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Shadow Report

Monitoring Biodiversity at SHADOW Lake Bog

Introduction/History:

Save Habitat And Diversity Of Wetlands (SHADOW) is a non-profit organization founded through a grassroots effort to save one of King County's last remaining peat bogs. Located around Shadow Lake, SHADOW has put over 90 contiguous acres of forest and wetland under protection for the purpose of conservation and education.

Since peat bogs consist of highly saturated soils, which are incapable of supporting heavy equipment, the bog surrounding Shadow Lake was deemed useless by logging companies. Because of this, over 110 cubic yards of this wetland was filled in to create a landfill for dumping waste materials. In 1995 the property was purchased by Max and Erin Prinsen who wanted to protected and restore the land back to its original state. With the help of several environmental agencies they able to remove all foreign materials from the property- but the restoration was far from over.

To this day, the members of SHADOW team together to restore and preserve the land from, among other things, urban development. This ongoing hard work has resulted in a new amphibian pond, a boardwalk, and an educational center devoted to teaching others about the importance and difficulties of wetland conservation. Most of the restoration work and up keep in the bog is done by monitoring forest succession, removing invasive species and planting native vegetation.

Monitoring wildlife is also an extremely important part of the restoration process at Shadow Lake bog because back when the property was a landfill, animals were pushed out of the area and by monitoring wildlife now, it's easy to see which animals are using the property again. It is also one of the ways to assess how successful SHADOW had been at restoring this land.

Site Description:

In order to better understand the how wildlife might interact with the area here is a very brief description of the major characteristics of the property.

Location

The Shadow Lake Bog is located in Renton, along the Puget Sound Lowlands, which empties its contents into the Duwamish-Green River. It lies directly to the west of Shadow Lake, and southeast of Lake Youngs **(figure 1).** The land immediately surrounding the bog is made up of cleared areas for large horse pastures and residential neighborhoods. Because the bog is situated directly next to Shadow Lake it serves as an important habitat for wildlife and as a buffer between pastures and because the bog is also located between both Shadow Lake and Lake Youngs, it allows the land to serve as a migration corridor for wildlife.

Habitats

As previously mentioned Shadow Lake Bog consists of over 90 acres of land and because it is so large it contains 11 different types of habitat. These habitats include

Hemlock/Sphagnum bog, Ledum/Sphagnum Bog, Palustrine Scrub/Shrub Wetland, Conifer Forest, Conifer/Deciduous Mixed forest, Riparian Forested Wetland, Deciduous Forest, and various ponds/Lakes **(figure 1).** The land has two main parts referred to as the "upper" and "lower" property. The lower property is where the boardwalk, pond, interpretive center and one access road are located. The upper property is much larger and contains two access roads and Jenkins Creek. The lower property is much more saturated but the different habitat types are seen through out the property.

Hydrology

The hydrology running through this site is brought in primarily by precipitation. The amphibian pond located on the lower property, beside the education center, is man-made and an underground pipe supplies the pond with water. When the water reaches the pond it likely filters into the ground and travels to the headwaters of Jenkins Creek. The upper property also has a small pond near the far access road. The peat in this bog act like a sponge and traps most of the water that come in. Because of this, the water level in the bog, and throughout the depression in the lower property, is about 6-7 inches deep. This water is usually filtered as it passes through the peat. The water table in the bog is higher in the center of the bog rather that near the lake. Something to keep in mind is that the largest amount of saturation runs from the center of the bog down to the lake because the surrounding areas are more upland and do not hold as much water. The major outlet for the water in this bog is the headwaters of Jenkins Creek.

Purpose/Objectives:

Note: The purpose of this report is to explain how I monitor wildlife, why it's important, and how to replicate my methods.

My main project at SHADOW is to monitor the property with several different techniques in order to document the type of wildlife that use the area for shelter, feeding, and breeding purposes. By doing this we can analyze colonization success, biodiversity, and abundance of wildlife found on the property as restoration of the bog progresses forward. As with any restoration project we hope to see the biodiversity and frequency of native animals on the property increase as the land gets restored back to its natural state. With better understanding of what species use this land it will provide important information towards reestablishing much needed migration corridors along Shadow Lake.

Field Methodology:

In order to monitor wildlife from many different habitats I will be performing several different surveying techniques throughout the property. First, I have access to two wildlife cameras that I split between the upper and lower property. Second, I conduct point-count bird surveys routinely during my visits. Third, I also set traps to conduct amphibian transects in the pond. Fourth, I examine scat and foot prints found on the property while I'm performing my surveys and transects. Lastly, opportunistic sightings are always documented- learning to be observant has allowed me to document many more animals. By combining the results from all of

these methods, I will be able to produce a more accurate representation of the biodiversity found on the property and reveal a more complete picture of animal types who use the area. For the purposes of this report I have mapped out locations, frequency, materials, and examples of each sampling technique. Field methodology is as follows:

Camera Traps
Materials: Laptop, and two Moultrie I50 Digital Game Cameras

These cameras are a fantastic ways to capture biodiversity and get an inside look at how wild animals are behaving on the property. They're sometimes referred to as 'camera traps' because they are a safer alternative to physically trapping or snaring animals to sampling wildlife. Since there is only access to two cameras I split them up between the lower and upper property to cover more ground. I also rotate them in fixed locations, which are strategically places in different habitat types **(figure 2).** By splitting them up and rotating them you then eliminate variables such as season, location, and habitat type affecting the types of animals you capture.

The cameras themselves are camouflaged, motion activated, and have a night vision feature. When you find the perfect location for the camera (usually pointing down a game trail or near a scat sample) you strap the camera to the tree. Then you can open the face of the camera and aim it with a laser pointer. I usually aim it at about waist height because allows you to capture small and large animals **(figure 3).** After aiming you need to erase the cameras internal memory so it has room for new videos. Because these cameras are motion activated it is very important to remember to whack down any shrubbery immediately surrounding the camera that might move and trip the motion sensor. If you don't you will capture many false videos and waste your cameras battery. It takes D batteries, which need to be changed about every six months.

About every other month I like to bait a trap in hopes of attracting more elusive animals to the cameras. If this is something you would like to try keep in mind the best bait to use is something that will not spoil out in the sun- such as meat or dairy products. I usually use canned cat or dog food (making sure to leave no garbage or sharp items behind).

I find that the efficient way to check the cameras is to bring a laptop to the camera and upload the videos straight to your computer- erasing the card and internal memory immediately after. Then you can move the camera to its next location. When the data is collected on my computer I like to count and sort them by animal.

Point-count Bird Survey
Materials: Pen, paper, binoculars (optional), bird guide (optional),

I decided to use this technique because it is a great way to sample the birds in the area. Although this is a rather simple survey to conduct it helps to skilled in

identifying birds by sight and sound- if you are not, it would help to bring along a more experienced birder. The best days to perform these surveys are on nice, sunny days when visibility is at its highest.

In order to be consistent data I chosen five fixed locations around the property to perform these surveys at least twice a month **(figure 4)**. The best way to conduct this type of survey is to approach the sites quietly and stand still for five minutes before you start recording data. This will give the birds in the area time to calm down and get use to your presence. You should record any bird you see or hear within ear or eyeshot- this includes birds flying overhead **(figure 5).** I usually spend five minutes at each point actively collecting data- ten minutes total with the calm down period.

Opportunistic sightings of birds while on the property are hugely important. I also find that Excel spreadsheets are the best way to collect data and keep in organized **(figure 6).**

Amphibian Transects

Materials: Two liter pop bottles that have been made into traps, pen, paper, and boots

Amphibian transects are usually performed in lakes, ponds, or streams in order to sample the types of amphibians living in or near that body of water. The transects I conduct at SHADOW are performed in the pond located next to the interpretive center and are performed at least twice a month **(figure 7)**. Generally speaking, transects are usually accomplished by setting traps or relying on manual observation. In order to collect plenty of data and tangible evidence I have decided to do both. The traps I use are made from recycled two liter pop bottles- with the neck of the bottle cut and inverted it creates a perfect one-way trap **(figure 8)**. These are great for catching small amphibians and other aquatic larvae so you can further examine them and assess the level of biodiversity in the pond.

While these traps can easily capture tadpoles, salamander larvae, and other insect larvae, larger frogs and salamanders do not fit. I suggest scanning the area and capturing them by hand **(figure 9)**. I find the best way to do this is a combination of looking for animals while you are setting the traps, circling the pond while examining the banks for any movement, and wading through the water.

When I arrive at SHADOW the first thing I do is set the traps and let them soak for the remainder of my time there and I remove them before I leave. I start by submerging six traps, evenly dispersed in the pond. While I am doing this I make sure to be as quiet as I can and very observant. I leave the traps for the duration of my visit, which is usually around 2.5-3 hours. When I remove the traps, I identify the animals, take pictures of new species, record the information, and release the native species back into the pond. I find that Excel spreadsheets are very helpful in

collecting the data in the field, keeping the data organized, and sorting previously collected data **(figure 10).**

<u>Note</u>: If highly invasive animals are captured during transects they are to be disposed of. One example of this found in the pond is Bullfrogs. Wetlands consist of sensitive habitats that can easily be disturbed by the presence of invasive species. If left unchecked, Bullfrogs can multiply and overtake habitat and native amphibians in the pond. The most humane ways to dispose of Bullfrogs are to either let the tadpoles dry out on land (and become food for other animals in the forest) or poke a stick through the head of larger, mobile frogs. I realize this sounds terrible, but incase you need further convincing, disposing of invasive Bullfrogs is considered a sport called "gigging" and it is the quickest, most humane way to dispose of them.

Animal Track and Scat Sampling
<u>Materials</u>: Camera, Scat/track guide (optional)

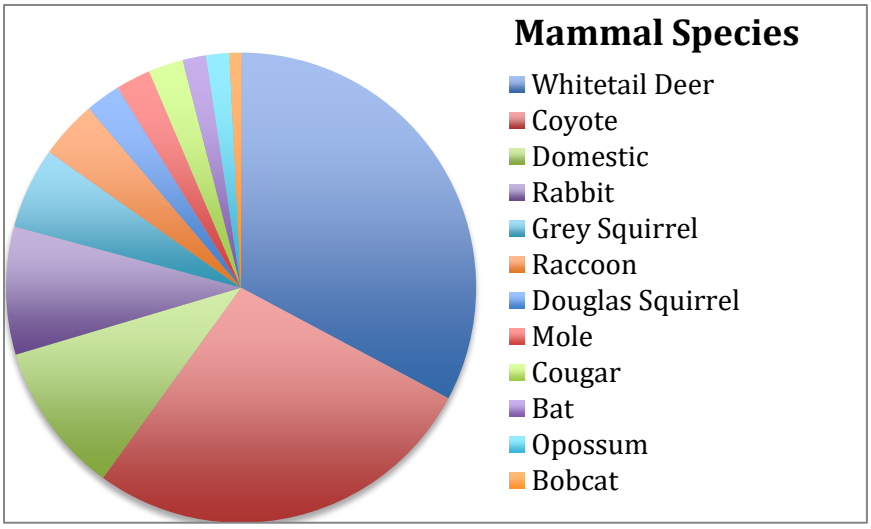
This sampling technique is very rudimentary. Personally, I do not have much experience with identifying scat and tracks, so I am learning as I go. Finding scat and animal tracks are very important evidence of animal presence on the property so I should not be over looked. I tend to find more evidence on trails and access roads **(figure 11).** The best way to find scat and tracks is by being very observant while checking camera traps or walking on trails you know animals frequent.

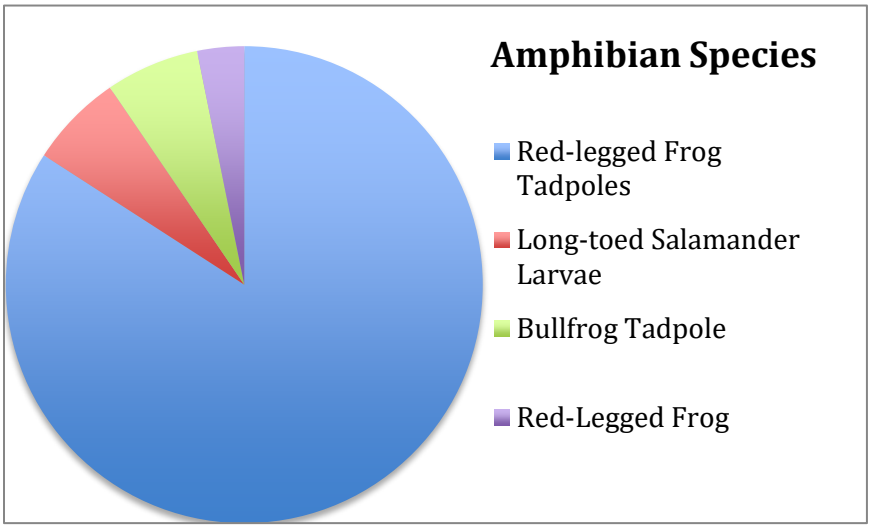
When I find evidence while I'm working in an area the first thing I do is take a picture **(figure 12-A)**. This way I can visually record the data and further research the scat on the Internet when I get home. Besides scat, I also like to take pictures of other evidence of animals when I find it on the property **(figure 12-B).** Sometimes, when the scat contains animal parts, I find a stick to flip the scat over and take more pictures.

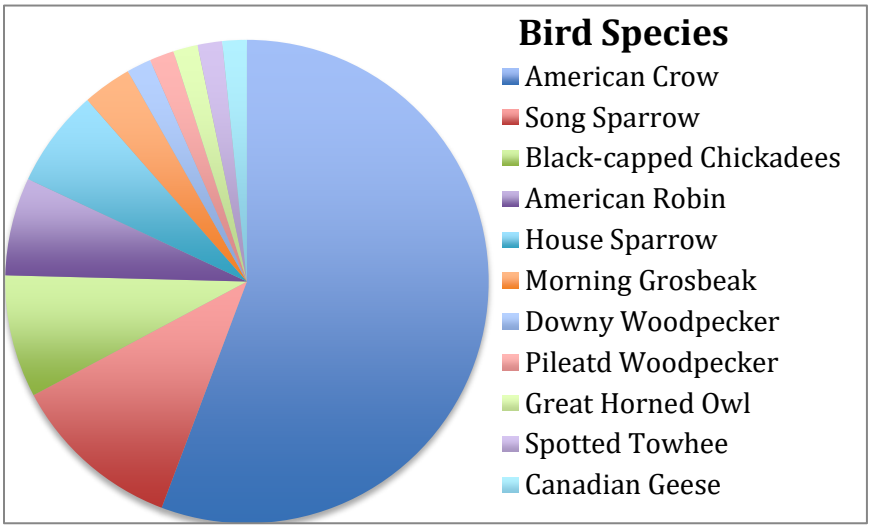
<u>Note</u>: It is very important that you do not touch or pick scat up with your hands. Because you are dealing with wild animals some scat may contain harmful bacteria- the last thing you want is to get this into your system. If you happen to touch scat do not put your hand in your mouth and wash them as soon as you can.

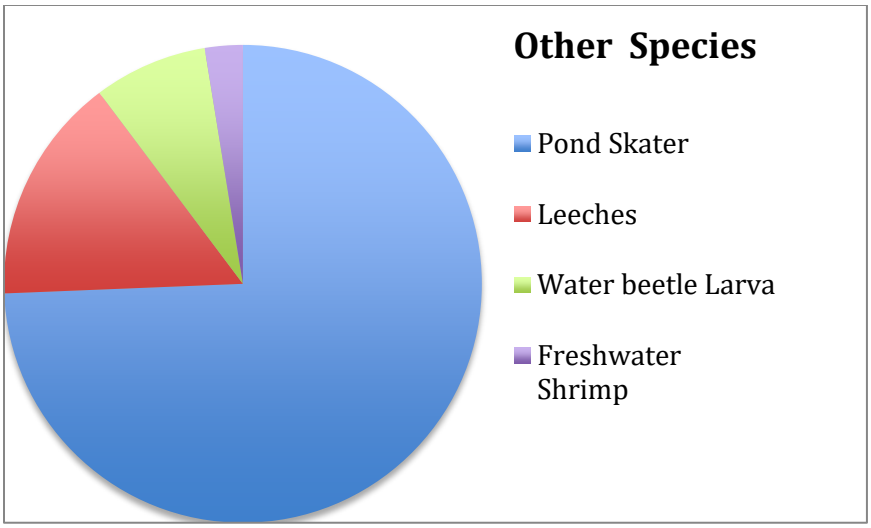
<u>Results:</u>

<u>Note</u>: the following pie charts are only the results of the data I have collected thus far. I wanted to give an example of one way to create a clear, visual aid to display collected data. These charts and tables will be updated as more data is collected.


Mammal Species
Whitetail Deer
Coyote
Domestic
Rabbit
Grey Squirrel
Raccoon
Douglas Squirrel
Mole
Cougar
Bat
Opossum
Bobcat


Amphibian Species
Red-legged Frog Tadpoles
Long-toed Salamander Larvae
Bullfrog Tadpole
Red-Legged Frog


Bird Species
American Crow
Song Sparrow
Black-capped Chickadees
American Robin
House Sparrow
Morning Grosbeak
Downy Woodpecker
Pileatd Woodpecker
Great Horned Owl
Spotted Towhee
Canadian Geese


Other Species
Pond Skater
Leeches
Water beetle Larva
Freshwater Shrimp

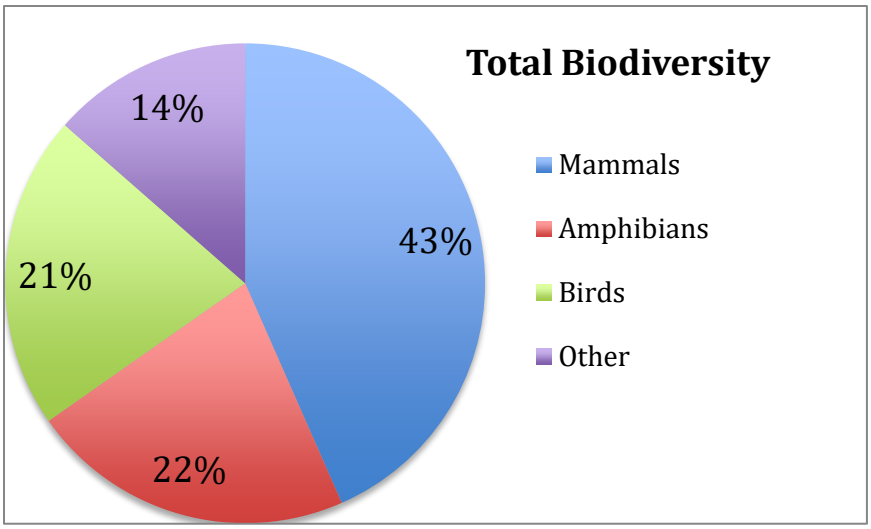

Total Biodiversity
14%
43%
21%
22%
Mammals
Amphibians
Birds
Other

Table of results:

SHADOW Lake Bog Biodiversity		
Specie	**Frequency**	**Method**
Mammals		
Raccoon	5	Scat/Camera
Coyote	34	Scat/Camera
Domestic	13	Camera
Opossum	2	Camera
Douglas Squirrel	3	Camera
Grey Squirrel	7	Camera
Whitetail Deer	41	Camera
Cougar	3	Scat
Bobcat	1	Scat
Rabbit	11	Camera
Bat	2	Camera
Moles	3	Observation
Amphibians		
Red-Legged Frog	2	Transect
Bullfrog Tadpole	4	Transect
Red-legged Frog Tadpoles	53	Transect
Long-toed Salamander Larvae	4	Transect
Birds		
American Robin	4	Survey
Pileatd Woodpecker	1	Survey
Great Horned Owl	1	Survey
American Crow	34	Camera
Downy Woodpecker	1	Survey
Song Sparrow	7	Survey/Camera
Spotted Towhee	1	Survey
Morning Grosbeak	2	Survey
Canadian Geese	1	Camera
Black-capped Chickadees	5	Survey
House Sparrow	4	Survey
Other		
Leeches	6	Transect
Water beetle Larva	3	Transect
Pond Skater	29	Transect
Freshwater Shrimp	1	Transect

Work Cited:

Desmul, L. (2009). *Wildlife use of the shadow lake bog; an in-depth survey and inferences into the effect of human disturbance*. Unpublished raw data, University of Washington, University of Washington, Seattle, .

Huff, M. H., Bettinger, K. A., Ferguson, H. L., Brown, M. J., & Altman, B. (2000, 09). *A habitat-based point-count protocol for terrestrial birds, emphasizing washington and oregon*. Retrieved from ftp://ftp.csltmail.com/Engineering/public/General/Upper Truckee SEZ Restoration Project/Monitoring_Plan_Draft_ENTRIX/Appendix/H/Huff et al. Protocol.pdf

Lambert, M. (n.d.). *Visual encounter surveying (amphibians and reptiles)*. Retrieved from http://www.nri.org/publications/ecological_methods/m_chapter11_en.pdf

Figures:

Figure 1: Site map and geographic location

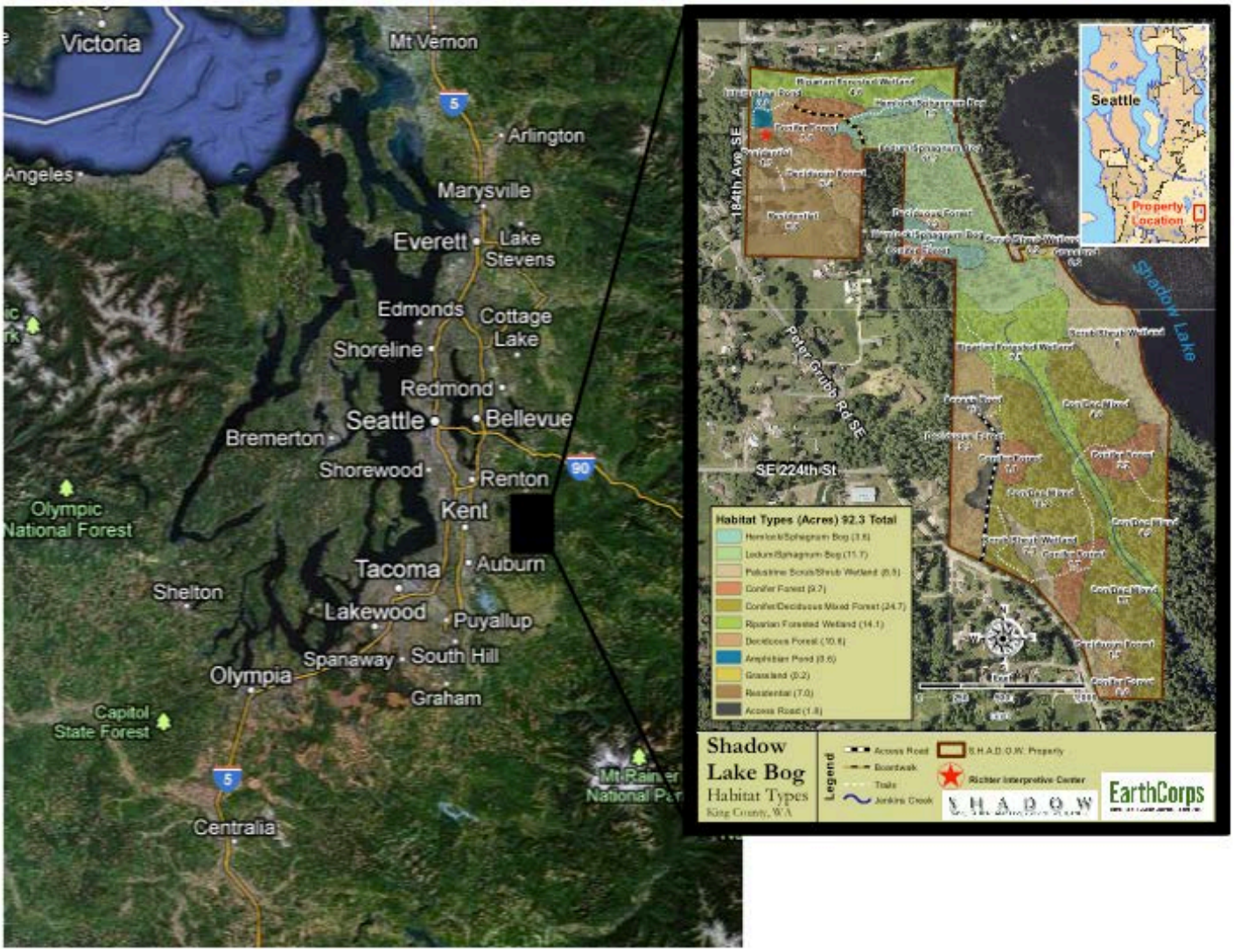


Figure 2: Wildlife camera placement

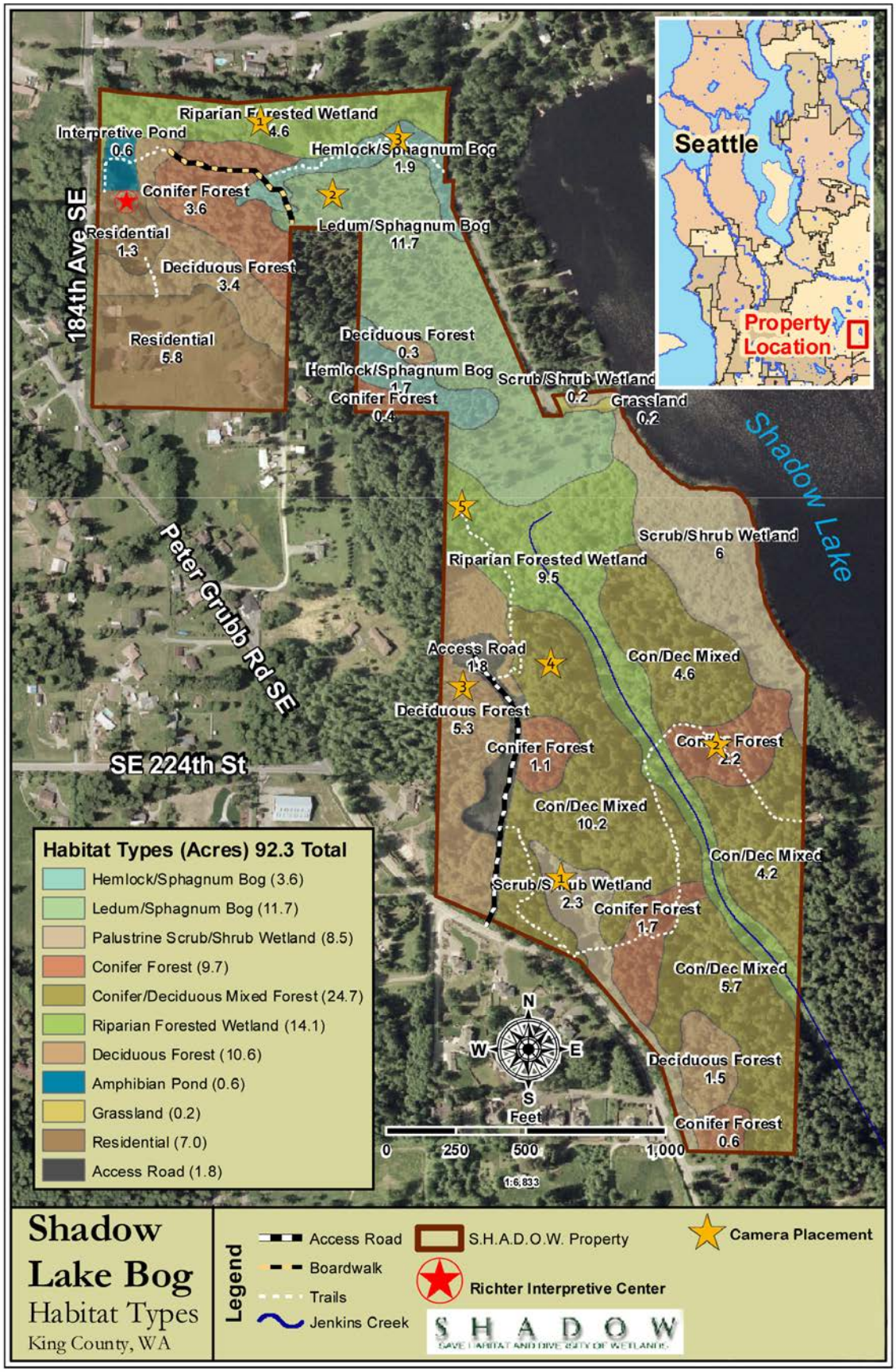


Figure 3: Example of animals caught on camera

Whitetail deer

Coyote captured on a baited trap

Five American Crows

Whitetail Deer stripping bark

Figure 4: Bird survey points

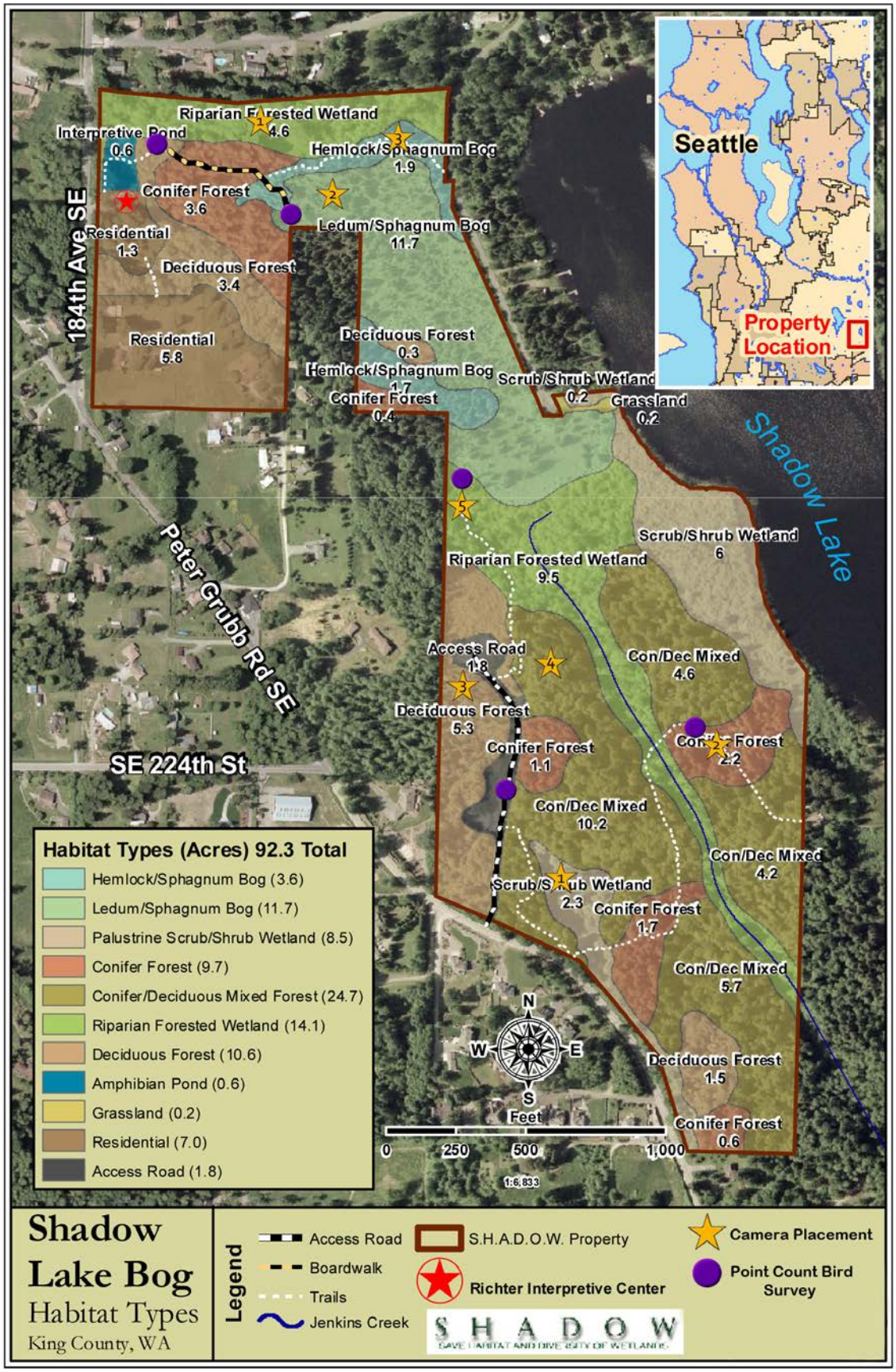


Figure 5: Examples of birds seen during survey

Pileated Woodpecker

American Robin

Morning grosbeak

Spotted Towhee

Figure 6: Example Bird survey data collection sheet

Bird Survey				
Date/Weather:				
Species	Number Observed	Sighted	Camera	Heard
American Robin	2	X		X
Pileatd Woodpecker	1	X		X
Great Horned Owl	1	X		
American Crow	23		X	
Downy Woodpecker	1			X
Song Sparrow	6	X		X
Spotted Towhee	1	X		
Morning Grosbeak	1	X		
Canadian Geese	1		X	
Black-capped Chickadees	3	X		X
House Sparrow	4	X		X

Figure 7: Amphibian transect location

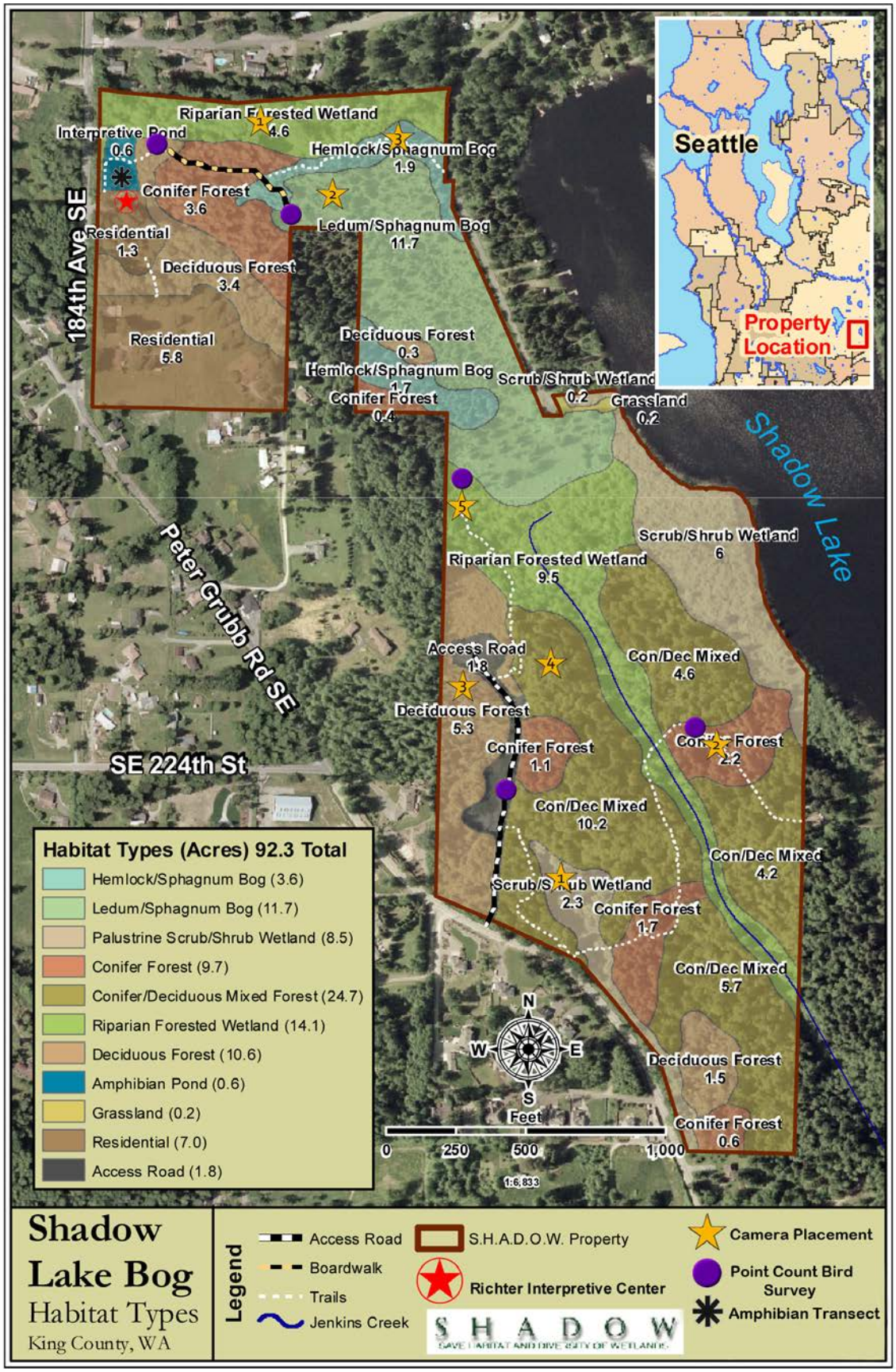


Figure 8: Pond trap design

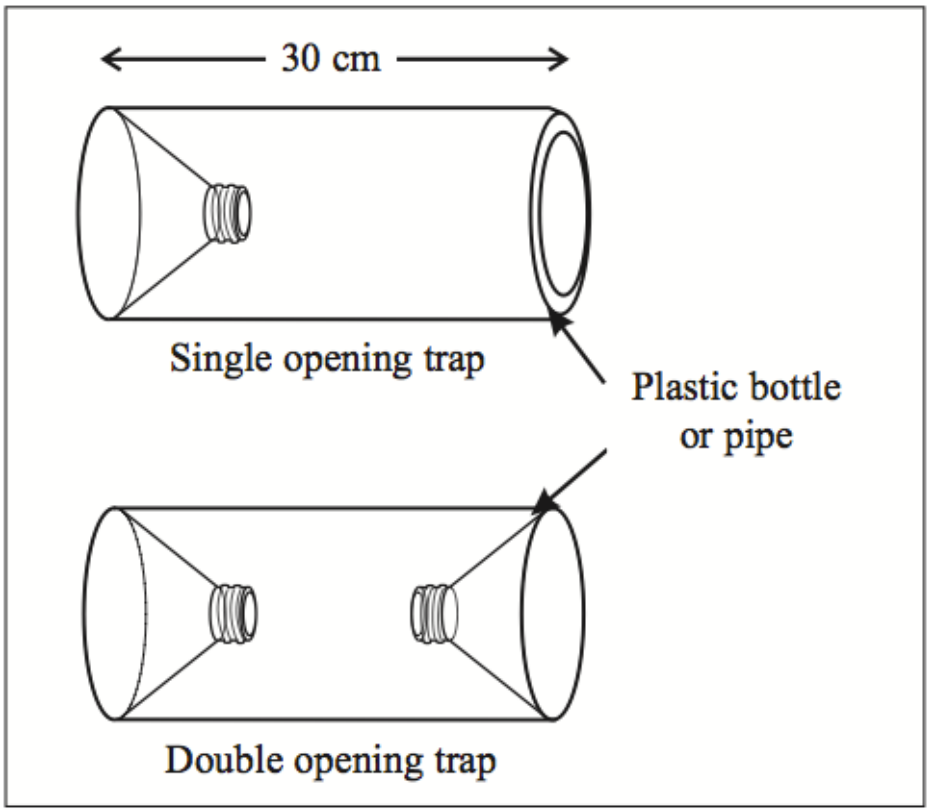
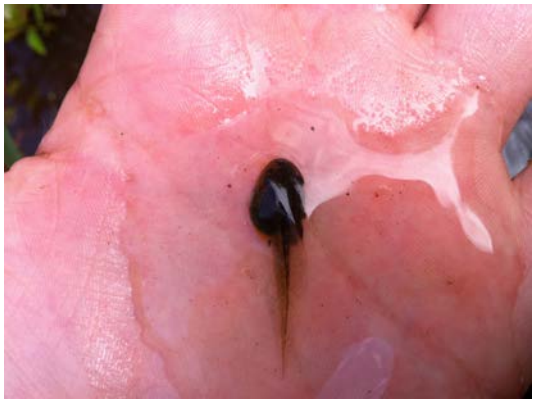


Figure 9: Examples of wildlife found during a transect

Red-Legged Frog

Tadpole



Water Beetle Larva

Long-toed Salamander

Figure 10: Amphibian transect data collection sheet

Amphibian Transect			
Date/Weather:			
Speicies	Number observed	Land	Water
Amphibians			
Red-Legged Frog	2		X
Bullfrog Tadpole	4		X
Tadpoles	49		X
Long-toed Salamander Larvae	4		X
Other			
Leeches	3		X
Water beetle Larva	3	X	X
Pond Skater	9		X
Freshwater Shrimp	1		X

Figure 11: Known scat locations

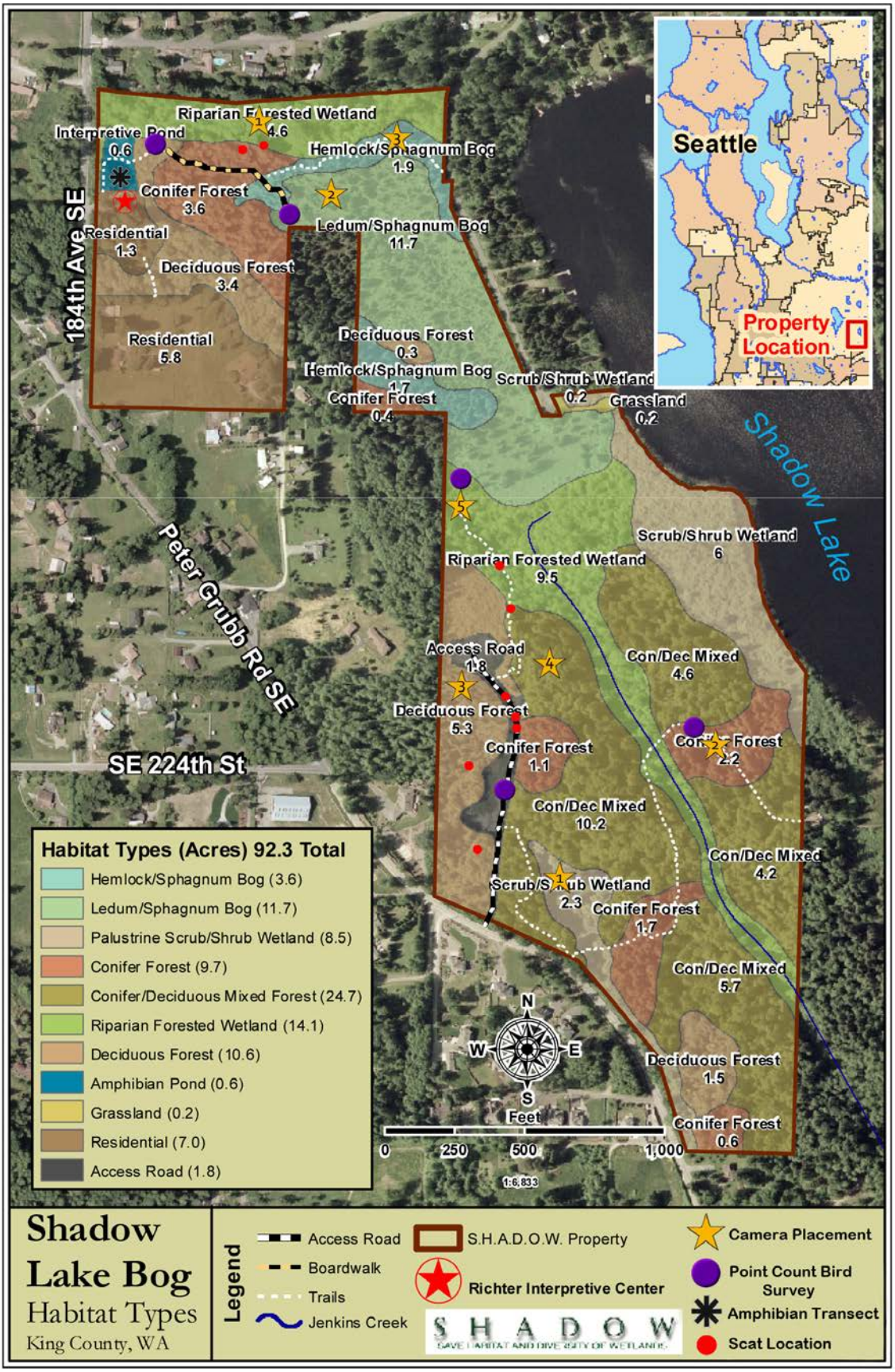


Figure 12-A: Examples of Scat

Possible cougar scat

Possible bobcat scat

Possible coyote scat

Possible cougar scat

Possible raccoon scat

Possible cougar scat

Figure 12-B : Other Evidence (bark stripped by deer)