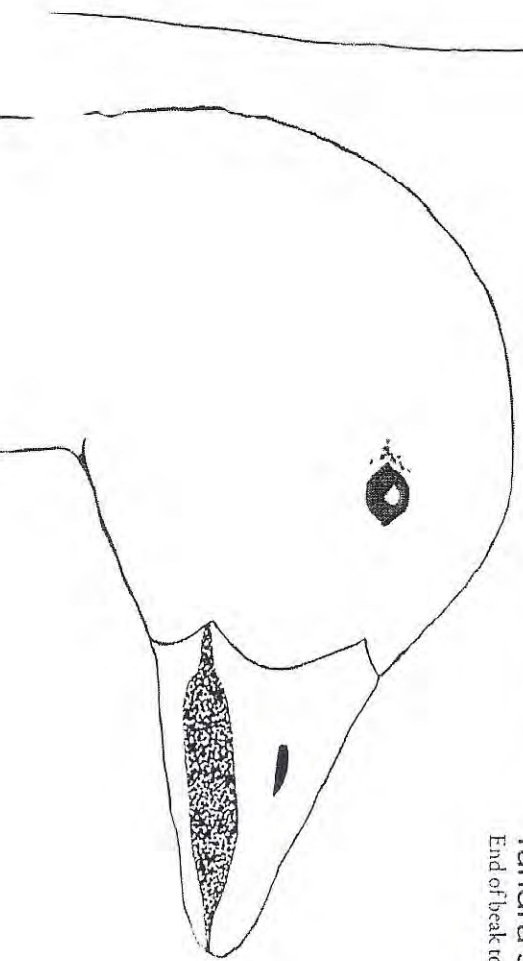
For more information on swans or for additional copies of this identification brochure, contact the TSS Washington Field Office



Trumpeter swan
End of beak to nostril 2" or more

Yellow teardrop marking on the lore

Tundra swan
End of beak to nostril up to 1 1/2"



Snow Goose

Total beak length slightly over 2"
From tip of beak to back of head
is about the same as length of neck.

Ross's Goose—similar to snow goose
in shape and color but smaller in size.
Plumage in all ages have black wing tips
(primary feathers). Bill pink, lacks black
'grin patch'.

Head and Neck Movement

Trumpeter swans frequently bob their head and necks up and down (head bobbing). With this motion they also have a variety of vocalizations. This combined activity apparently serves as a form of communication between individuals and within the group. Head bobbing and vocalization activity increase when the birds are disturbed and reaches maximum intensity just prior to the birds taking flight. This behavior may be brief or absent if the birds are suddenly startled and take flight.

Tundra swans do not bob their head and neck in this manner. Occasionally tundras will nod only their head up and down. There is no defined preflight display as in the trumpeter. While vocalizing they may hold their head and neck out at a 45° angle.

Head and Bill Shape

Trumpeter—bill heavy in proportion to head with a straight profile. Angular head shape somewhat resembling canvasback duck. Eye not distinct from bill.

Tundra—bill more dish-shaped in profile, bill smaller in proportion to head compared to trumpeter. Head smoothly rounded; eye usually distinct from bill.

The shape of the head profile may vary between individual birds. Tundra swans especially, have a wide range of head-bill shapes, some having very obvious concave bills, while others appear straighter. Look carefully at the eye area for any yellow on the lore and to see if the eye is distinct from the bill.

Snow Goose—less than one-half the size of a swan; total bill length is about 2"; bill is shorter compared to head length than in swans; bill does not extend very close to eye. Neck length is about the same length and distance from tip of bill to back of head.

Juvenile Identification—both *Trumpeter* and *Tundra* juveniles have a gray body coloration. *Tundra* juveniles are brighter silvery gray with black legs and feet. *Trumpeters* are darker sooty gray, especially in the head and neck area; leg and foot color is primarily yellow-orange mottling with some black. From late December on, *Tundra* juveniles begin turning white and by mid-March are nearly all white. *Trumpeters* remain dark gray.

Tundra bill color is usually mottled pink with black tip; *Trumpeters* are black at base and tip with a pink middle. Bill color late in the season gradually fades from pink with black borders to all black in both species.

Mate juvenile plumage white with brownish splotches; bill gray with black base. Legs and feet are black.

Snow goose juveniles are gray with black wing tips. Bills are grayish in color.

CAUTION

Exercise caution and respect while watching and photographing wildlife—For species like trumpeter and tundra swans and snow geese, continual disturbance during the critical months (winter and spring) can lead to increased deaths from stress-induced disease and can result in nesting failure on northern breeding grounds. Please leave feeding and resting birds alone.

Stay in your car—it is an excellent observation and photographic blind.

Move slowly and quietly—when you do get out to hike, bike, canoe or kayak.

Use binoculars, spotting scopes and telephoto lenses—they allow you to sneak up on wildlife without leaving your car or disturbing their normal activities.

Respect private property—do not trespass onto farm fields or other private property to get a closer look.

Sportsmen must exercise caution while hunting snow and Canada geese. Swans may mix with these geese and in the excitement of the hunt, shooting mistakes can occur. Trumpeter and Tundra swans are protected in Washington and many other states.

Use Non-toxic shot while hunting.

Not true, sponsored by:

The Trumpeter Swan Society • Washington Game Bird Club
Washington Waterfowl Association • Wild Birds Unlimited Everett, WA

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Bill Color

Trumpeter—black bill with red border on lower mandible; the red border may be present on some tundras.

Tundra—black bill, usually with yellow spot of varying size in front of eye; this spot may be absent on some tundras.

Mute—orange with prominent black knob at the base.

Snow Goose—bill shorter than swans, dark pink with black 'grin patch'.

