



Beaver Habitat 2019 Map Series  
Isabel Rojas, Bark  
2020

## **Beaver Habitat 2019 Map Series**

### **Background**

In 2019, Bark began a field program with a long-term goal of creating or improving habitat for beaver, and increasing beaver populations through means of ecological restoration in the Mt. Hood National Forest. Bark's first steps in this process were to map potential beaver habitat sites in Mt. Hood National Forest, and to engage college students and Bark's volunteers to collect field data at these sites. This will feed into a prioritization of future restoration actions to be completed in partnership with the Forest Service. These actions could include hardwood plantings and beaver structure creation/placement, and ultimately the reintroduction of beavers into the restored habitat.

So far, with help from volunteers and students, Bark has surveyed 56 locations for potential beaver habitat restoration. Survey protocols were adapted from the [Methow Beaver Project](#), and sites were ranked by suitability for beaver restoration/reintroduction potential. This was done over the course of three Portland State University terms and Bark's two-week summer "Base Camp" event held in Mt. Hood National Forest. Ultimately, these sites identified and surveyed will be individually selected by their attributes for future restoration activities, in coordination with the USFS.

Isabel Rojas, GIS analyst at Bark, has compiled and analyzed large geospatial datasets, organized survey reports, while producing inventory maps. Her project focused on mapping potential habitat for rehabilitated beavers in Mt. Hood National Forest, and organizing the following map series to reflect the results of that work.

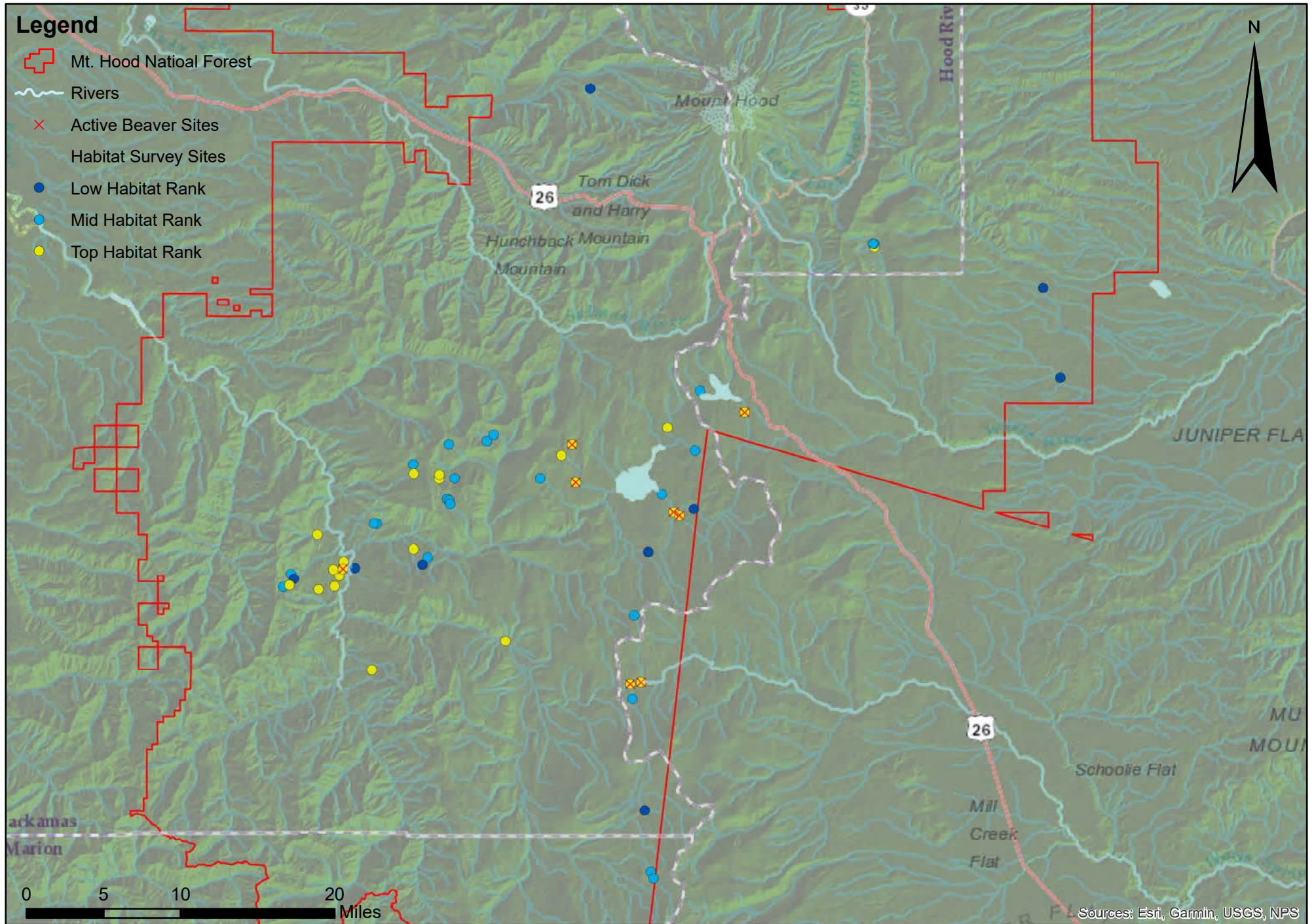
### **Sections of this map series include:**

1. Forest wide map displaying all survey sites visited during Bark's 2019 field season, and their relative habitat quality ranks obtained through field data collection. Also included are the presence/absence of resident beavers.
2. Focused habitat component maps showing the relative presence of three key habitat features at high quality habitat sites: 1) water cover; 2) woody food; and 3) stream discharge. These maps were designed to be navigable for additional field verification/restoration project planning and design.
3. Bark's field data sheet and associated survey protocol.
4. Complete dataset obtained through 2019 fieldwork.

Questions about this map series can be directed to [isabel.i.rojas95@gmail.com](mailto:isabel.i.rojas95@gmail.com)

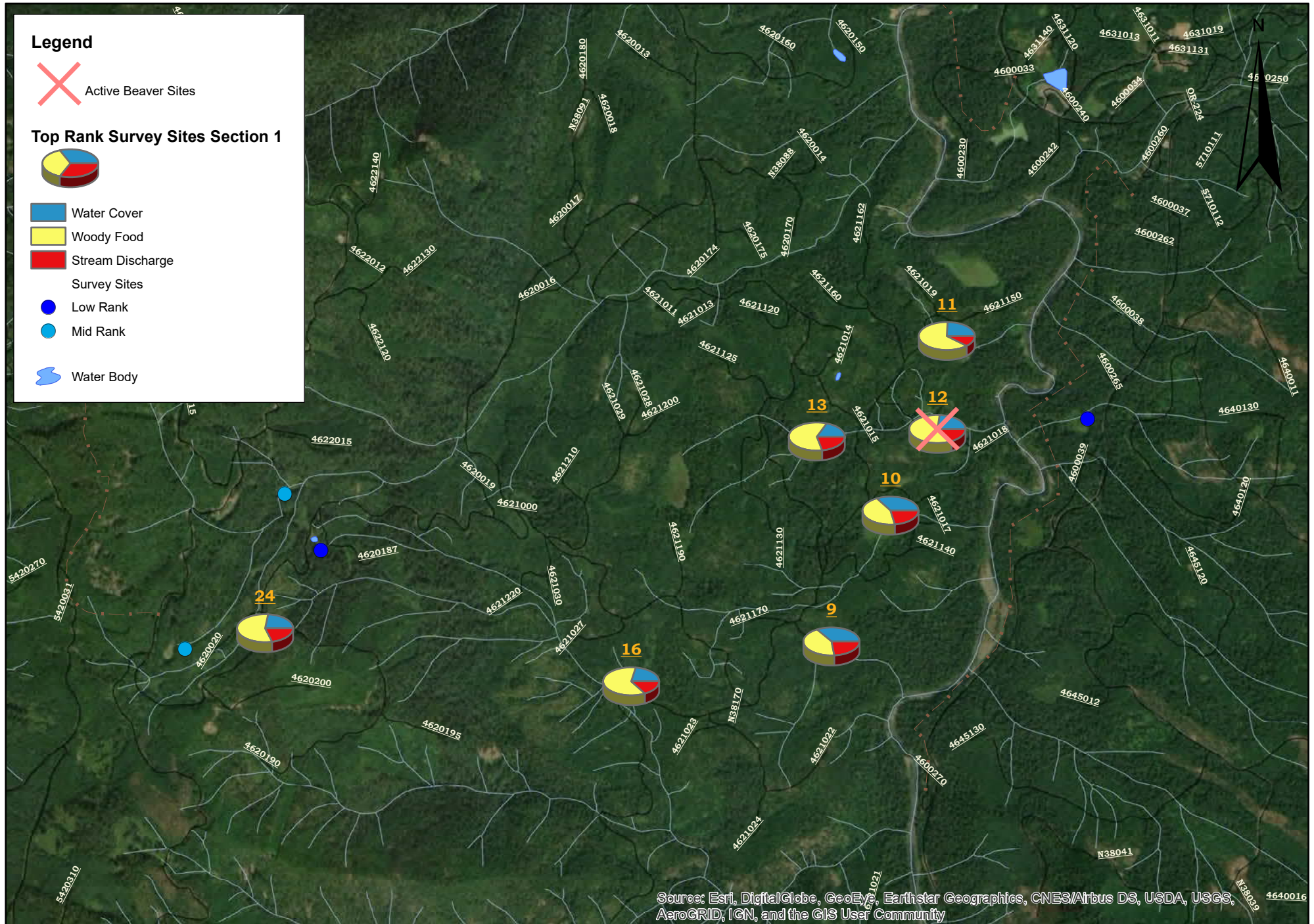


# Bark's 2019 Beaver Habitat Surveys





# Bark's 2019 Beaver Habitat Surveys



0 0.5 1 2 Miles

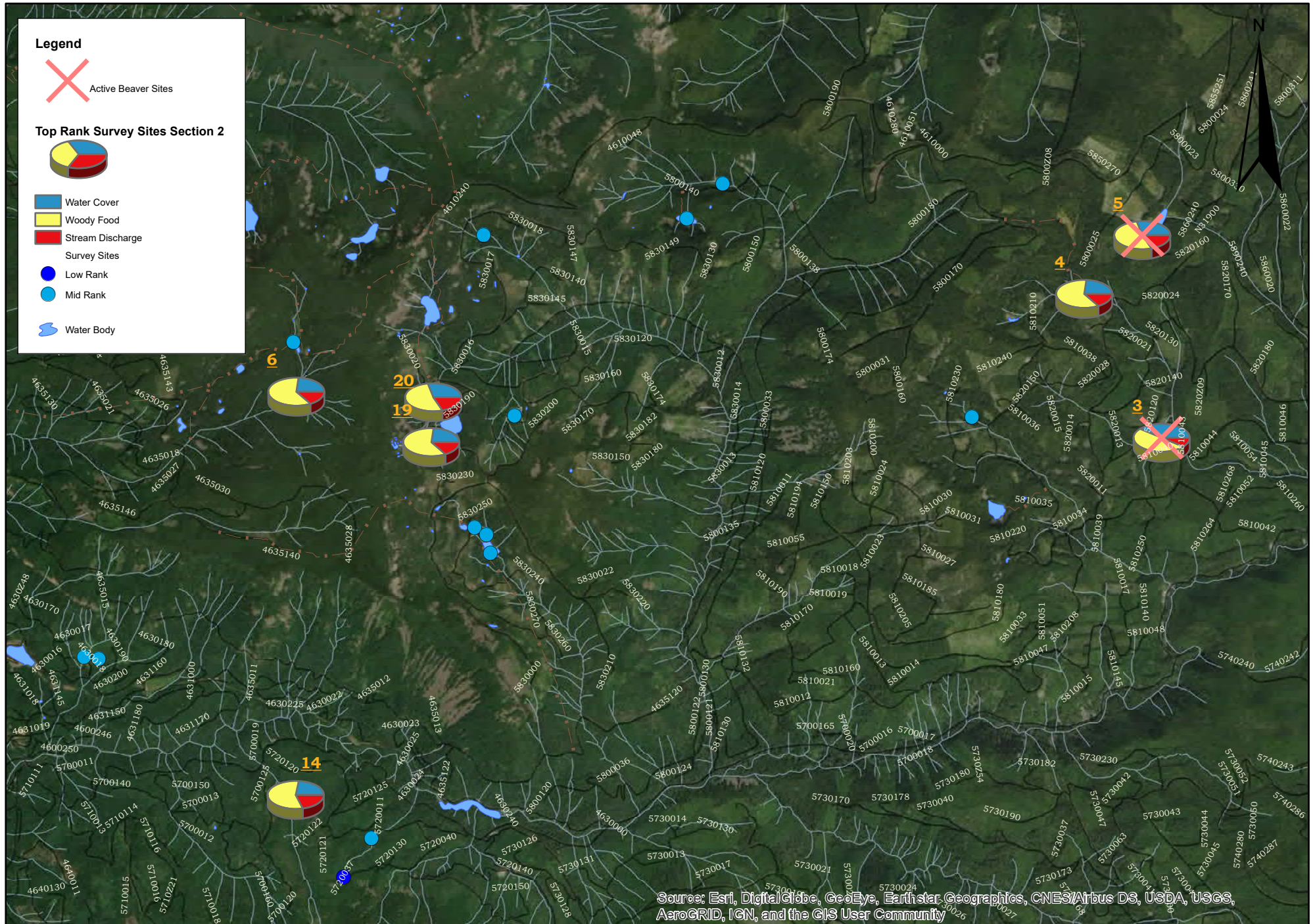
Data Acquired from: Oregon Spatial Data Library, FSGeodata, Clearinghouse

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# Bark's 2019 Beaver Habitat Surveys



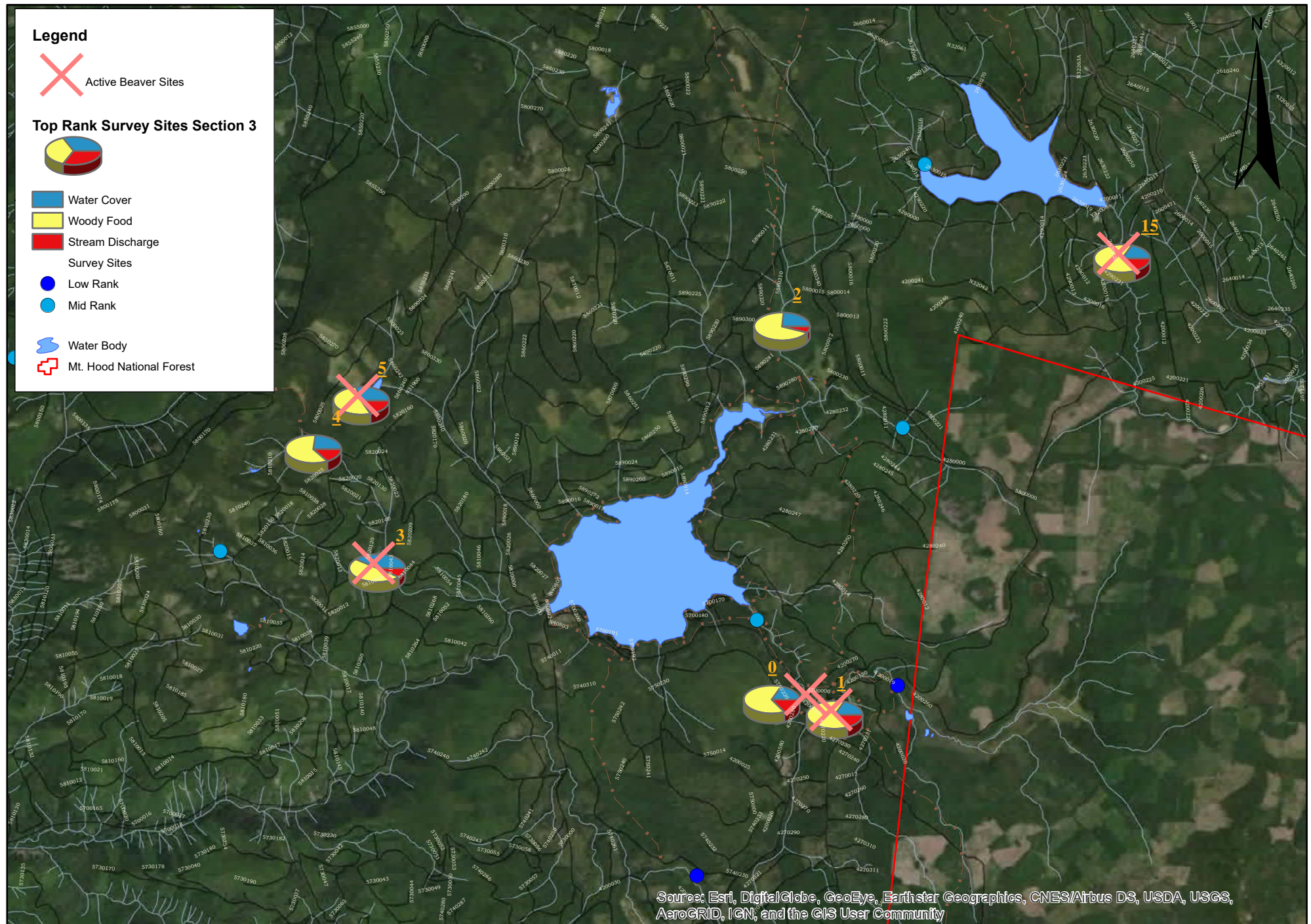
0 1 2 4 Miles

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Data Acquired from: Oregon Spatial Data Library, FSGeodata, Clearinghouse





# Bark's 2019 Beaver Habitat Surveys



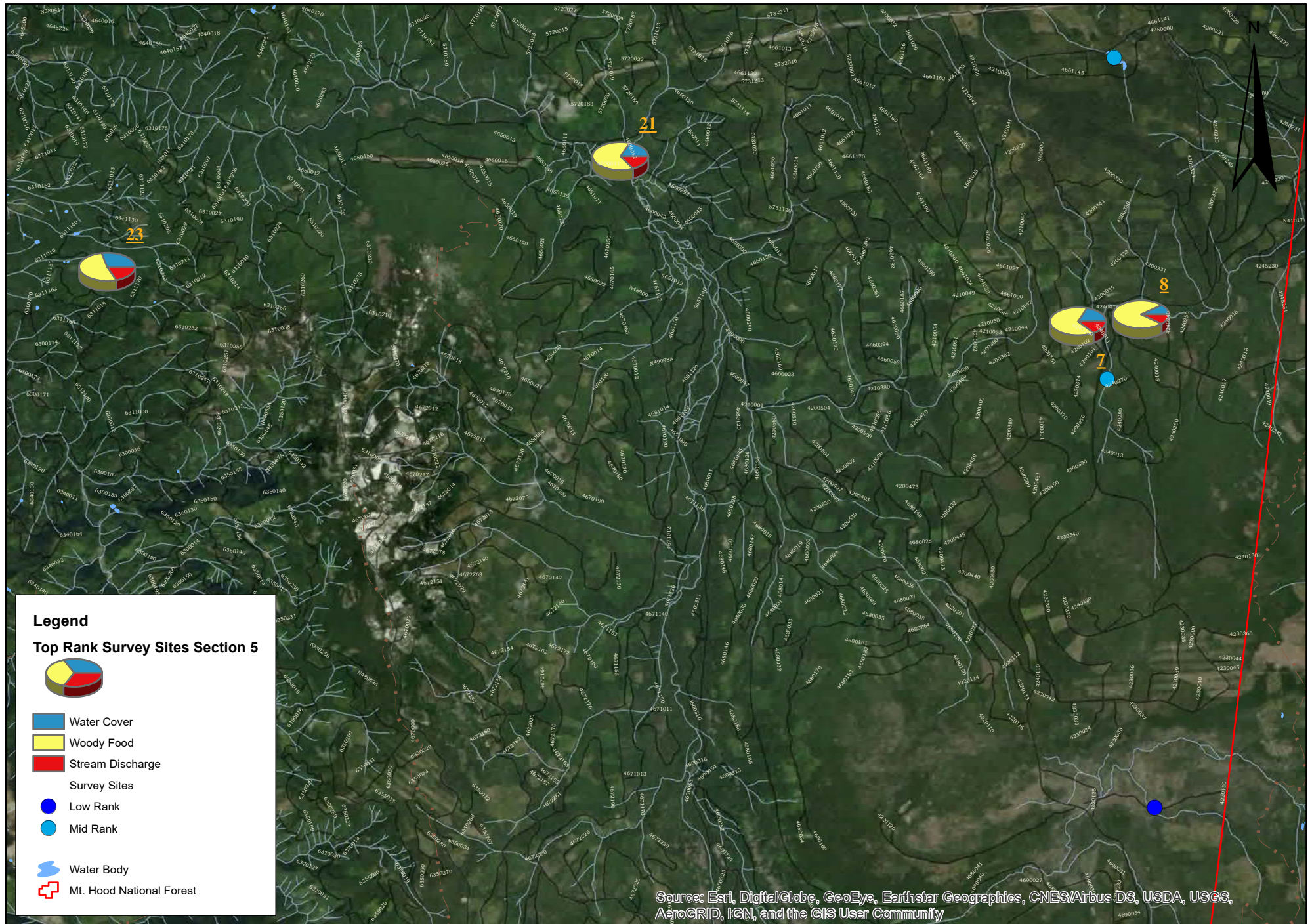
0 1.25 2.5 5 Miles

Isabel Rojas, 2020  
Data Acquired from: Oregon Spatial Data Library, FSGeodata, Clearinghouse





# Bark's 2019 Beaver Habitat Surveys



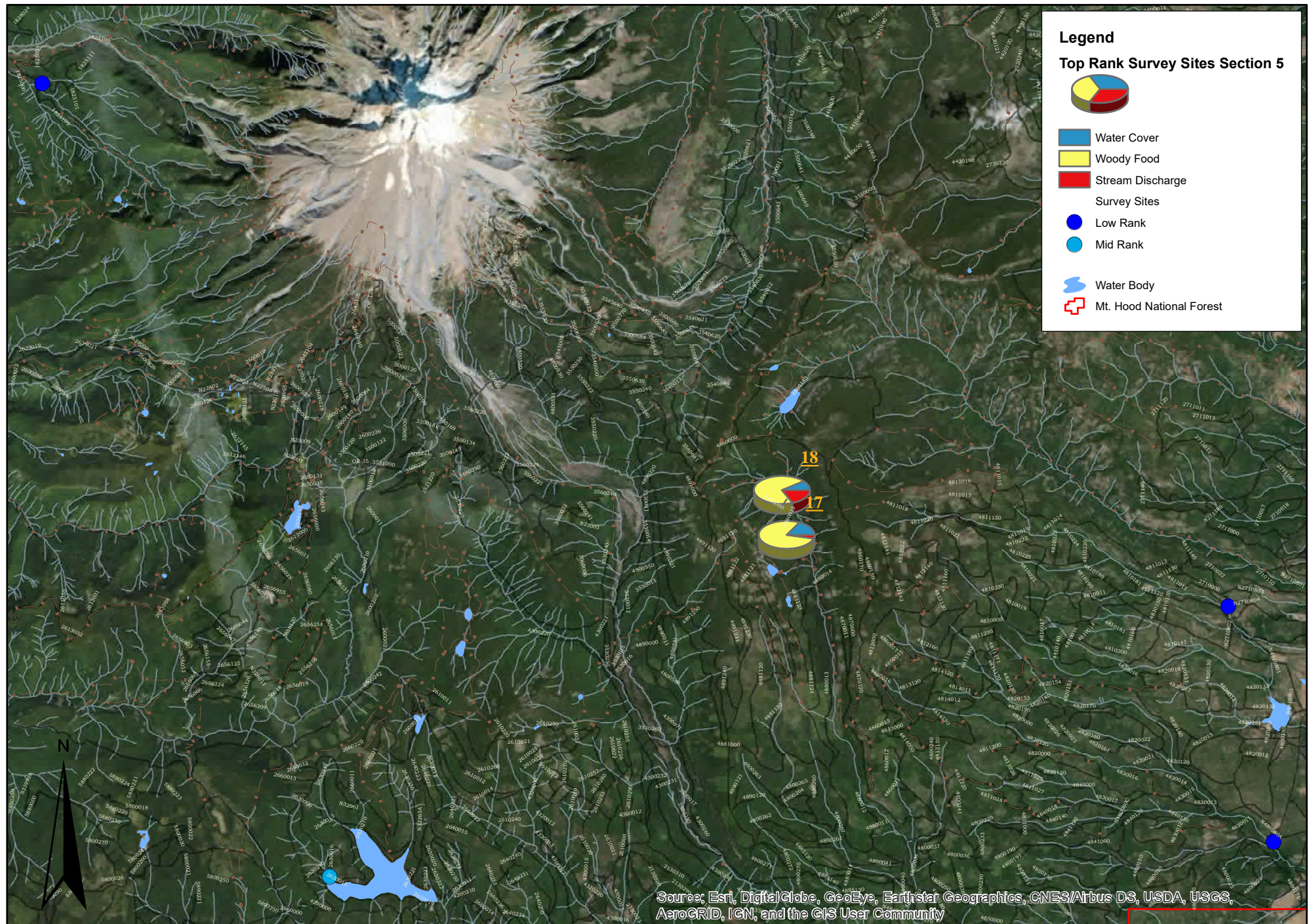
0 1.5 3 6 Miles

Isabel Rojas, 2020  
Data Acquired from: Oregon Spatial Data Library, FSGeodata, Clearinghouse





# Bark's 2019 Beaver Habitat Surveys



0 2.25 4.5 9 Miles

Isabel Rojas, 2020  
Data Acquired from: Oregon Spatial Data Library, FSGeodata, Clearinghouse





# Beaver Reintroduction Project - Beaver Site Assessment Surveys

Date: \_\_\_\_\_ Observer(s): \_\_\_\_\_ Site Name: \_\_\_\_\_

Watershed: \_\_\_\_\_ GPS Coordinates: \_\_\_\_\_

**Initial screening** — the following conditions may change the site's suitability

☐ Recent beaver presence or activity, describe \_\_\_\_\_

☐ Heavy human infrastructure/presence, describe \_\_\_\_\_

\_\_\_\_\_ **Woody food score = multiply a x b x c**

- |    |                            |                     |                            |
|----|----------------------------|---------------------|----------------------------|
| a. | ① Other hardwoods          | ② Includes alder    | ③ Includes willow or aspen |
| b. | ① Within 300 feet of water | ② Within 100 feet   | ③ Within 30 feet           |
| c. | ① Dozens of stems          | ② Hundreds of stems | ③ Thousands of stems       |

\_\_\_\_\_ **Herbaceous food (grasses and non-woody flowering plants, Scale 0—3)**

- ① No grasses/herbs      ② 25% cover      ③ >50% cover

\_\_\_\_\_ **Woody building materials, conifers or hardwoods 1-6-inch diameter (Scale 1—5)**

- ① Dozens of stems      ② Hundreds of stems      ⑤ Thousands of stems

\_\_\_\_\_ **Dominant stream substrate (Scale 0—5)**

- ① Rock      ② Sand or cobble      ⑤ Silt/clay/mud

\_\_\_\_\_ **Historic beaver use (Scale 0—10)**

- ① No signs of previous use      ⑤ Multiple old beaver chew marks      ⑩ Old dams, lodges, and chew

\_\_\_\_\_ **Floodplain structure (Scale 1—10)**

- ① Narrow & steep, 'V' shaped channel      ⑤ wider, "\_\_\_" shaped channel      ⑩ Wide and flat, adjacent floodplain area

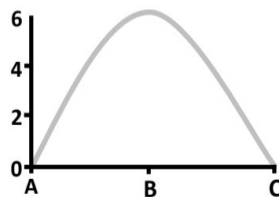
\_\_\_\_\_ **Stream gradient (Scale 1—5)**

- ① ≥9%      ③ ~5%      ⑤ ≤3%

\_\_\_\_\_ **Water cover (Scale 0—10)**

- ① No pools      ⑤ At least 1 pool > 1.5 feet deep and 15 feet wide      ⑩ Multiple pools > 3 feet deep >30 feet wide

\_\_\_\_\_ **Stream discharge (Scale 0—6)**



**A:** Intermittent flow (no flow or < garden hose)

**B:** Year-round flow, but never destructive (flow similar to 10" - 30" pipe)

**C:** Destructive flow that may inhibit damming (flow too high to wade safely)

\_\_\_\_\_ **TOTAL SCORE**



## **Data collection protocol:**

Completing this scorecard will allow Bark to rank potential beaver reintroduction sites in Mt. Hood National Forest by using criteria known to influence the presence and persistence of the species.

- **You will need:** 1) Datasheet with clipboard, 2) measuring tape, 3) a smartphone with the Avenza app and site map downloaded, and 4) a clinometer.
- **Divy up tasks:** In a group of 3-4 surveyors, choose one person to be the “scribe”, who will be responsible for making sure the scorecard is completely filled out. One additional person will be using Avenza to keep track of the team’s route, dropping pins, and taking photos. And the remainder of the group will generally be responsible for taking measurements, and making observations known to the other two teammates.
- **Choosing your survey location:** Using the Avenza app for navigation, safely walk as much of the delineated site as possible. Record your track in the app. After you have done this, choose the location of your survey based on the following: deepest and widest water, greatest amount of mud substrate, flattest terrain, greatest number of old beaver structures, and greatest number of hardwood trees closest to the water. If you begin your survey and later find a more appropriate location based on these criteria outside the delineated area, start your survey over at this location.
  - In your initial exploration, look for the plants listed on the form and look around to see what woody building material 1-6 inches in diameter exist. Walk the streambanks to see how much mud is available for building and digging. Look for old beaver lodges, dams and chew on branches. Pay close attention to how steep vs. flat and narrow vs. wide the stream channel is overall. How many deep, wide pools exist, if any? Does this stream flow year-round? What kind of flow does this stream have compared to a garden hose, road culvert, or river rapid?
- **Datasheets:** When you are ready to begin your survey, record your scores for each category listed on the datasheet. For each category, select a score within the range that is provided. The extremes as well as the mid-ranges are listed to help you better gauge a score based on your observations, but all numbers between those listed are options for selection.
- **Measuring stream gradient:** Use a clinometer to record the slope of the stream channel. Do this across three 30-foot segments of the bank. If this isn’t possible, try to break up the stream channel or pond inflow/outflow into 2 or more sections where you can visually measure ~30 feet of slope parallel to the direction of water flow.
- **Remember:** Date, name of observers, the site name on the map provided, watershed, and GPS coordinates (include the location of the pin you drop in Avenza at your initial survey site). As you are exploring the site, remember to take photos and drop pins in Avenza to display locations of your survey site. Include photos of any sign of beaver presence (old or recent). When you get back home, export your Avenza data and send it to [michael@bark-out.org](mailto:michael@bark-out.org)
- **Total your score:** At the end of your survey, total all the scores recorded on the bottom of the scorecard.



## Beaver Habitat Surveys 2019

FID	Watershed	X Coord	Y Coord	Active Beaver	Dominant Woody	Herbaceous Food	Woody Building Materials	Stream Substrate	Historic Beaver Use	Floodplain Structure	Stream Gradient	Water Cover	Stream Discharge	Total Score
0	Oak Grove Fork Clackamas	-121.95676	45.12251	No	18	3	3	3	0	8	10	3	0	48
1	Oak Grove Fork Clackamas	-121.7624	45.112	No	18	3	4	2	4	6	9	5	5	56
2	Oak Grove Fork Clackamas	-121.7513	45.1001	Yes	27	3	1	5	10	10	10	7	6	79
3	Oak Grove Fork Clackamas	-121.7459	45.0978	Yes	27	3	3	5	10	10	10	7	6	81
4	Oak Grove Fork Clackamas	-121.7325	45.1022	No	9	3	4	1	0	8.5	10	0	0	35.5
5	Oak Grove Fork Clackamas	-121.75708	45.15601	No	27	3	5	5	10	10	10	9	2	81
6	Oak Grove Fork Clackamas	-121.8431	45.1198	Yes	12	3	3	5	10	7	8	10	2	60
7	Oak Grove Fork Clackamas	-121.8567	45.13763	No	27	3	5	5	10	10	10	10	6	86
8	Oak Grove Fork Clackamas	-121.8465	45.1449	Yes	18	3	1	5	5	10	10	10	6	68
9	Oak Grove Fork Clackamas	-121.9265	45.147	No	18	2	5	5	0	7	8	10	0	55
10	Middle Clackamas River	-121.9956	45.1317	No	18	3	3	2	0	9	5	9	4	53
11	Oak Grove Fork Clackamas	-121.9202	45.15131	No	27	3	4	4	5	7	9	0	0	59
12	Middle Clackamas River	-121.9951	45.1255	No	27	3	5	4	10	8	4	10	6	77
13	Oak Grove Fork Clackamas	-121.9622	45.1449	No	18	2	3	2	0	8	1	5	1	40
14	Oak Grove Fork Clackamas	-121.7884	45.0318	No	0	3	5	5	5	10	10	5	0	43
15	Warm Springs River	-121.792	44.9862	Yes	27	3	4	5	8	9	8	7	5	76
16	Warm Springs River	-121.7819	44.9874	Yes	27	3	4	4	6	9	9	3	3	68
17	Warm Springs River	-121.7901	44.9762	No	18	3	3	4	5	8	9	2	6	58
18	Upper Clackamas River	-121.7785	44.9022	No	6	1	5	2	0	5	9	0	0	28
19	Middle Clackamas River	-122.0693	45.0512	No	9	3	3	5	10	10	10	8	5	63
20	Middle Clackamas River	-122.0649	45.0581	No	12	3	3	5	10	10	10	10	6	69
21	Middle Clackamas River	-122.0607	45.0673	No	27	3	5	5	10	10	10	10	4	84
22	Middle Clackamas River	-122.0614	45.0624	Yes	27	3	4	5	10	10	10	10	6	85
23	Oak Grove Fork Clackamas	-121.9819	45.0701	No	12	3	4	4	7	8	9	6	6	59
24	Middle Clackamas River	-122.0704	45.062	No	18	3	3	5	10	10	10	5	6	70
25	Oak Grove Fork Clackamas	-121.9952	45.0755	No	18	3	5	4	10	10	10	7	6	73
26	White River	-121.6848	45.1662	Yes	27	3	4	5	7	9	9	7	6	77
27	Middle Clackamas River	-122.08425	45.0491	No	18	3	5	4	5	10	5	6	4	60
28	Middle Clackamas River	-122.0502	45.06293	No	9	3	5	2	0	10	7	0	0	36
29	Middle Clackamas River	-122.1101	45.059	No	8	3	2	5	8	10	5	7	4	52
30	Oak Grove Fork Clackamas	-121.9638	45.1087	No	9	2	4	4	0	8	5	8	2	42
31	Oak Grove Fork Clackamas	-121.9617	45.1078	No	27	3	5	2	0	10	4	1	5	57
32	Oak Grove Fork Clackamas	-121.961	45.1055	No	18	1	5	3	0	9	5	10	3	54
33	White River	-121.5632	45.27534	No	27	3	2	5	0	10	10	5	1	63
34	Middle Clackamas River	-122.11755	45.05081	No	12	3	3	5	5	10	5	10	5	58
35	White River	-121.3889	45.18902	No	6	3	1	4	2	5	0	3	3	27
36	White River	-121.5649	45.2777	No	27	3	5	3	8	7	10	3	6	72
37	White River	-121.56338	45.27747	No	12	3	4	2	0	6	8	0	6	41
38	Oak Grove Fork Clackamas	-122.0298	45.0924	No	18	3	4	5	7	7	3	5	5	57
39	Oak Grove Fork	-121.97138	45.12211	No	27	3	4	5	9	10	5	10	6	79
40	oak Grove fork	-121.97105	45.12482	No	18	3	2	5	5	10	5	10	6	64



## Beaver Habitat Surveys 2019

41	Upper Sandy River	-121.8296	45.38	No	12	1	1	1	0	8	1	0	5	29
42	Oak Grove Fork Clackamas	-121.87644	45.12239	No	27	3	4	5	2	0	8	7	0	56
43	White River	-121.7267	45.1803	No	18	2	5	1	4	3	8	0	0	41
44	Oak Grove Fork Clackamas	-121.73143	45.14085	No	8	3	4	5	0	8	9	2	1	40
45	Oak Grove Fork Clackamas	-121.7752	45.07369	No	6	3	5	3	0	10	10	0	0	37
46	Oak Grove Fork Clackamas	-121.9868	45.0653	No	6	3	3	1	0	4	8	0	0	16
47	Upper Clackamas River	-121.7728	44.8614	No	27	3	3	4	0	10	10	1	1	59
48	Upper Clackamas River	-121.7703	44.8571	No	27	3	1	1	0	8	9	1	5	55
49	Oak Grove Fork Clackamas	-122.0324	45.0926	No	6	3	1	5	10	10	5	10	6	56
50	Upper Clackamas River	-121.909	45.0147	No	27	3	5	2	6	10	5	7	6	71
51	Middle Clackamas River	-122.0853	45.0852	No	12	3	3	5	9	10	5	9	6	62
52	Collawash River	-122.0343	44.9956	No	18	3	2	5	10	10	5	10	6	69
53	White River	-121.4051	45.2484	No	9	2	1	2	3	5	5	0	3	31
54	Middle Clackamas River	-122.1074	45.056	No	6	3	2	5	0	10	3	5	0	34
55	White River	-121.5643	45.2776	No	9	3	4	3	7	7	6	10	6	55
56	Middle Clackamas River	-122.11157	45.0519	No	18	3	2	5	8	10	5	7	6	64