

# Western Toad Monitoring Surveys 2016

## Background

The Western Toad (*Anaxyrus boreas*) was once considered to be the most abundant amphibian species in Western Montana, but populations have declined in recent years. It is still encountered throughout its range, but is no longer as common as it once was. Structured surveys conducted in the early 2000s documented breeding for this species at only 2-5% of waterbodies. To help assess the current status and establish a long-term monitoring strategy, a collaborative resurvey of documented western toad breeding sites. We have selected 110 sites, and with the help of agency personnel and other volunteers, hope to visit most, if not all, accessible sites in June and July at lower elevations and August at higher elevations.

## Objectives

To provide information to assess the status of Western Toads in Montana:

- Establish protocols for long-term monitoring of breeding sites with revisits every 5 years
- Quantify the proportion of breeding clusters (sites) and local water bodies (surveys) with evidence of breeding and the number of eggs, larvae, or juveniles detected in 2016
- Centralize resulting survey and detection information into MTNHP databases in order to make it readily available to state and federal agencies.

## Coordination of Surveys

Completion of these surveys will not be possible without the assistance of many people from different agencies across the state. The time and effort of these professionals is greatly appreciated, but presents a logistical challenge for managing surveys. We will coordinate effort primarily through postings on an ftp site (<ftp://nris.mt.gov/public/bachen/WTMON16>). Load this address into **Windows Explorer** NOT Internet Explorer and drag and drop files to your local folders. In this folder you will find a spread sheet "Site\_Status.xlsx" with the status of each quarter latitude-longitude survey area (QLL), overview maps, a folder with QLL maps, these protocols, field guides for identification of incidental animals, and recordings of frog and toad calls. To claim a site:

1. Use the overview maps to identify site(s) you can survey
2. Check the status of the sites(s) in the Site\_Status.xlsx file
3. If the site(s) are not completed or assigned, contact Dan via phone or email to claim them

We have included survey points on private lands, but these sites are lower priority and we have made no effort to contact land owners. Most of these points are located on publicly accessible private lands (e.g. Weyerhaeuser lands), however it is necessary that the surveyor confirm this before heading into the field. Accessing any site located on private land without permission is trespass.

The field effort will be coordinated by:

Dan Bachen  
Senior Zoologist  
Montana Natural Heritage Program  
1515 East 6<sup>th</sup> Avenue  
Helena, MT 59620

Cell: 406-546-4302  
Office: 406-444-3586  
[dbachen@mt.gov](mailto:dbachen@mt.gov)

## **Materials**

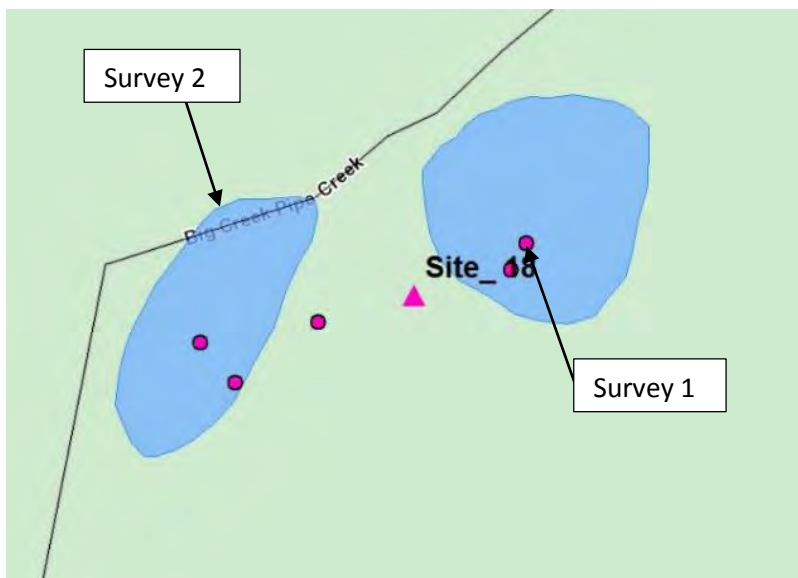
1. GPS
2. Heavy Duty Dip Net with 12" bag small mesh (NHP has some available to loan, contact Dan if needed)
3. Watch/ timer
4. Field guide (Amphibians and Reptiles of Montana) for adult and tadpole ID
5. Rubber Boots (e.g. Xtratuf, Muck or similar)
6. Camera
7. Thermometer
8. Write-In-Rain Notebook and pencil
9. Data Sheets (at end of document or in ftp folder)
10. Bleach and weed sprayer for decontamination

## **Timing and Conditions for Surveys**

Surveys will be conducted during early June through mid-July for sites below 5,000 ft and through mid-late August for higher elevations in order to target detection of eggs, tadpoles, and metamorphs (terrestrial young of the year).

## **Site and Survey Structure**

Each site is composed of one or more waterbodies where Western Toad breeding has previously been detected as indicated by pink points on maps (if breeding has not previously been detected, no point will be present and the waterbody is lower priority for survey). If there are multiple waterbodies with previous evidence of breeding at a site, each should be high priority for resurvey and have its own data sheet. If time allows, any lentic waterbodies within 400m of the site centroid that have no recorded breeding should also be surveyed but are lower priority. For example (see below), Site 18 includes 2 lakes with breeding observations. Both lakes are high priority for resurvey, and each should be surveyed separately. On the data sheets, both would be Site 18 but have separate survey numbers. A single point is outside the left lake (survey 2), the observer should check the aerial photos provided and visit this point to check if there is a lentic waterbody not shown on the map layer.



### **Visual encounter Survey Protocols**

To maximize detection of amphibians each survey uses both timed visual encounter and dip net techniques in all portions of the water bodies that are less than 50 cm in depth. If little emergent vegetation is present then careful examination of these shallow water environments for the presence of eggs, larvae, or post metamorphic animals may suffice. However, in areas with dense emergent vegetation, it will be necessary to intensely sample the area with a dip net. At sites where water depths drop off steeply from the shoreline, visual searches and dip netting may be performed from the shoreline. However, areas with extensive shallows will require systematic searches and dip netting while wading through the area on evenly spaced transects. If ill or dying animals are encountered at a site, place individual animals in individual zip lock bags and keep them on ice so that they can be shipped to a pathologist for analysis. Aside from sick animals, collecting voucher specimens is unnecessary.

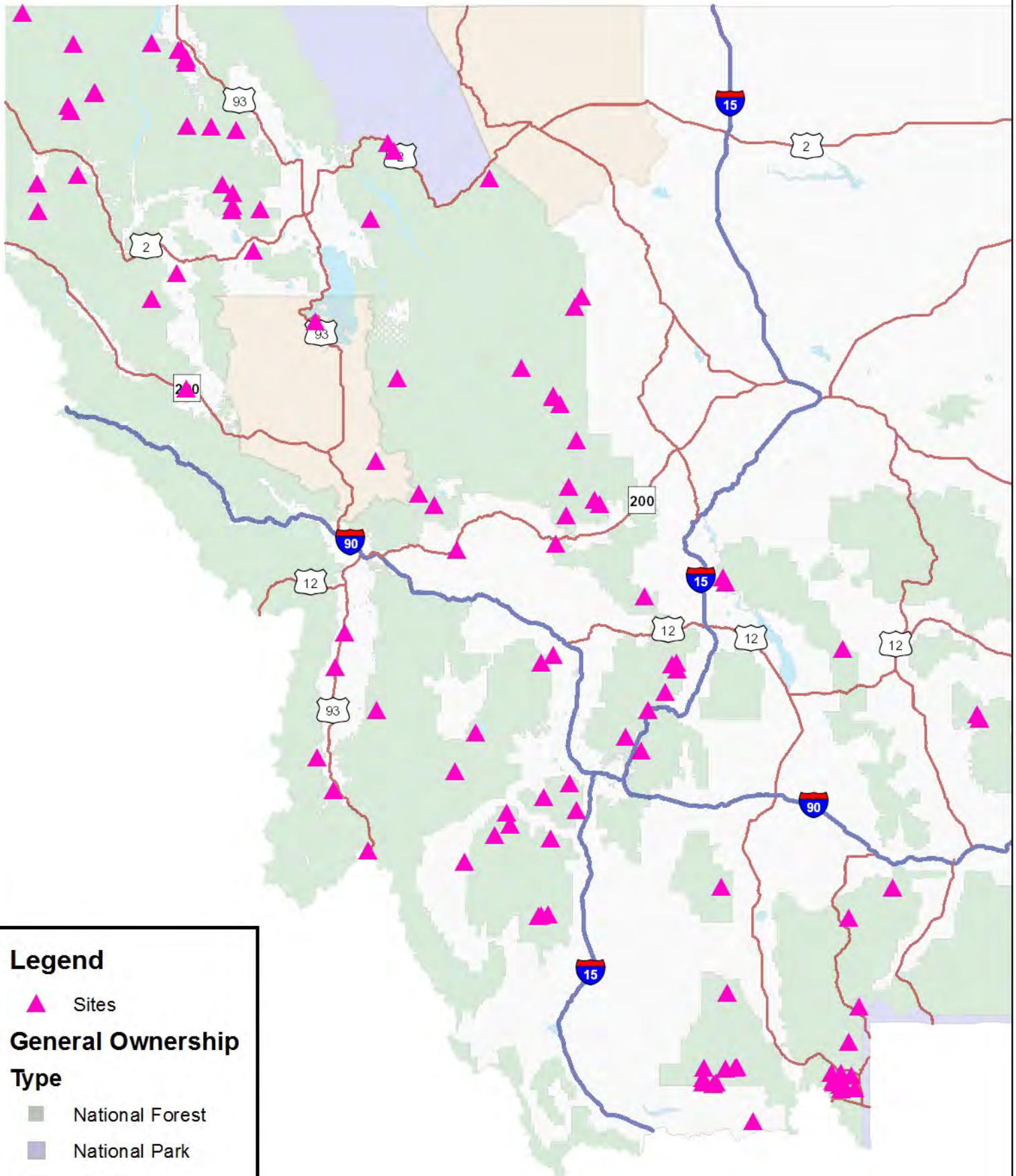
#### **A typical survey will proceed as follows**

- Upon arriving at the site, find the northwest corner of the water body
- Record a GPS point for the NW corner
- Begin the survey (noting the time) by walking in one direction around the perimeter of the water body.
- Move slowly and look closely for amphibians which are often found in areas with warmer water or basking on banks
- When emergent vegetation is present or turbidity is high, use the dip net to survey for tadpoles. Standing at the water's edge or in the shallows drag the net through the vegetation in front of you, look in the net for any captured tadpoles or metamorphs and identify to species using photos and /or key in the MT field guide. Repeat this on either side until you have completely surveyed the immediate area.
- Note all detections in your notebook, as it is cumbersome to fill out the data sheet while surveying. Typically, I record time to first detection for each age class, a tally of individuals encountered for each age class, and incidental species encountered.
- Once you have completed the survey and returned to the NW corner, note the time and begin to fill out the data sheet.

#### **Washing and Decontamination Procedures:**

In order to prevent the spread of fungal and viral pathogens, care should be taken to wash mud, aquatic vegetation, and other materials off of dip nets, boots, socks, and other equipment prior to departing from a site. Survey gear should be left to dry in the sun for as long as possible between sites. Dip nets, boots, socks, and other survey equipment should be decontaminated with a mixture of 10% bleach (4 ounces or one half cup) per gallon of water) between all sites. This can be accomplished by washing gear in tubs or by simply spraying washed gear down with pressurized sprayer containing 10% bleach and allowing it to dry in the sun. Do not rinse bleached equipment between sites. Instead allow the bleach to remain on the equipment to ensure that pathogens are killed. Most bleach will evaporate between sites so the amount of bleach introduced at the next site should be quickly diluted

# Overview of Sites across Western Montana



## Legend

▲ Sites

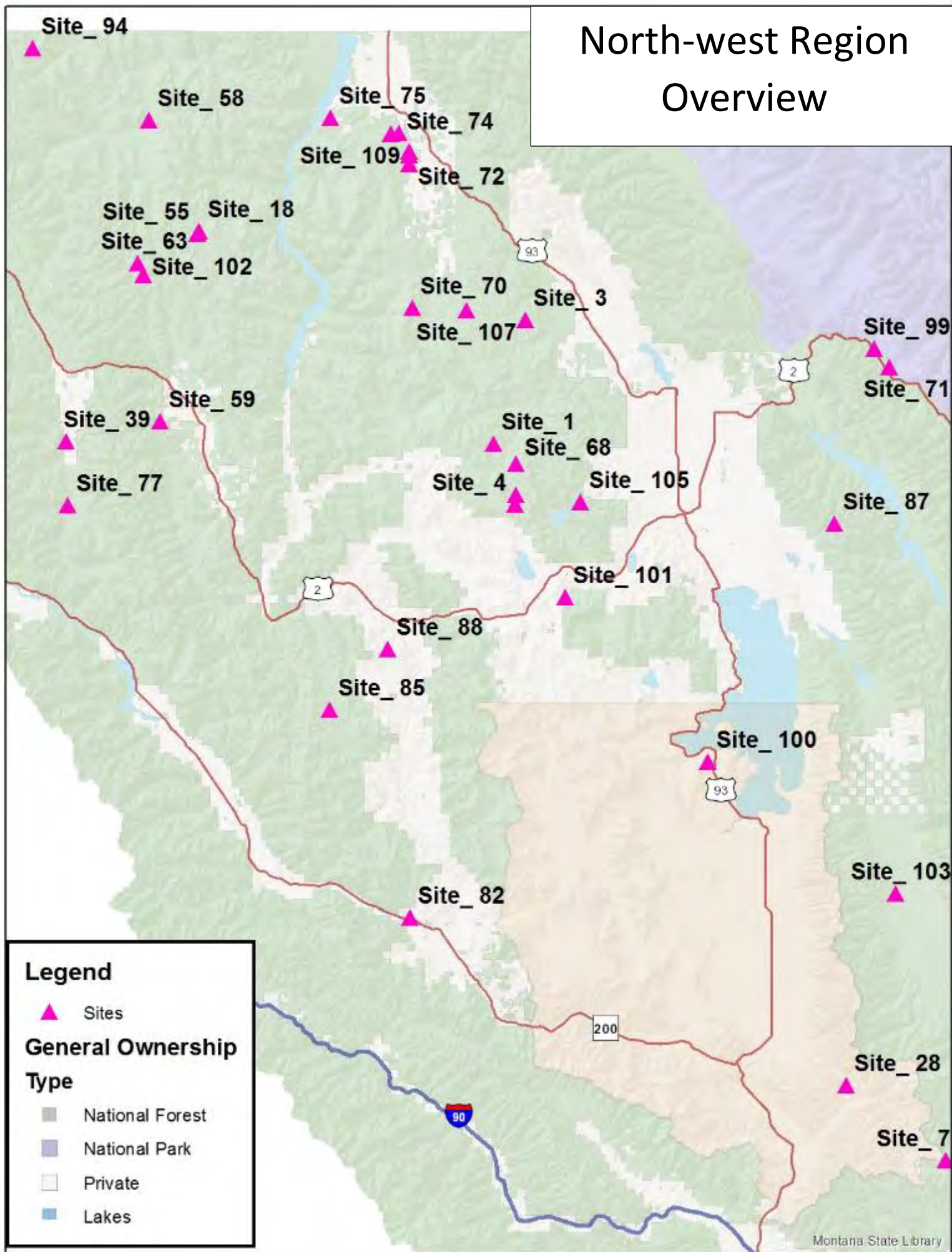
## General Ownership Type

### Type

- National Forest
- National Park
- Private
- Lakes

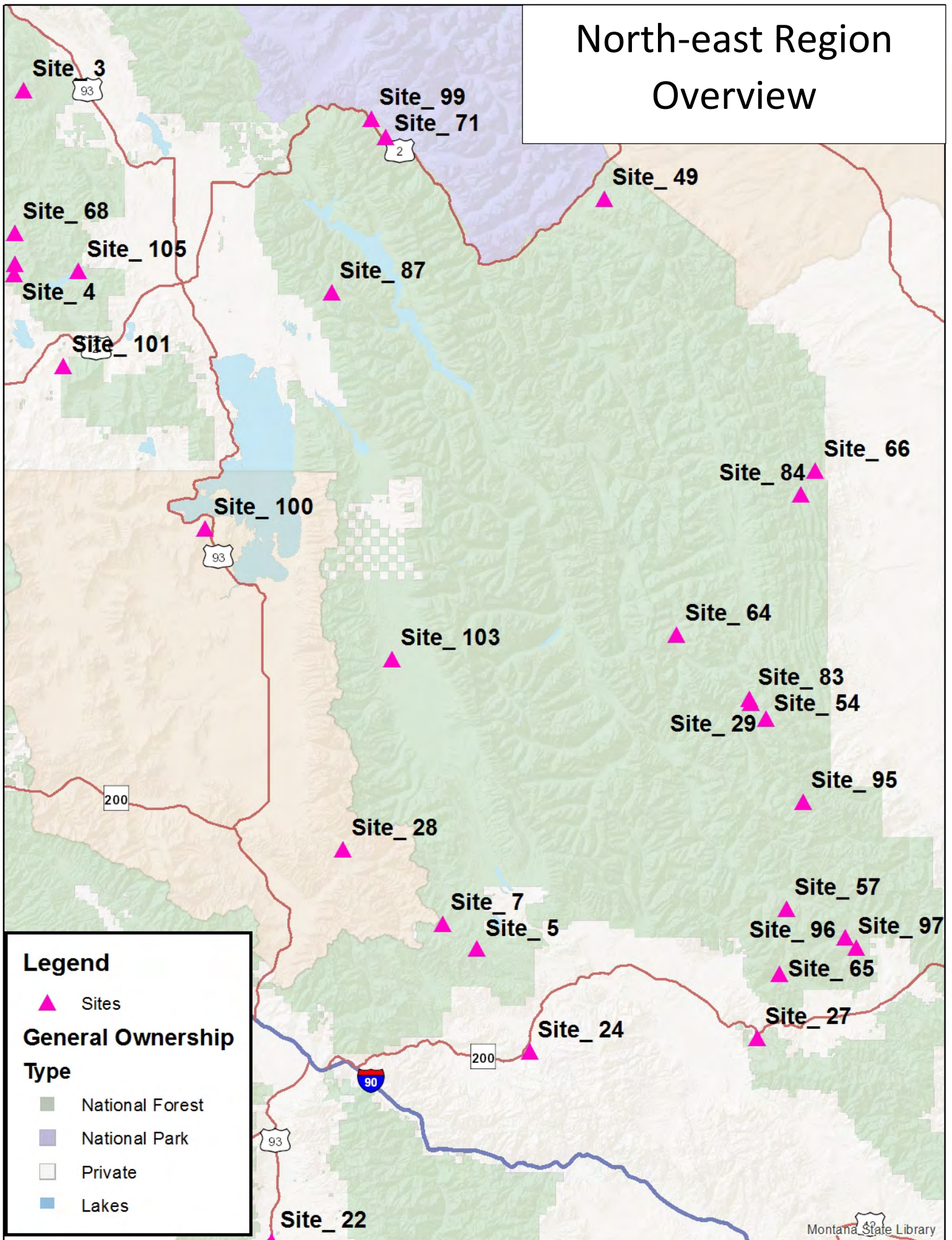


# North-west Region Overview



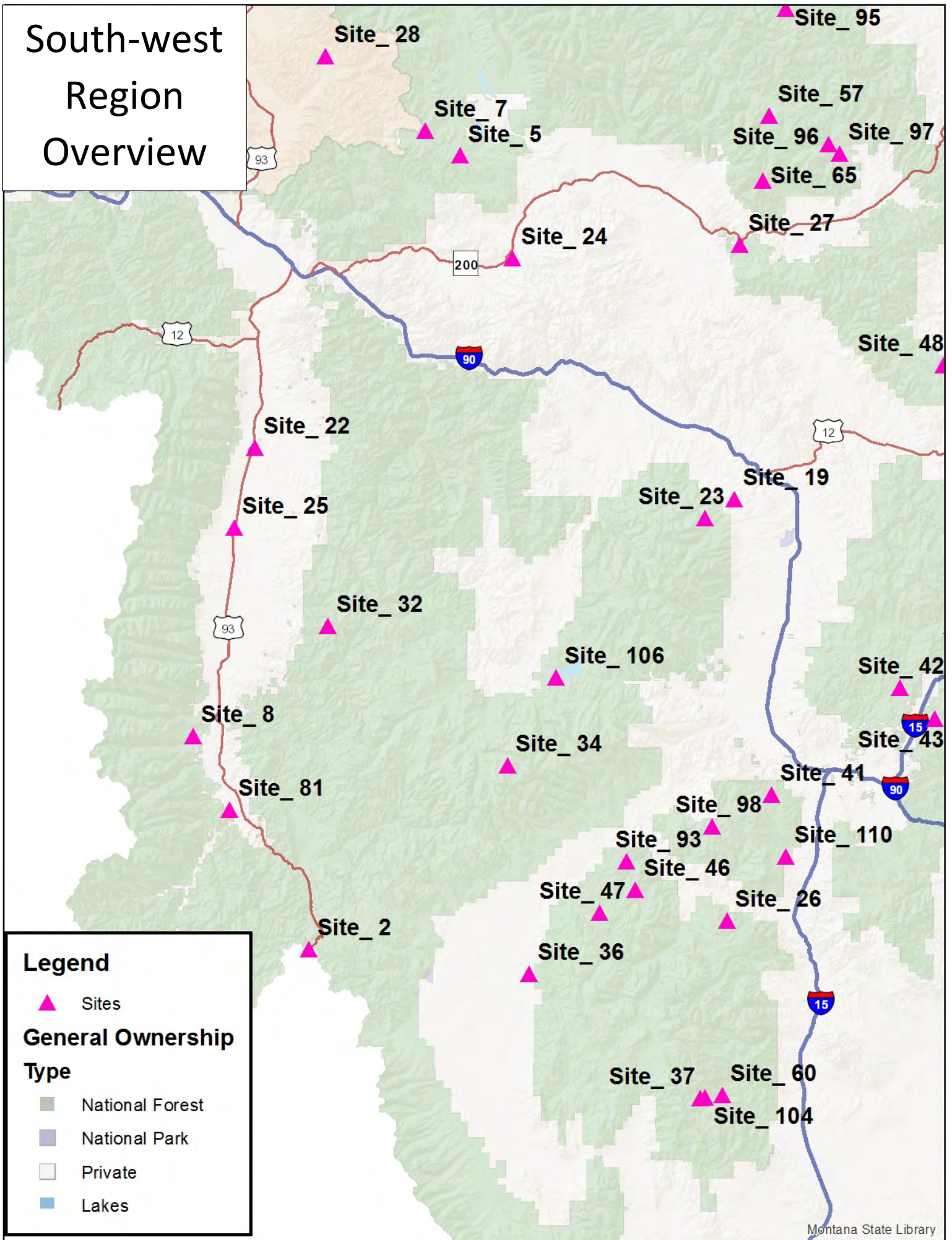


# North-east Region Overview





# South-west Region Overview



## Legend

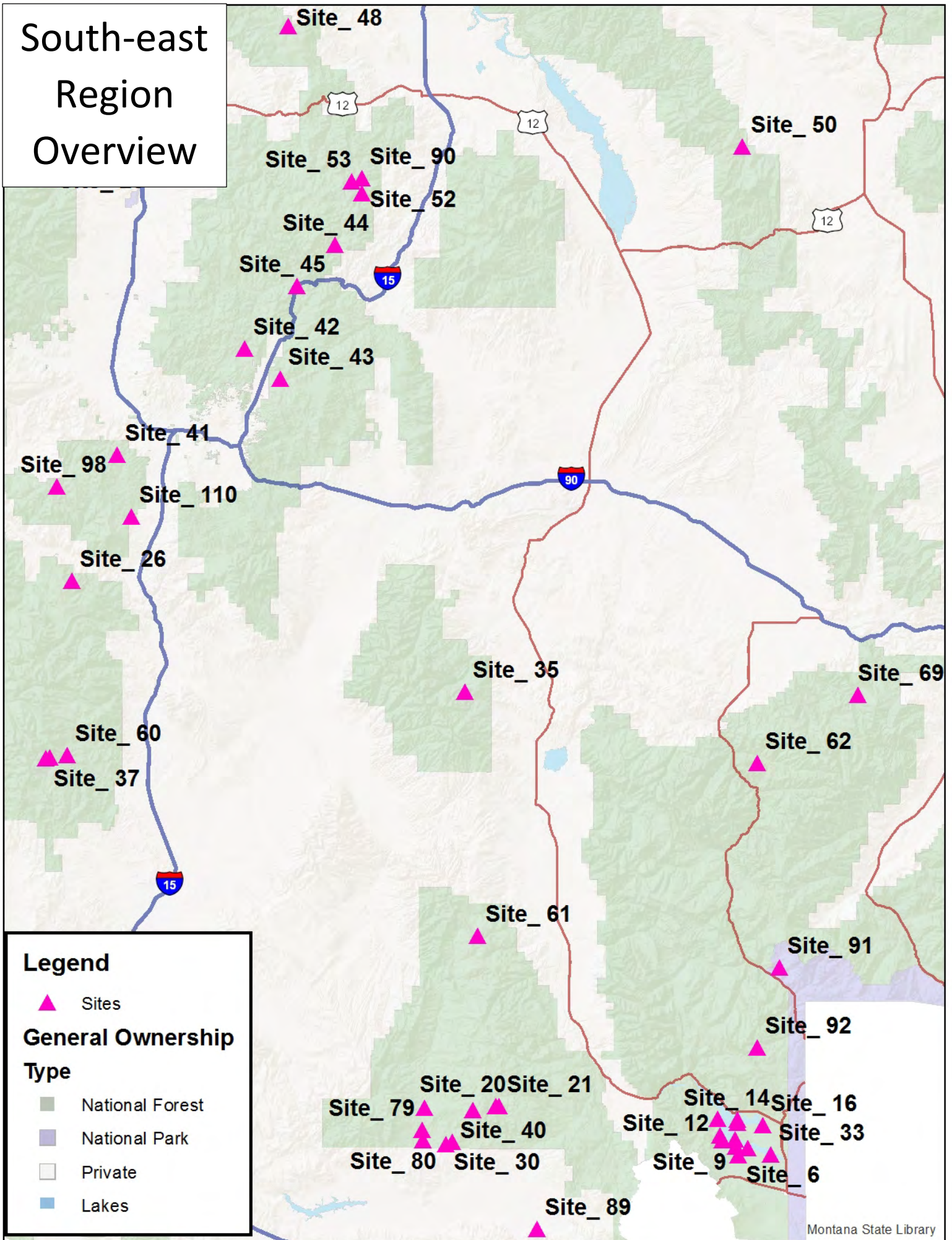
▲ Sites

## General Ownership Type

- National Forest
- National Park
- Private
- Lakes



# South-east Region Overview



## Legend

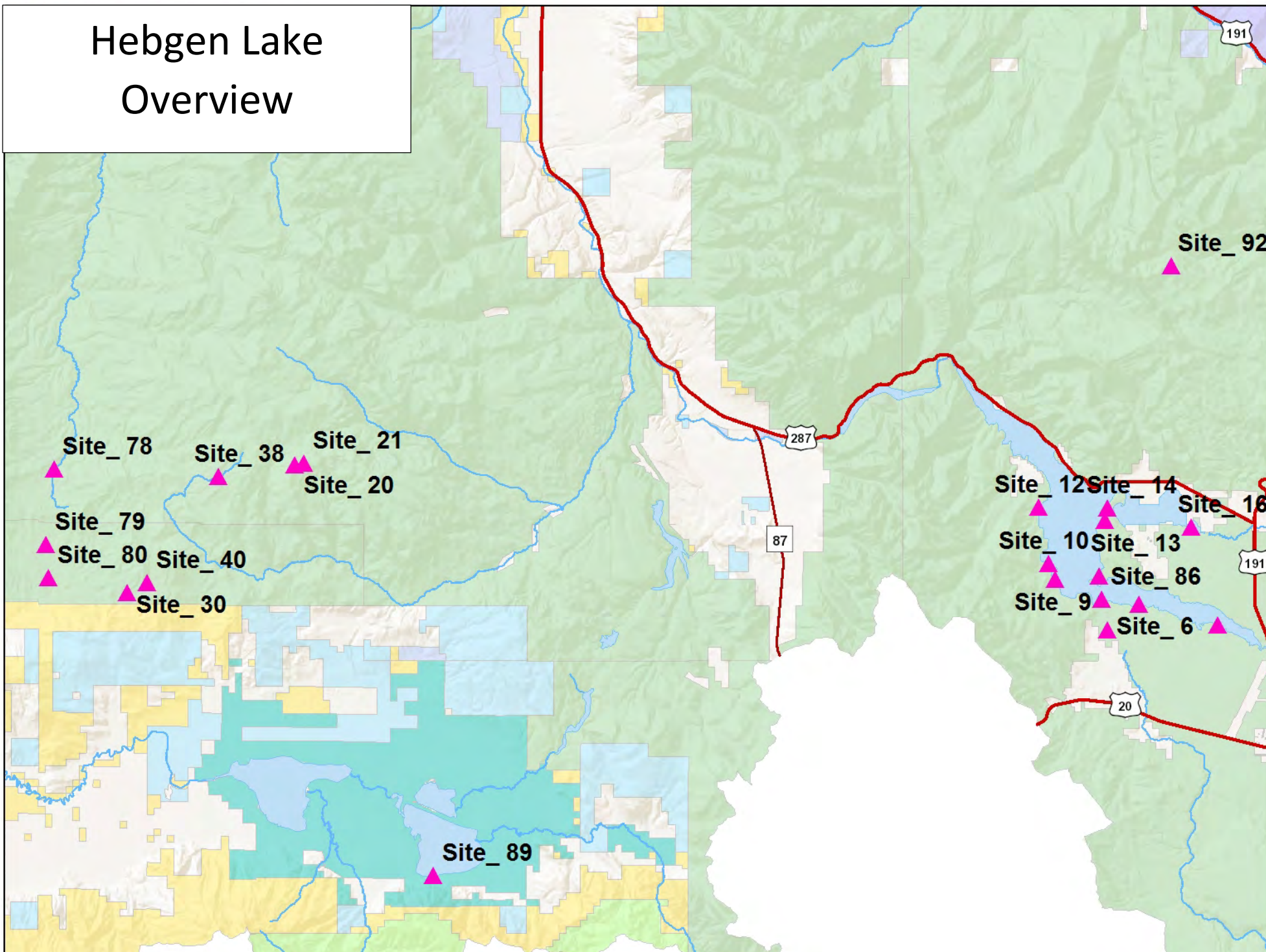
▲ Sites

## General Ownership Type

- National Forest
- National Park
- Private
- Lakes

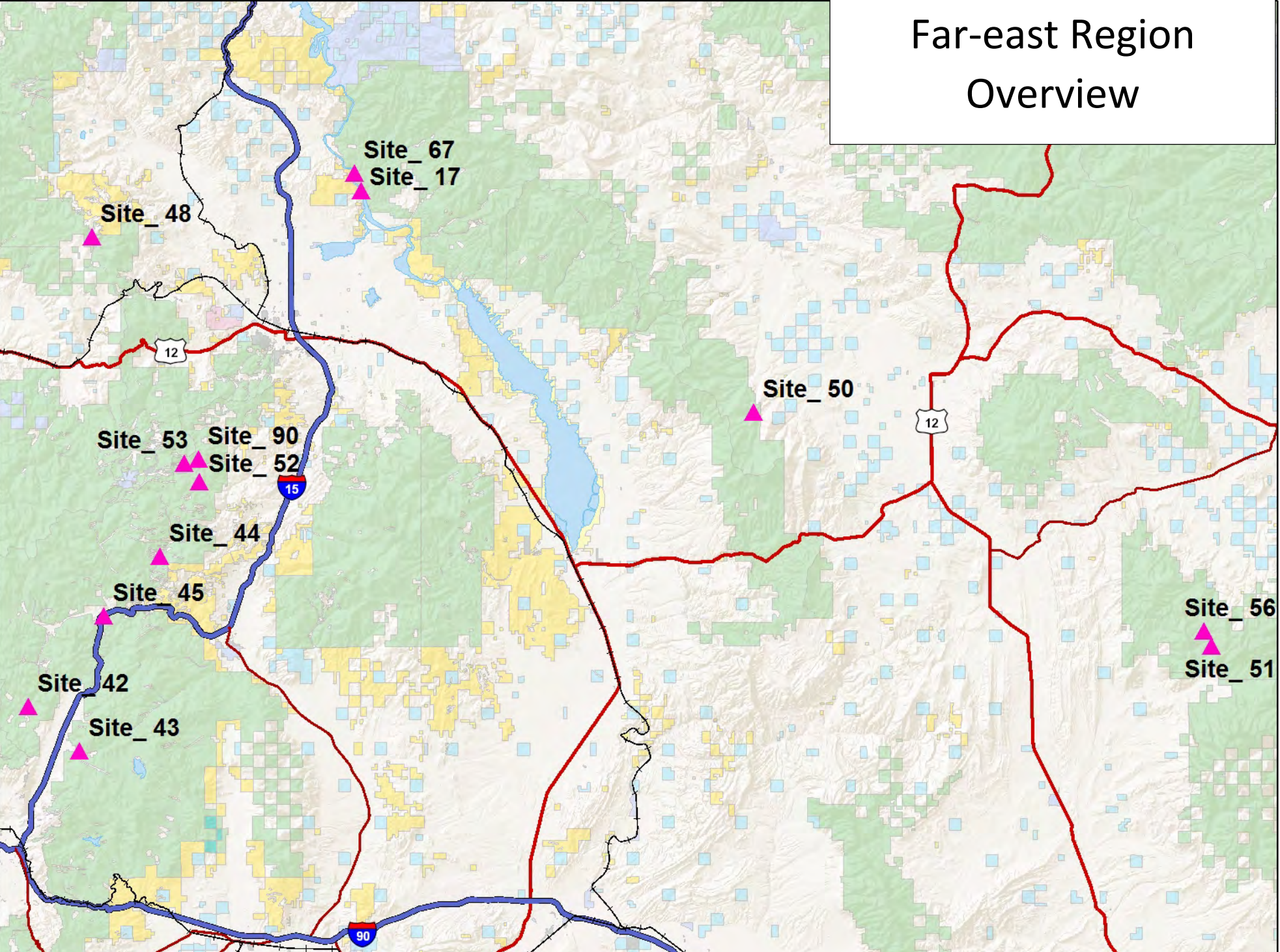


# Hebgen Lake Overview





# Far-east Region Overview





# Site Data Form for Lentic Breeding Amphibian and Aquatic Reptile Surveys

## Locality Information

Date		Observer(s)		Owner		Site Detection: Aerial Photo <input type="checkbox"/> Topo Map <input type="checkbox"/> NWI Map <input type="checkbox"/> Incidental <input type="checkbox"/>				GPS EPE		
Western Toad Breeding Surveys		Site Number		Survey Number		County		Map Name				
Locality						T	R	S	Section Description			
Map Elevation		Datum	Latitude (DD)		Longitude (DD)			Survey Type 0 1 2 3 4 5 6 7 8				

## Habitat Information

Begin Time		End Time		Total Person Minutes of Search		Site Overview Photo Taken <input type="checkbox"/> Photo Description(s)						
Site Dry: Y N	Site Origin: Beaver Water Depressional Manmade Other _____					Support Reproduction? Y N		GIS Mapping 0 1 2 3 4 5 6 7				
Habitat Type:	Lake/ Pond	Wetland/ Marsh	Bog/ Fen	Backwater/ Oxbow	Spring/ Seep	Active Beaver Pond	Inactive Beaver Pond	Site Multipooled	Ditch/ Puddle	Reservoir/ Stockpond	Well/ Tank	
Weather: Clear Partly Cloudy Overcast Rain Snow			Wind: Calm Light Strong			Air Temp °C		Water Temp °C		Water pH		
Color: Clear Stained		Turbidity: Clear Cloudy		Water Connectedness: Permanent Temporary Isolated		Water Permanence: Permanent Temporary		Max Depth: <1 M 1-2 M >2 M		Percent of Site > 2 M 0 1-25 26-50 51-75 76-100		
Site Length:		Site Width:		Percentage of Site Searched: 1-25 26-50 51-75 76-100		Percent of Site at ≤ 50 cm Depth: 0 1-25 26-50 51-75 76-100		~ Emergent Veg Area (M <sup>2</sup> )				
Percent of Site with Emergent Veg: 0 1-25 26-50 51-75 76-100			Percent of Site with Larval Activity: 0 1-25 26-50 51-75 76-100			Rank Emergent Vegetation Species in Order of Abundance: Sedges Grasses Cattails Rushes Water Lily Shrubs Other _____						
Primary Substrate of Shallows: Silt/Mud Sand Gravel Cobble Boulder/Bedrock				North Shoreline Characteristics: Shallows Present: Y N Emergent Veg Present: Y N				Distance (M) to Forest Edge:				
Grazing Impact None Light Heavy Structure Heavy Structure and Water Heavy Water					Water Dammed/Diverted Y N		Timber Harvest in Area Y N		Mining Activity Y N			
Other Human Impacts Or Modifications:				Fish Detected? Y N		Time at First Detection:		Fish Species If Identified:				
Fish Spawning Habitat Present? Y N U			Inlet Width:		Inlet Depth:		Inlet Substrate		Outlet Width		Outlet Depth	Outlet Substrate

## Species Information

<b>Amphibian Species</b>			Time at first detection	E L M J A	No. Egg Masses			5-20mm larvae	≤10 ≤10K	≤100 >10K	≤1000 >10K
20-50mm larvae	≤10 ≤10K	≤100 >10K	>50mm larvae	≤10 ≤10K	≤100 >10K	≤1000 >10K	Number Metamorphs	Number Juveniles			
Number Adults			Voucher Number			Breeding with Fish?	Y N	If breeding with fish is cover present?	Y	N	
<b>Amphibian Species</b>			Time at first detection	E L M J A	No. Egg Masses			5-20mm larvae	≤10 ≤10K	≤100 >10K	≤1000 >10K
20-50mm larvae	≤10 ≤10K	≤100 >10K	>50mm larvae	≤10 ≤10K	≤100 >10K	≤1000 >10K	Number Metamorphs	Number Juveniles			
Number Adults			Voucher Number			Breeding with Fish?	Y N	If breeding with fish is cover present?	Y	N	
<b>Amphibian Species</b>			Time at first detection	E L M J A	No. Egg Masses			5-20mm larvae	≤10 ≤10K	≤100 >10K	≤1000 >10K
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Number Adults			Voucher Number			Breeding with Fish?	Y N	If breeding with fish is cover present?	Y	N	
<b>Amphibian Species</b>			Time at first detection	E L M J A	No. Egg Masses			5-20mm larvae	≤10 ≤10K	≤100 >10K	≤1000 >10K
20-50mm larvae	≤10 ≤10K	≤100 >10K	>50mm larvae	≤10 ≤10K	≤100 >10K	≤1000 >10K	Number Metamorphs	Number Juveniles			
Number Adults			Voucher Number			Breeding with Fish?	Y N	If breeding with fish is cover present?	Y	N	
<b>Reptile Species</b>		Time at first detection	E J A	Number Individuals		SVL in CM		Tissue Number		Voucher Number	
<b>Reptile Species</b>		Time at first detection	E J A	Number Individuals		SVL in CM		Tissue Number		Voucher Number	
<b>Reptile Species</b>		Time at first detection	E J A	Number Individuals		SVL in CM		Tissue Number		Voucher Number	
<b>Reptile Species</b>		Time at first detection	E J A	Number Individuals		SVL in CM		Tissue Number		Voucher Number	

## Site Map for Lentic Breeding Amphibian and Aquatic Reptile Surveys

**Grid Scale (m):**

														<b>N ↑</b>	

\* Indicate the following locations on the map: **T** = temperature, **G** = GPS reading, **C** = clinometer reading, and **P→** = photo locations and directions of photos. Indicate area with emergent vegetation with cross-hatching and indicate a 2-meter depth contour with a dashed line.

Other Notes:

**Incidental Species (Not Herps):**

Species	Total	#Male	#Female	Observed How?	Comments



# Definitions of Variables on Lentic Breeding Amphibian Survey Data Sheet

## Locality Information

**Date:** Use MM-DD-YY format (e.g. 5/12/00 for May 12 of 2000).

**Observers:** List names or initials of individuals involved with survey of this site and circle the name of the recorder.

**Owner:** Use abbreviation of the government agency responsible for managing the land you surveyed. (e.g. USFS, BLM). If private land was surveyed list the owner's full name to indicate that you did not trespass.

**Site Detection:** Was site detected on aerial photo, topographic map, NWI map, or was it observed incidentally while in the field.

**GPS EPE:** The estimated positional error reported by the GPS receiver in meters.

**Strata Number:** The sample strata in which the 6<sup>th</sup> level HUC watershed lies (one of nine defined in western Montana).

**HUC Number:** The sample number of the 6<sup>th</sup> level HUC in one of the nine sample strata defined for western Montana.

**Site Number:** The number pre-assigned to the water body within each 6<sup>th</sup> level HUC. If the water body was not pre-assigned a number because it was not on topographic maps or aerial photos then assign it a sequential number and draw it on the topo map.

**Survey Number:** The number of the survey conducted within the site starting at 1. For instance if a site contains 3 distinct waterbodies, the observer should conduct 3 surveys and record the data on 3 sheets each with a unique survey number.

**State:** Use the two-letter abbreviation.

**County:** Use the full county name.

**Map Name:** List the name of the USGS 7.5-minute (1:24,000 scale) topographic quadrangle map.

**Locality:** Describe the specific geographic location of the site so that the type of site is described and the straight-line air distance from one or more permanent features on a 7.5-minute (1:24,000 scale) topographic map records the position of the site (e.g., Beaver pond, 1.5 miles south of Elephant Peak and 1.3 miles east of Engle Peak).

**T:** Record the Township number and whether it is north or south.

**R:** Record the Range number and whether it is east or west.

**S:** Record the Section number.

**Section Description:** Describe the location of the site at the ¼ of ¼ section level (e.g., SENE indicates SE corner of NE corner).

**Map Elevation:** The elevation of the site as indicated by the topographic map in feet (avoid using elevations from a GPS)

**UTM Zone:** Universal Transverse Mercator zone recorded on the topographic map. Use NAD 27 as the map and GPS datum.

**UTM North:** Universal Transverse Mercator northing coordinate in meters as recorded on the topographic map or GPS receiver. Be sure to note any major differences between UTM coordinates on the map and those on the GPS receiver.

**UTM East:** Universal Transverse Mercator easting coordinate in meters as recorded on the topographic map or GPS receiver. Be sure to note any major differences between UTM coordinates on the map and those on the GPS receiver.

**Survey Type:** Circle the appropriate number defined as follows: 0 = private land so site was not surveyed; 1 = site not surveyed due to logistics; 2 = site is a lotic spring/seep not worth future survey; 3 = lentic site that is worth future survey; 4 = misidentified as a potential lentic site on the aerial photograph or on the topographic map (e.g., a shadow from a tree or a talus slope) and not worth future survey; 5 = inactive beaver dam that now only has lotic habitat and is not worth future survey; 6 = only lotic habitat is present and the site is not worth future survey, but it appears possible that the meadow was an historic beaver dam complex; 7 = a lentic site because it would hold water for at least a short time period during wetter conditions, but it is not worth future survey because it would never hold enough water long enough to support amphibian reproduction; 8 = site is not worth future survey for some reason other than those listed above.

## Habitat Information

**Begin Time:** List the time the survey began in 24-hour format.

**End Time:** List the time the survey ended in 24-hour format.

**Total Person Minutes of Search:** Record the total person minutes the site was searched (e.g. if one person surveys for 15 minutes and another surveys for 30 minutes, but takes 5 minutes to measure a specimen the total person minutes is 40 minutes).

**Camera and Photo Number(s) / Description (s):** Identify the camera and the number of the photo as viewed on the camera's view screen and a description of the contents of the photograph (e.g., 13 = 1 x ASMO larvae and 14 = 1 x habitat). Take photos of all portions of the site and anything else that may be of interest (e.g., areas with fish versus areas with amphibians).

**Site Dry:** Circle whether the site was dry or not at the time of the survey.

**Site Origin:** Circle whether the site origin is glacial, beaver, water (i.e., flooding or spring), depression, manmade, or describe other origin.

**Support Reproduction:** Is site capable of supporting reproduction so it is worth resurveying (e.g. in wetter years if now dry)?

**GIS Mapping:** Circle the appropriate number defined as follows: 0 = site not surveyed; 1 = a 4 in the survey type and site is not worth future survey; 2 = a 2, 5, 6, or 8 in survey type and site is not worth future survey; 3 = 7 in survey type and site is not worth future survey; 4 = a 3 in the survey type and site is dry, but is worth future survey; 5 = a 3 in the survey type and site has ephemeral water and is worth future survey (including high elevation sites that freeze solid); 6 = a 3 in the survey type, site is worth future survey, has emergent vegetation, and has permanent water that lasts all summer long and does not freeze solid in the winter so that it is likely to support aquatic overwintering; 7 = a 3 in the survey type, site is worth future survey, does not have functional amounts of emergent vegetation, and has permanent water that lasts all summer long and does not freeze solid in the winter so that it is likely to support aquatic overwintering.

**Habitat Type:** Circle the appropriate habitat type of the site being surveyed. If site is multi-pooled water information does not need to be gathered for every pool, but you may wish to record this information on the map. If breeding activity is limited to one pool at a multi-pooled site water information should be recorded for this pool and this should be noted in the comments.

**Weather:** Circle weather condition during survey.

**Wind:** Circle wind condition during survey (> 20 mph winds should be classified as strong).

**Air Temp:** Record air temperature at chest height in the shade. Record temperature in Celsius. °C = (°F - 32)/1.8

**Water Temp:** Record water temperature where larvae or egg masses are observed or at 2 cm depth 1 meter from the margin of the water body. Record temperature in Celsius.  $^{\circ}\text{C} = (^{\circ}\text{F} - 32)/1.8$

**Water pH:** Record water pH at the same location water temperature was recorded.

**Color:** Circle whether the water is clear or stained a tea or rust color from organic acids.

**Turbidity:** Circle whether water is clear or cloudy.

**Water Connectedness:** Circle if water body has permanent connection to flowing water (Permanent), is connected to flowing water for a temporary period each year (Temporary), or is never connected to flowing waters or other water bodies (Isolated).

**Water Permanence:** Circle whether the site contains water throughout the entire year (Permanent), or contains water for only a portion of the year (Temporary).

**Max Depth:** Circle the category corresponding to the maximum depth of the water body.

**Percent of Site > 2 M:** Circle the percentage of the site with water depth greater than 2 meters deep.

**Site Length:** The length of the longest dimension of the standing water body.

**Site Width:** The width of the second longest dimension of the standing water body.

**Percentage of Site Searched:** Circle the percentage of the site surveyed.

**Percentage of the Site at  $\leq 50$  cm Depth:** Circle the appropriate percentage.

**Approximate Area with Emergent Veg ( $\text{M}^2$ ):** The approximate area of the site that contains emergent vegetation.

**Percentage of Site with Emergent Veg:** Circle the percentage of the entire site with emergent vegetation.

**Percentage of Site with Larval Activity:** Circle the percentage of the site where amphibian larvae were observed.

**Rank Emergent Veg Species in Order of Abundance:** Record the rank order of abundance in front of the 3 most prevalent emergent vegetation species. If the vegetation present is "other" indicate what it is.

**Primary Substrate:** Circle the substrate that covers the majority of the bottom of the site.

**North Shoreline Characteristics:** Circle whether shallows and emergent vegetation are present or absent on the north shoreline.

**Distance (M) to Forest Edge:** Record the closest distance between the water's edge and the forest margin in meters.

**Grazing Impact:** Circle the appropriate grazing category defined as follows: no grazing in vicinity of the site; grazing noted in the vicinity of the site, but no major impacts to wetland structure or water quality; heavy structural impacts to site (e.g., vegetation destroyed creating bare ground, hummocks, pugging, or altered hydroregime); heavy structural impacts and water quality impacted due to animal waste; and water quality impacted due to animal waste.

**Water Dammed/Diverted:** Circle whether or not water has been dammed or diverted at the site (including blow outs or pits).

**Timber Harvest:** Circle whether or not timber has been harvested within 200 meters of the site.

**Mining Activity:** Circle whether or not there is evidence of mining activity within 200 meters of the site.

**Other Human Impacts or Modifications:** Briefly describe if, how, and when the site has been altered by human activities. If the site has not been altered record none for not altered. If multiple anthropogenic impacts exist document all of these using the back of the data sheet if necessary and qualify approximate timing of impact (e.g., recent versus historic).

**Fish Detected?:** Circle whether or not fish were detected.

**Time at First Detection:** If fish were detected, indicate the time in total person minutes of survey when they were first detected.

**Fish Species if Identified:** List the fish species identified.

**Fish Spawning Habitat Present?:** Are shallow waters with adequate gravels/cobbles present that would allow salmonid fishes to spawn? An active search for fry is also a good idea.

**Inlet Width:** What is the average width of the inlet stream in meters?

**Inlet Depth:** What is the average depth of the inlet stream in centimeters?

**Inlet Substrate:** What is the primary substrate at the inlet stream (Silt/Mud, Sand, Gravel, Cobble, or Boulder/Bedrock)?

**Outlet Width:** What is the average width of the outlet stream in meters?

**Outlet Depth:** What is the average depth of the outlet stream in centimeters?

**Outlet Substrate:** What is the primary substrate at the outlet stream (Silt/Mud, Sand, Gravel, Cobble, or Boulder/Bedrock)?

### **Species Information**

For each species record the first two letters of the scientific genus and species names for all amphibian and reptile species found at the site (e.g., ANBO for *Anaxyrus boreas*). Record the total number of person minutes of survey required before each life history stage of each species was encountered beside the E (egg), L (larvae), M (metamorph), J (juvenile), or A (adult). Record the number or category of number of each of the specified life history and/or size classes. For amphibians indicate whether they have bred in the same water body where fish are present, and if they have, indicate whether there is protective cover (e.g., extensive shallows with emergent vegetation, a log barrier, talus). Specimens should not be collected unless ill or dying animals are encountered.

### **Site Map for Lentic Breeding Amphibian and Aquatic Reptile Surveys**

**General:** Include a rough sketch of the site including the shape of the site and the shape and spatial relations of surrounding biotic and abiotic features. Indicate the area covered with emergent vegetation with cross-hatching. Indicate a 2-meter depth contour for the water body with a dashed line. Indicate the location where the water temperature was taken, the location where the GPS position was taken, the location where clinometer readings for southern exposure were taken, and the location of any photographs with an arrow indicating the direction in which the photo(s) were taken. Make sure that the orientation of the sketch (i.e. the north arrow) corresponds to the orientation of the site.

**Grid Scale:** Indicate the approximate scale of the grid lines relative to the site sketched in meters.

**Other Notes:** Include any other notes of interest in this space. Examples: (1) areas of highest larval density; (2) thoughts on why a species may not have been detected at a site; (3) problems associated with the survey of the site (e.g., dangerous boggy conditions); (4) If a site was dry would it support reproduction during wetter years.