Alaska's

Wild Wonders

Counting Wildlife!

Biologists need to know how many animals live in an area (**the population**) so they can wisely manage them. That way not too many or too few animals are hunted. Sometimes biologists count every animal, and other times they use special techniques to estimate the population. This issue of Wild Wonders explores some of the ways biologists count animals.

In This Issue

Biologists follow population sizes from year to year (**the trend**) to see if there are more, less or the same number of animals.

Animal trends regularly go up and down, but a big decline could mean the population is **unhealthy**.

Alaska Department of Fish and Game, Division of Wildlife Conservation, 2017

Knowing animal behavior helps with counting

Just keep counting ... caribou!

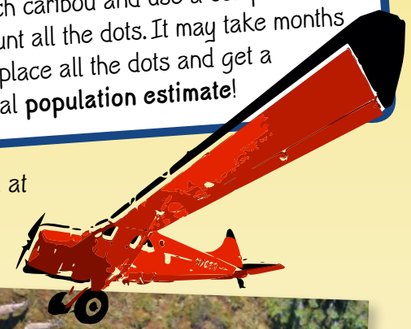
Bzzzzzzzzzzzzzzzzzzzz That's the sounds of millions of mosquitoes buzzing. If you've ever experienced a dense swarm of mosquitoes during an Alaskan summer you know they can drive you crazy! These tiny biting insects search for any exposed flesh, and in the process, fly into your eyes, ears, nose, and mouth. Humans swat them with their hands or use insect repellent. What about caribou? How do they avoid these relentless pests?

To escape the maddening swarms of insects, caribou flock to windswept ridges and snow fields. Often, entire herds bunch together in large groups called **aggregates**. Biologists take advantage of this grouping behavior to count each caribou in the herd. Since every animal is counted it is called a **census**.

So many caribou! Counting caribou aggregates should be easy, right? It's actually very difficult. Some herds have 100,000 caribou crammed together in one place. It is not possible to count them all at once. Instead biologists take photos to count the herd later.

Photocensus

Since there are too many caribou to count at once, biologists use a **photocensus**. This means that they fly over the caribou in an airplane and take photos of each aggregate. Starting this year, biologists will use a special computer program to line up all the photos. Then they will place a dot over each caribou and use a computer to count all the dots. It may take months to place all the dots and get a final **population estimate**!



Your turn: How many caribou can you count?

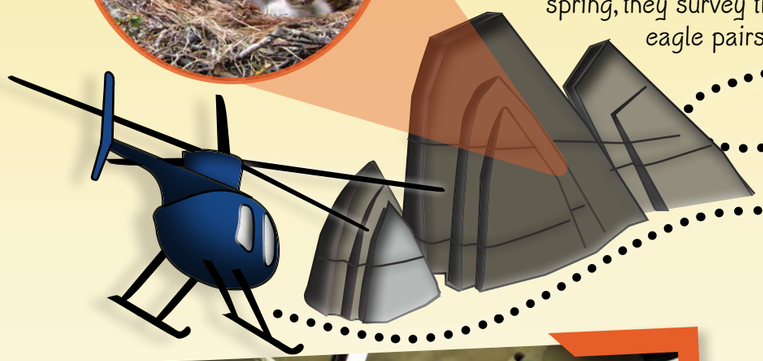
Answer: There are at least 777 caribou in this aggregate.

Eagle, are you home?

When counting animals it is useful to take advantage of behavior. Just like biologists count caribou in the summer when the herds bunch together to avoid insects, biologists often count birds during the **breeding season** when they are near their nests. Eagles are often counted this way because they have huge nests (an eagle nest can be 8 feet across) that are easy to find.

This is my territory! Despite migrating up to 8,000 miles each year, golden eagles usually return to the same nesting area. This area is called a **territory**, and male and female pairs defend it fiercely. To keep the peace, other eagles don't build nests closer than a mile away. Eagles can live up to 32 years, and pairs usually build many nests within their territory. Each nest provides a specific advantage under different conditions. For example, one nest may provide a view of a ground squirrel colony while another may be better when ptarmigan populations are high. They may also switch locations every few years to allow parasites that have accumulated in the nest to die off.

For more than 20 years biologists have kept track of golden eagle territories on the Seward Peninsula. Every spring, they survey these territories to see if the eagle pairs have returned.



Occupancy Surveys

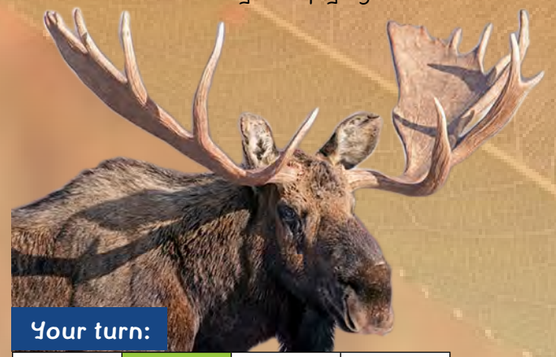
Since eagles usually nest on small, rocky outcroppings in the Seward Peninsula, biologists look for nests by flying in a helicopter to all the rocky areas. They keep track of which outcroppings have nests on them. When they return the following year, they check to see if old nests are **occupied** (that means the female is incubating eggs or has chicks), or if new nests have been built. These are called **occupancy surveys**. By comparing the number of occupied territories each year biologists can tell how the population is doing.

Counting a few and estimating the rest

Solitary moose

Imagine this: every tree frosty and leafless, every pond, river and lake frozen; this is Interior Alaska in the winter. From the air, it looks like a blanket of white. Animals with dark coats, like moose, are easy to spot against this background. So why can't biologists just fly around in an airplane and count all the moose?

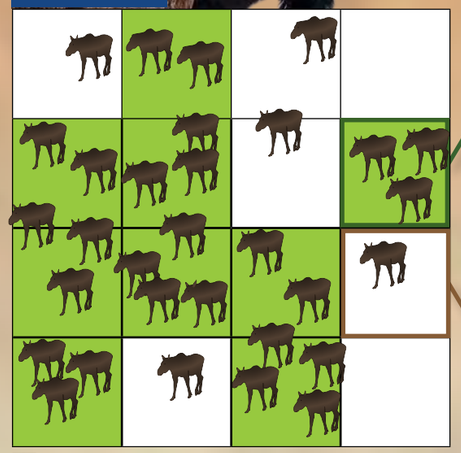
So what's the problem? Moose are solitary animals and spread out across the landscape (there are usually only a few moose every square mile). As a result, it would take months and lots of money to count all the moose in Alaska. Instead, biologists count all the moose in small areas (called **sampling units**) and use the number of moose counted in these areas to estimate the population across a larger area. Think of it this way: if you break an area into 10 equal-size squares, and count three moose in just one of the squares, you could get a rough estimate of the total number of moose by multiplying 3 x 10 = 30 moose.



Stratified Sampling

To get a more accurate population estimate, biologists take into account the quality of the habitat. They know that moose are more abundant in areas with lots of young willows. To account for this difference in habitat quality, biologists pick two sampling units, one with good habitat and one with bad habitat. They use these two units to come up with a population estimate for good and bad habitat areas. This is called **Stratified Sampling**!

Your turn:



☐ Good habitat, more moose.

☐ Bad habitat, less moose.

☐ number of moose in one good habitat sampling unit

x 9 (the total number of squares with good habitat)

☐ **good habitat population estimate**

Add the estimates together ___ + ___ = ___

☐ number of moose in one bad habitat sampling unit

x 7 (the total number of squares with bad habitat)

☐ **bad habitat population estimate**

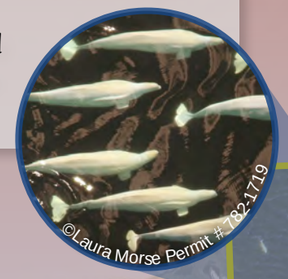
estimated moose population!

Answer using outlined subunits: good habitat estimate 3 x 9 = 27, bad habitat estimate 1 x 7 = 7, estimated moose population 34.

Beluga backs!

Belugas are toothed whales with a robust body, packed with extra blubber (fat) to survive life in cold Alaska waters. At birth, belugas are dark blue/gray but as they age they get lighter, often turning white. These chunky whales are an important traditional food for Alaska Natives living along the northwestern coast of Alaska.

Chasing salmon tails! Every summer the group, or **stock**, of beluga whales that live in Bristol Bay, Alaska intercept red salmon (aka sockeye) on their way to rivers for spawning. Biologists take advantage of this behavior and count the white belugas by flying zigzag patterns across and along the shoreline of the bay.



Your turn:

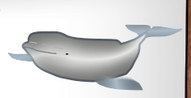
☐ number of beluga you see

x 3 correction factor

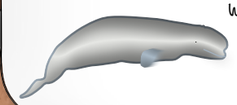
☐ **beluga population estimate**

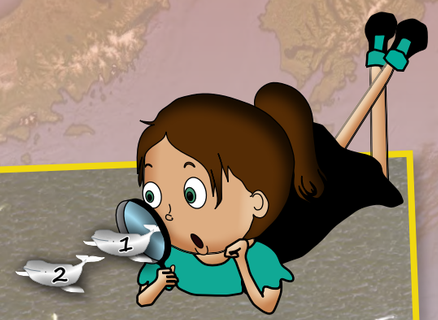
Answer: There are 70 beluga in the picture so the beluga population estimate is 70 x 3 = 210 beluga.

Correction Factor



Although the white belugas stand out against the muddy waters of Bristol Bay, **like marshmallows in hot chocolate**, biologists can't see the belugas swimming below the surface. How many beluga do biologists miss? During several years they compared the survey counts to a second more expensive technique called **Mark-Recapture** (see page 7). This told them that for every beluga they see, there are about two more under water. Now each year they multiply their aerial survey counts by 3 (the **correction factor**) to get a more accurate population estimate.





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Using clues to count hidden wildlife

Oh deer, is that poop?

Sometimes biologists can't see the animals they need to count, so they use clever ways to survey them. The deer of southeast Alaska are one of these species. They live in the rainforest along the coast or on islands. The vegetation is so thick that it is impossible to see more than a few feet into the forest. Biologists also cannot see the deer from above because of the thick forest canopy.

How do biologists count them? Rather than counting deer, biologists count deer pellets. That's right, **POOP**! Deer poop about 12 times per day, and their poop (pellet) piles stick around for a long time, even in wet environments.

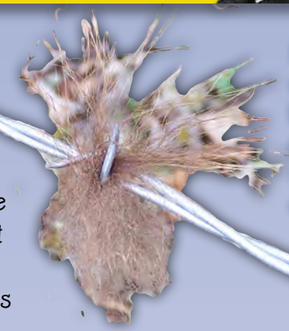
The number of pellet piles doesn't tell biologists the exact number of deer in the area. But, by comparing the number of piles to the number counted the past year, biologists can tell if the deer population has grown, is the same, or has declined. This is known as the **relative abundance** of deer compared to past years.

Pellet Transect

Starting at the coastline, a biologist walks into the forest with one end of a 65 foot cable attached to his or her belt. A second biologist watches the cable and when the end appears, yells "stop." He or she then follows the cable (called a **transect line**) and counts every pile of deer poop that is within about 3 feet of the line. The pair repeats this until they have traveled about one and a half miles. The biologists conduct several of these transects in each area.

Bear, where are you?

Like deer, bears are very tricky to count because they are experts at disappearing into the forest. Fortunately for biologists, they often leave behind clues. Bears tend to walk the same trails day after day, year after year. They develop a habit of rubbing against certain objects (such as a tree) along their path. Over time these objects collect the hair off of all the bears that travel that path.



Biologists place barbed wire **hair snares** along bear paths. The sharp points capture the hair from bears without causing them any harm.

Bear hair investigations! To a biologist, the hair of these bears is like gold. It contains **DNA**. This is the bear's genetic material and each bear has a unique DNA code (just like our finger prints). Biologists use a special laboratory process to unlock the DNA code from each bear's hair. Once they've done this for all the hair samples, they know how many and which bears passed through the area.

Mark-Recapture

Biologists place hair snares along "beary" paths. A few days later they collect all the hair off the snares (**round 1**). After a few more days they go back (**round 2**), and collect a second batch of hair off the snares.

In a lab the biologists identify (using the DNA as the **mark**) which bear's hairs were captured in each round. The round 2 hairs (the **recapture**), include some bears that were also marked in round 1, and some that were never marked before. The ratio between marked and unmarked bears is the key to estimating the bear population size. This technique is called **Mark-Recapture**.

$$\frac{\text{(Number of bears "marked" in round 1)} \times \text{(Number of bears "marked" in round 2}}{\text{Number of bears from round 2 that were "recaptured"}} = \text{estimated bear population!}$$

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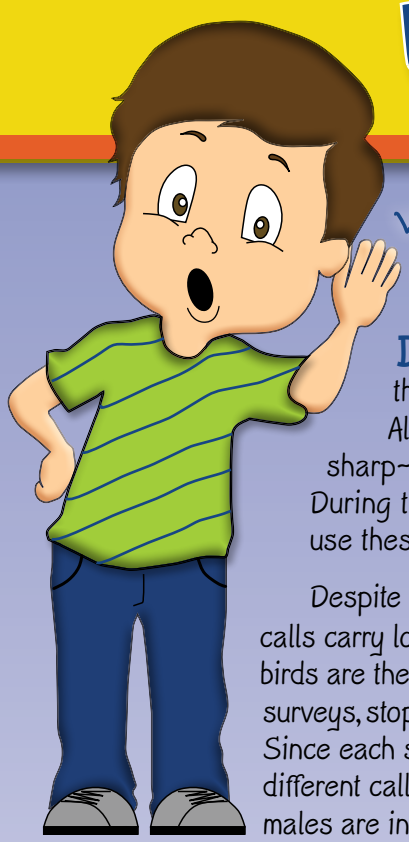
Use your other senses



Lurping Barking Hooting Drumming Booming Rattling

Do you hear that? ... these are the sounds that biologists use to count Alaska's grouse (spruce, sooty, ruffed, and sharp-tailed) and ptarmigan (willow and rock). During the spring, male grouse and ptarmigan use these strange vocalizations to attract females.

Despite grouse and ptarmigan's small size, their calls carry long distances. Early in the mornings when birds are the most active, biologists walk or drive long surveys, stopping every so often to listen for calls. Since each species of grouse and ptarmigan has a different call, biologists can not only tell how many males are in the area, but which species breed there.

Grouse, grouse, ptarmigan!

Play it with your classmates! Grouse, grouse, ptarmigan is similar to duck, duck, goose. By playing you'll become an expert at grouse and ptarmigan call identification. Now you can be the biologist and count all the grouse and ptarmigan near your home.

Instructions:

- Players sit in a circle, facing inward.
- The teacher calls out one of the six grouse or ptarmigan species you've practiced. He or she then plays the grouse and ptarmigan calls in a random order.
- The first player to be "it", walks around the circle tapping each player's head. When the song of the grouse or ptarmigan that the teacher called is played, "it" yells the species name.
- The player whose head was last tapped must chase "it". If "it" reaches an open spot in the circle before being tagged, he or she is safe and the "chaser" becomes the new "it".

***This game is best facilitated by a teacher.**

Learn these songs

A variety of FREE bird identification apps are available online. Although ADF&G cannot endorse a specific product, one example of this kind of app is the Cornell Lab's Merlin Bird ID app.

Listen to the following bird calls. Use two words to describe each call?

Spruce Grouse

_____

_____

Ruffed Grouse

_____

_____

Sooty Grouse

_____

_____

Sharp-tailed Grouse

_____

_____

Willow Ptarmigan

_____

_____

Rock Ptarmigan

_____

_____