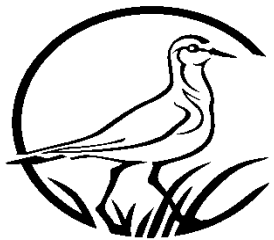


Distribution, Status, and Management of Amphibians & Reptiles in the Tongue and Powder River Basin

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MONTANA
**Natural Heritage
Program**

<http://mtnhp.org>



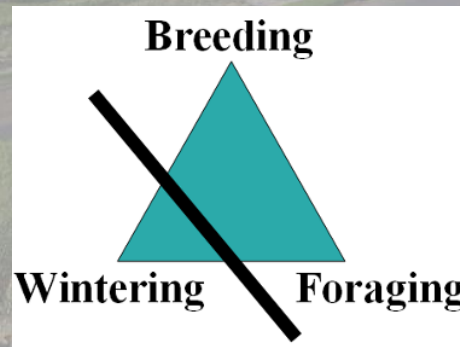
Wyoming
Natural Diversity
Database



**Montana Fish,
Wildlife & Parks**

Background

- **Global declines of amphibians**
- **Permeable skin and aquatic life history stages = water quality risks**
- **Thermal ecology = road mortality risks**
- **Complex life cycles & natural history make = vulnerability to habitat loss and fragmentation**



- **New pathogens = additional ecological stressors**
- **General lack of baseline information**

Project Goals

- **2-3 year inventory as “baseline” in wet and dry years**
- **Distribution – few records**
- **Status - site occupancy rates**
 - ✓ **Lentic and riparian sites**
 - ✓ **Rock outcrops**
 - ✓ **Nocturnal call surveys**
- **Identify impacts of current traffic volume**
 - ✓ **No. road mortalities/vehicles per hour**
- **Distribution of pathogens (chytrid, Ranavirus)**
- **Establish long-term monitoring protocols and scheme to evaluate potential impacts of CBNG development**

Wyoming Study Area

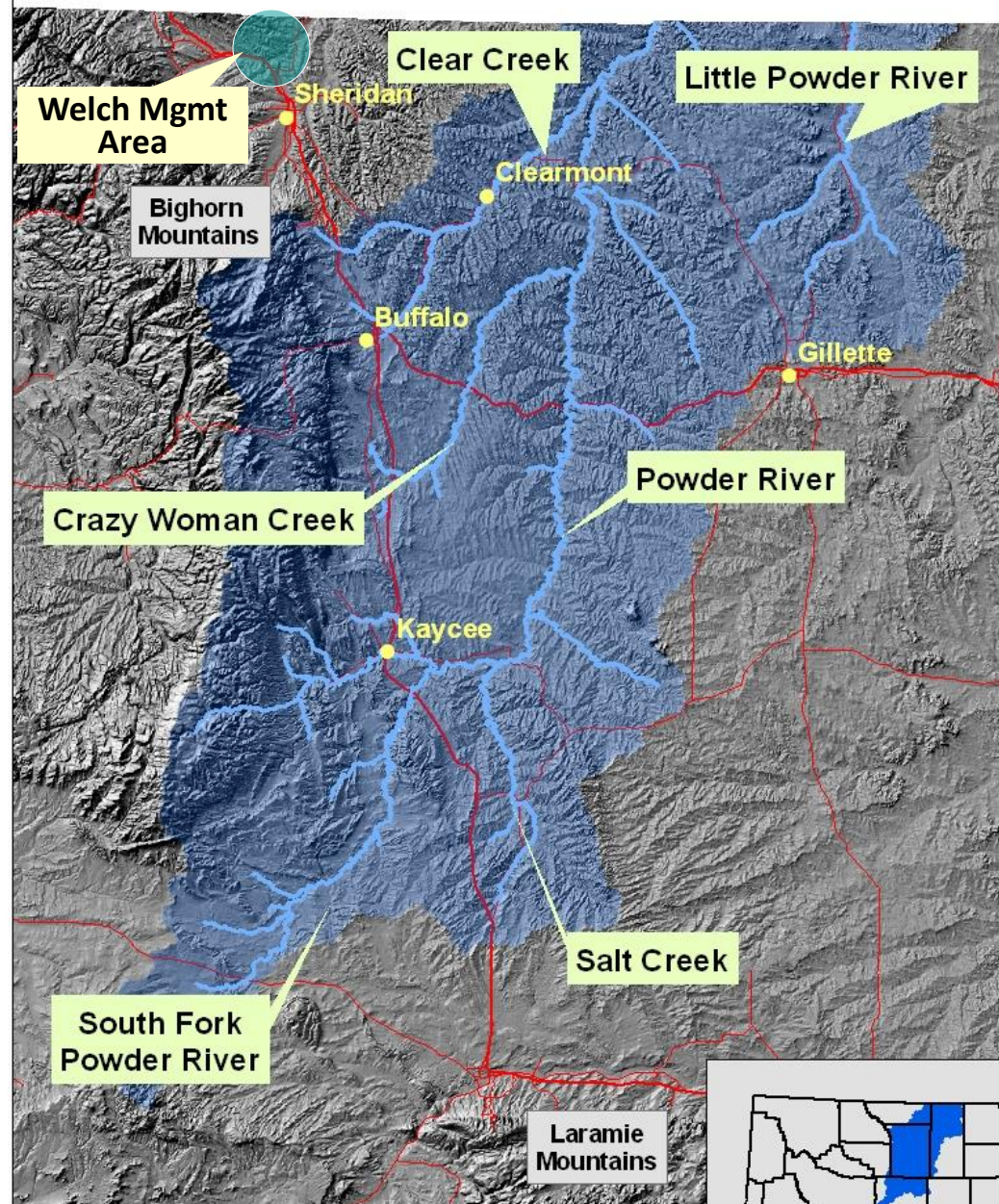
■ Powder River Basin

- ✓ ~25,000 km²
- ✓ Semi-arid
- ✓ Sagebrush-Steppe & mixed grass prairie

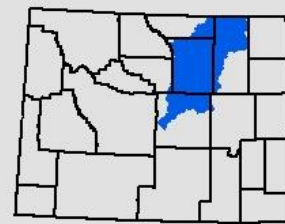
■ Powder River & major tributaries

- ✓ Perennial & ephemeral

■ Welch Management Area

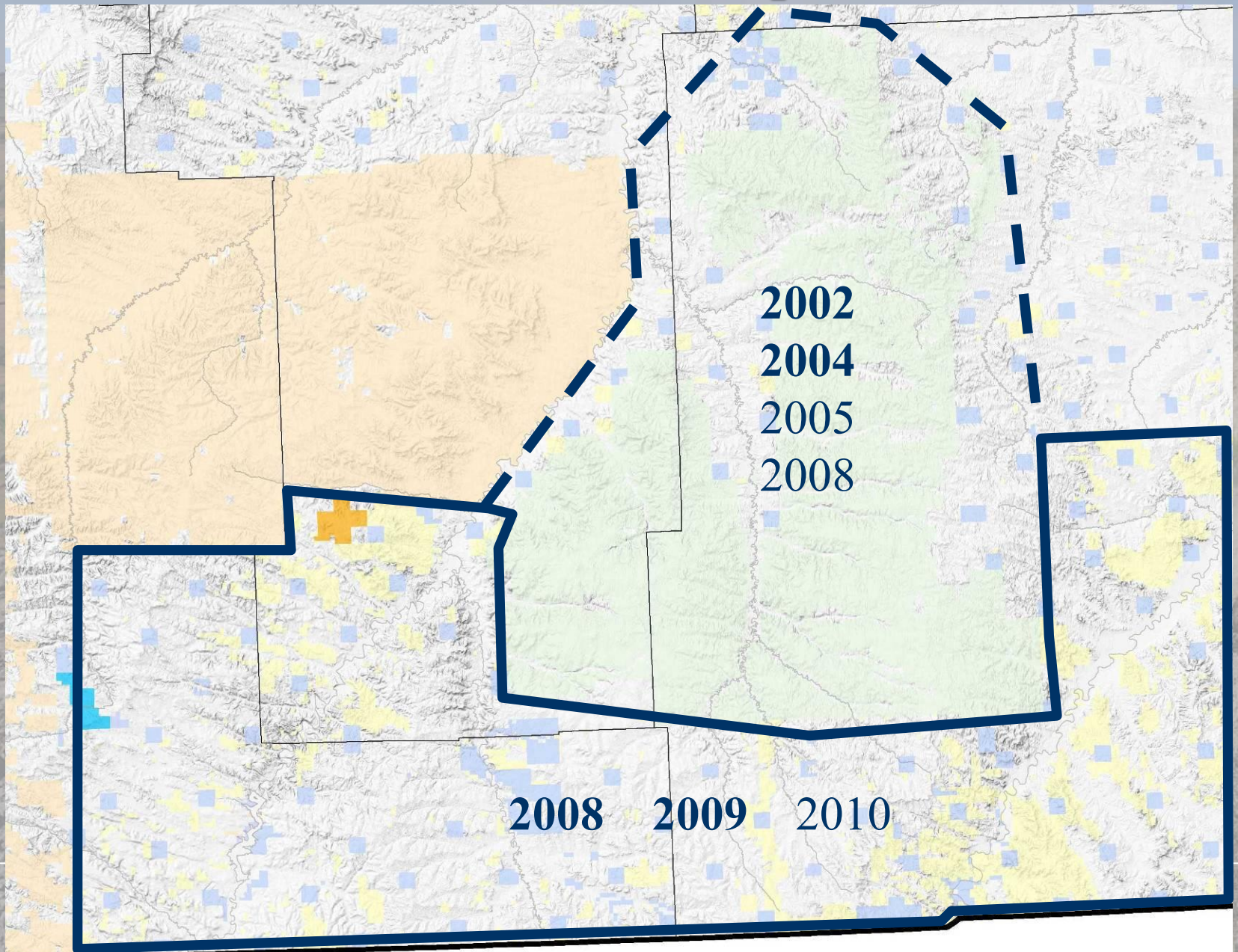


0 12.5 25 50 Miles



WYOMING

Montana Study Area



Amphibians in Project Area

Tiger Salamander



Montana Species of Concern = SOC
Wyoming Species of Concern = SOC

Woodhouse's Toad



Great Plains Toad



Plains Spadefoot



Boreal Chorus Frog



Northern Leopard Frog



American Bullfrog



Introduced at
at least one
location in
region.
Potential for
CBNG to
enhance
spread.

Turtles and Lizards In Project Area

Montana Species of Concern = SOC Wyoming Species of Concern = SOC

Painted Turtle



Snapping Turtle



Spiny Softshell



Greater Short-horned Lizard



Common Sagebrush Lizard



Snakes in Project Area

Montana Species of Concern = SOC Wyoming Species of Concern = SOC

Rubber Boa



Western Hog-nosed Snake



Milksnake



Eastern Racer



Gophersnake



Prairie Rattlesnake



Terrestrial Gartersnake



Plains Gartersnake



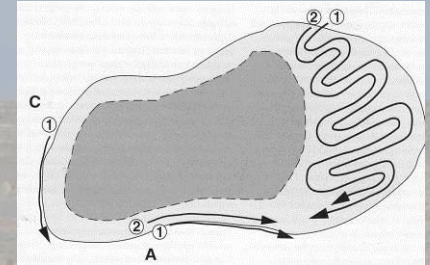
Common Gartersnake



Methods

■ Visual Encounter Surveys (VES)

- ✓ Riparian areas and standing water bodies
- ✓ Amphibians and reptiles



■ Rock Outcrop VES Surveys

- ✓ South-facing rock outcrops
- ✓ Reptiles
- ✓ Recorded birds and mammals (especially bats!)



■ Nocturnal Call Surveys

- ✓ Transects along roads
- ✓ Breeding frogs and toads



■ Road Surveys

- ✓ Fixed road sections for dead or basking herps
- ✓ Primarily reptiles



Wyoming

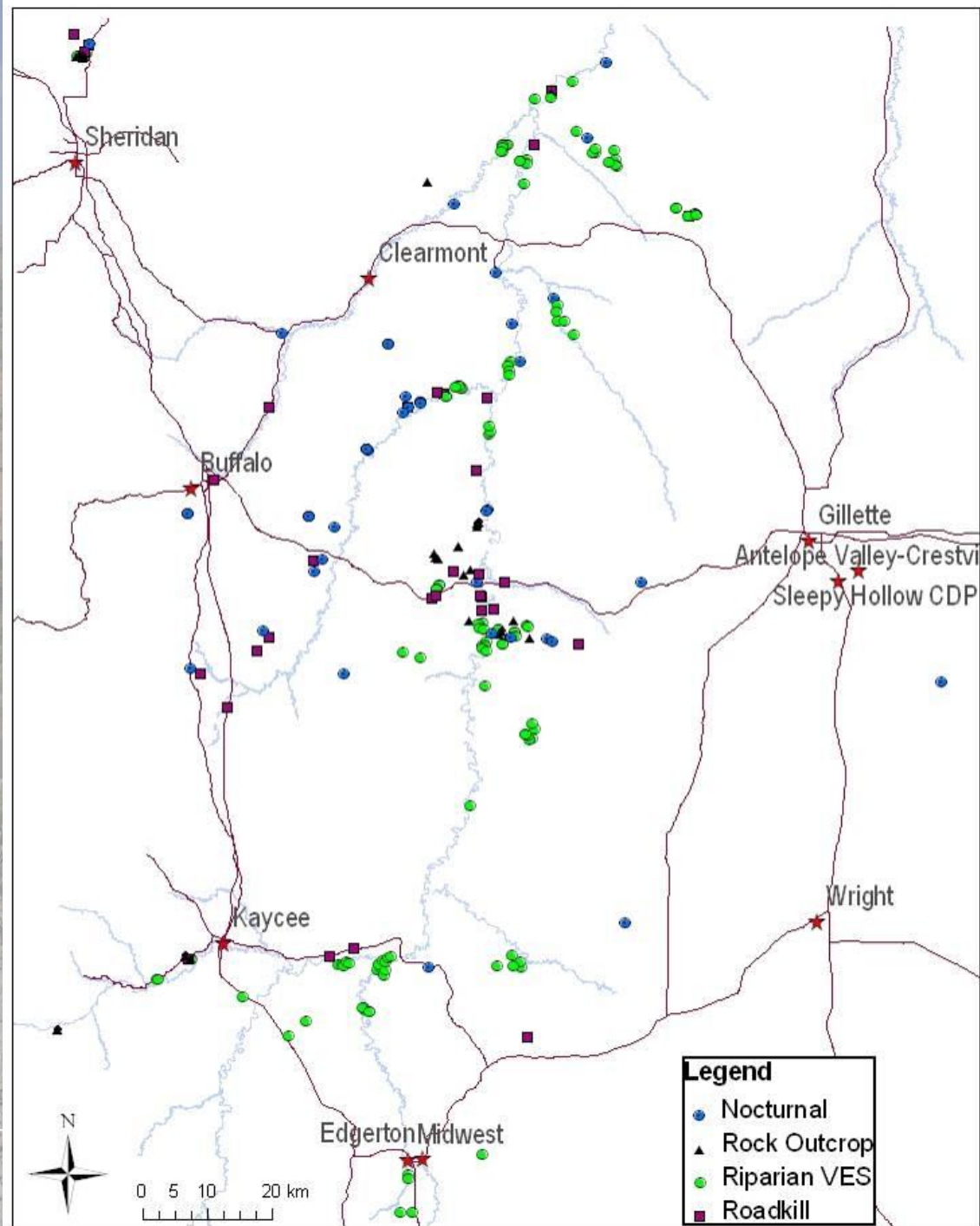
2008 & 2009 Surveys

115 Riparian VES

39 Nocturnal Call

30 Rock Outcrop

22 Roadkill/Basking

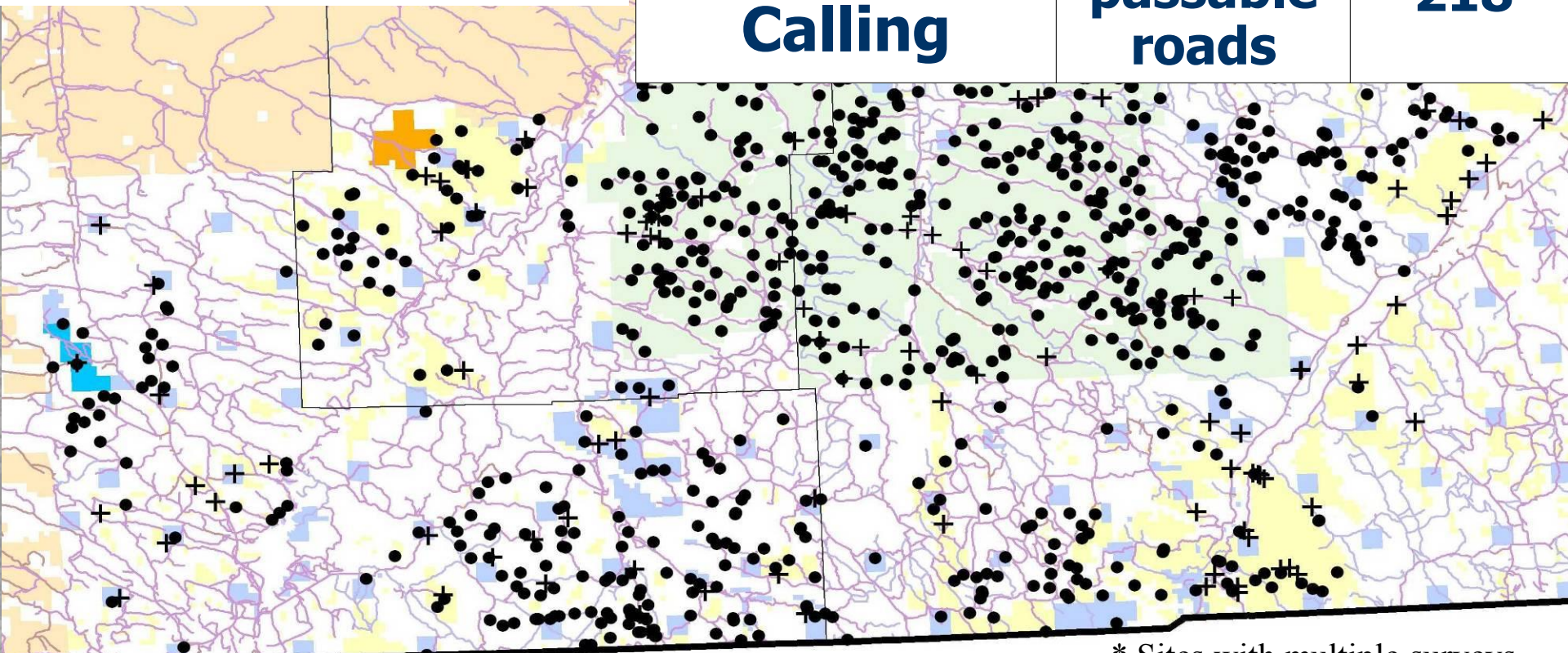




Montana Surveys

+ = Rock Outcrop Surveys
● = Lentic Site Surveys
Note: USFS lands surveyed
in 2002, 04, 05, 08

	2008	2009
Lentic VES	373	165*
Rock Outcrop VES	101*	42*
Nocturnal Calling	Most passable roads	218



* Sites with multiple surveys

Naïve* Lentic Site Occupancy Rates

	Montana		Wyoming	
	2008 (n = 175)	2009 (n = 102)	2008 (n = 68)	2009 (n = 47)
Tiger Salamander	38	59	18	11
Plains Spadefoot	18	7	3	0
Great Plains Toad	1	2	1	0
Woodhouse's Toad	40	28	24	15
Boreal Chorus Frog	57	48	13	0
Northern Leopard Frog	5	5	15	36
Painted Turtle	25	21	1	0
Snapping Turtle	nd	nd	1	0
Terrestrial Gartersnake	2	13	6	13
Plains Gartersnake	1	2	6	0
Common Gartersnake	1	1	1	2

Naïve* Rock Outcrop Occupancy Rates

* Not yet corrected for detection probability

Species	% Sites Occupied (2008 / 2009)	
	Montana (N = 101 / 42)	Wyoming (N = 16 / 14)
Greater Short-horned Lizard	nd / nd	6 / nd
Common Sagebrush Lizard	65 / 26	63 / 86
Rubber Boa	1 / nd	nd / nd
Eastern Racer	22 / 3	nd / 3
Western Hog-nosed Snake	1 / nd	nd / 1
Milksnake	3 / nd	nd / nd
Gophersnake	9 / 5	nd / 48
Prairie Rattlesnake	33 / 14	nd / 19

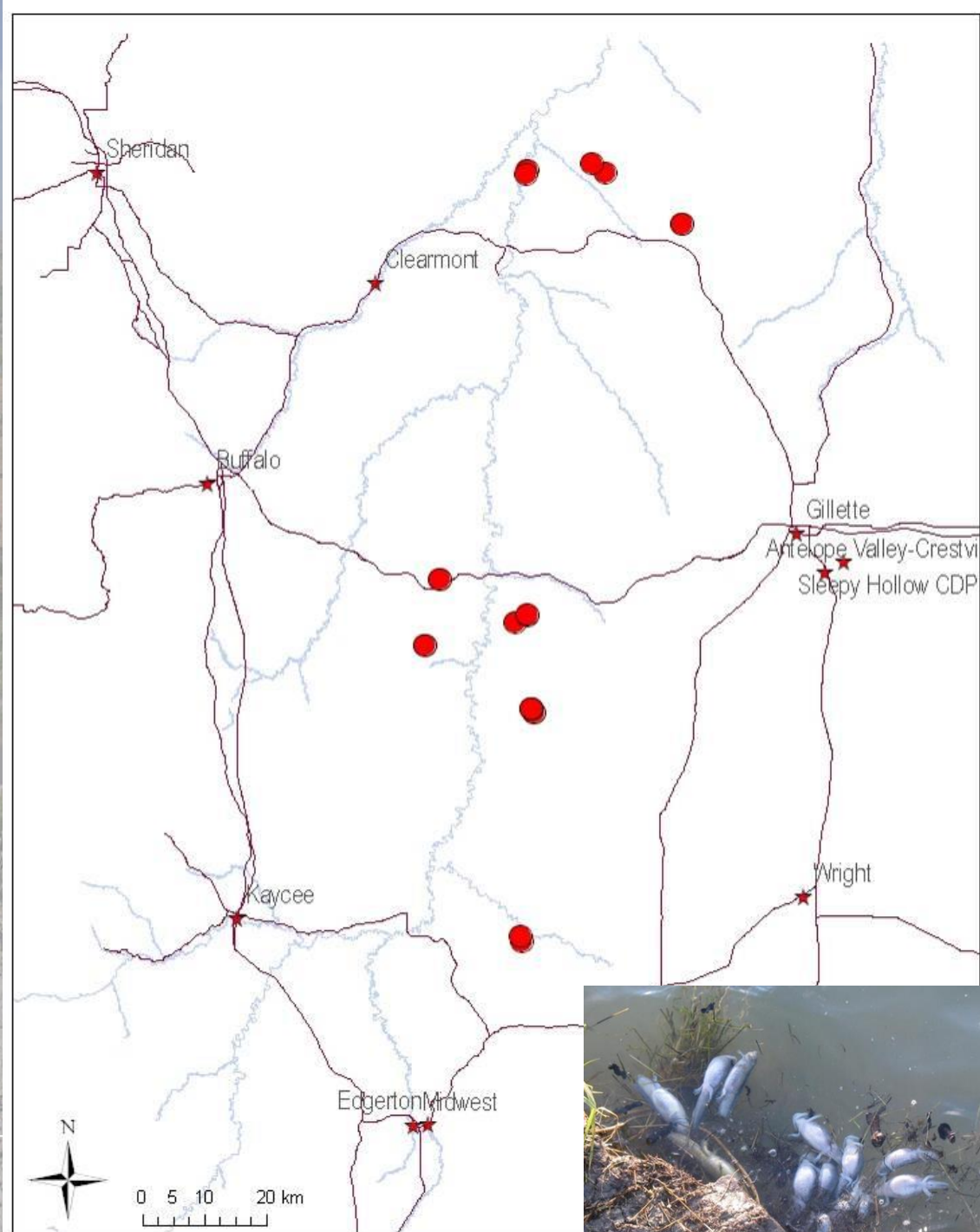
Nd = not detected

• Woodhouse's Toad detected at 23% (2008) and 14% (2009) of MT sites

Wyoming

Tiger Salamander Mortality

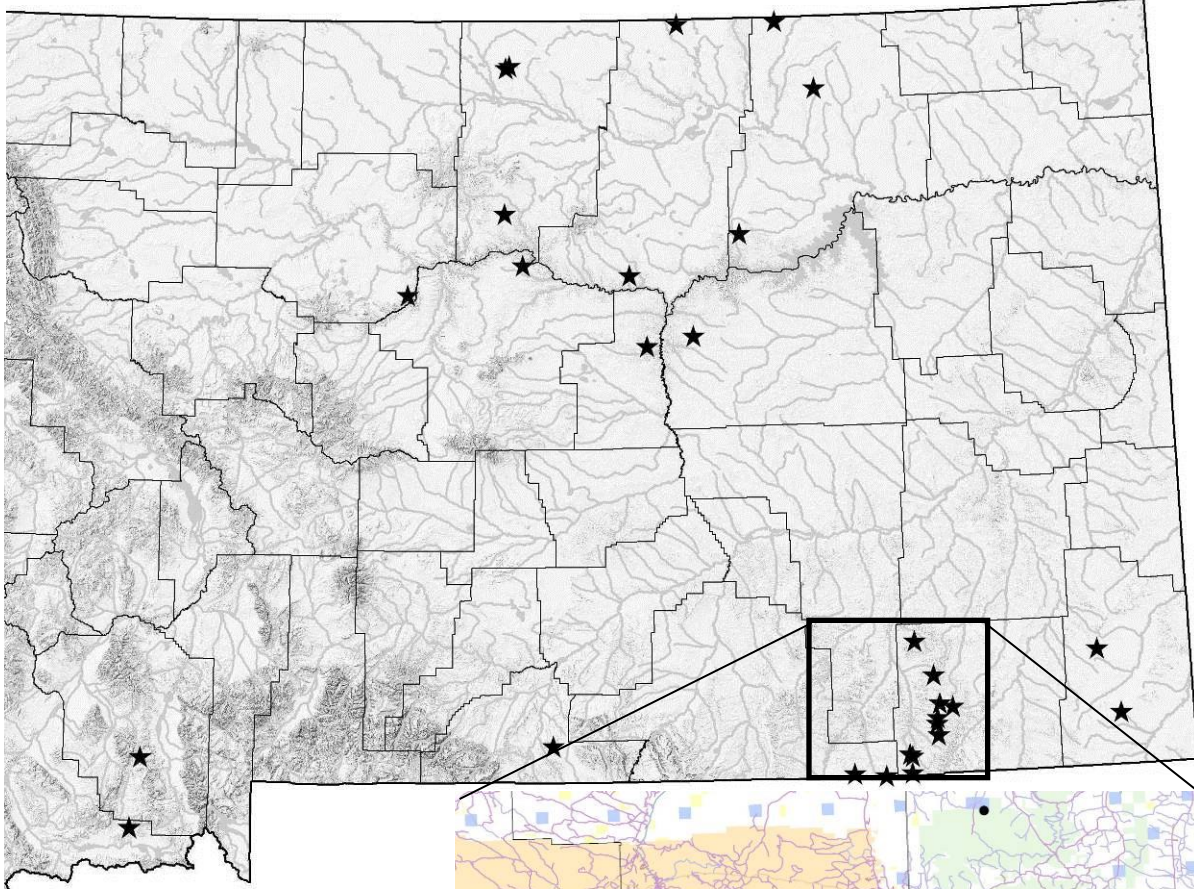
- Over 600 dead of dying larvae
- 2008: 18% of standing water bodies
- 2009: 63% of standing water bodies
- Specimens collected & sent to USGS National Wildlife Health Center – Confirmed Ranavirus



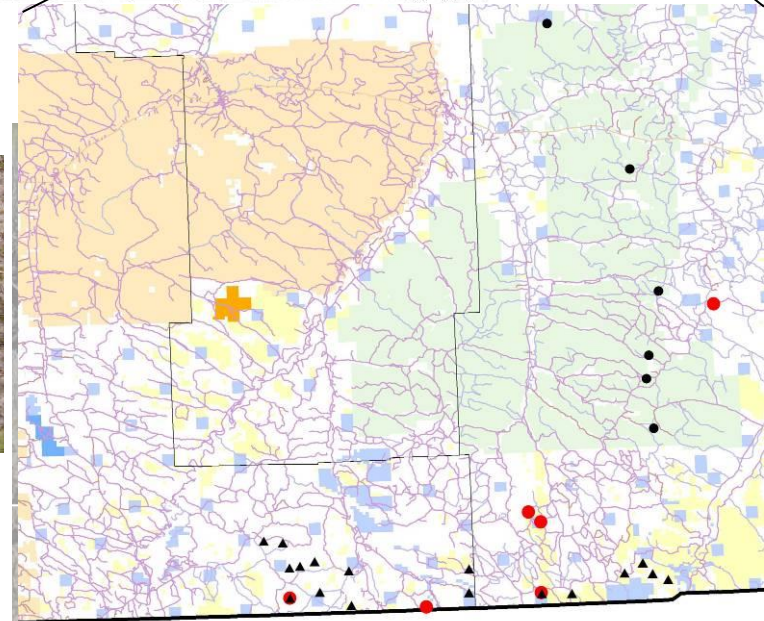
Montana

Tiger Salamander Mortality

- Thousands of dead or dying larvae
- 2008: 3% of standing water bodies (n= 175)
- 2009: 17% of standing water bodies (n = 102)
- Mortalities distributed across species range in Montana dating back to 2002 and across Great Plains.
- Evidence for fish intr and bait trade enhanced spread



Red Circle = 2008
Black Triangle = 2009
All other = 2002-2008



Montana Distribution of Chytrid Fungus



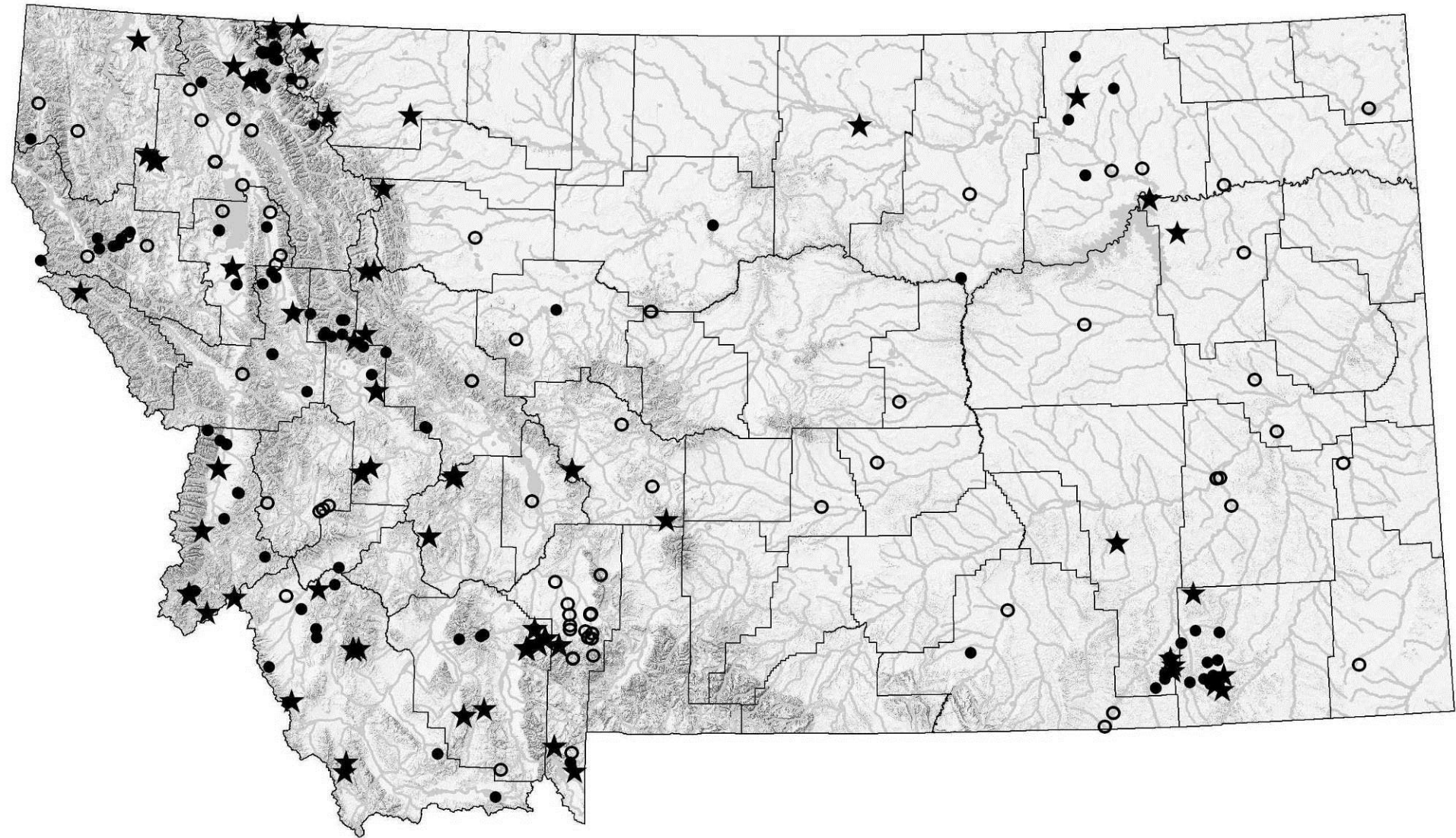
= Recent Positive



= Recent negative



= Historic samples all negative



Other Highlights

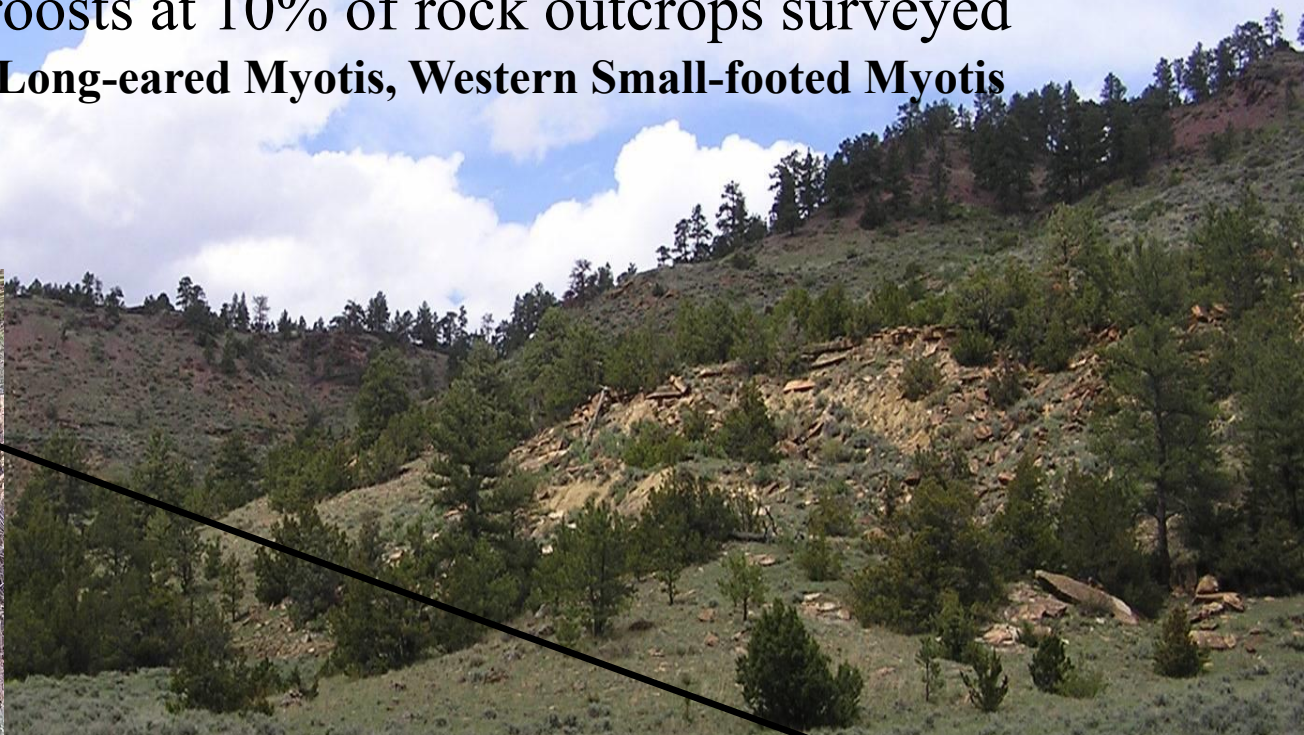
- **> 4,000 herp observations in MT & WY (< 400 pre-2000)**
- **185 km range extension for Rubber Boa**
- **Some species much more common than we thought**
- **New occurrences documented for several rare species**
- **Cheatgrass & Sweet Clover impact to basking habitat**
- **> 4,000 non herp animal observations**
- **New rare plant records**
- **Road mortality for nightjars**
- **Bat roosts detected during >10% of rock outcrop surveys (some maternity colonies, 4 bat species).**



Bats and Rock Outcrops

Bats detected in day roosts at 10% of rock outcrops surveyed

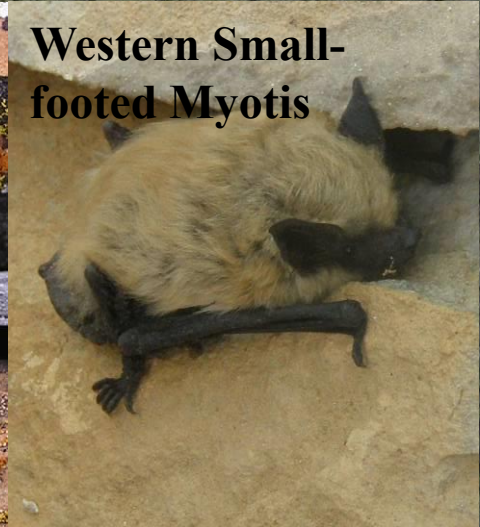
Pallid Bat, Big Brown Bat, Long-eared Myotis, Western Small-footed Myotis



Pallid Bat



Western Small-footed Myotis



Future work

- Riparian surveys in Montana
- Expand rock outcrop and lentic surveys in Wyoming
- Hibernacula surveys in Wyoming and Montana
- 3rd year of baseline at selected lentic and rock outcrop sites
- Opportunistic road and nocturnal calling surveys
- Finalize and implement long-term monitoring plan



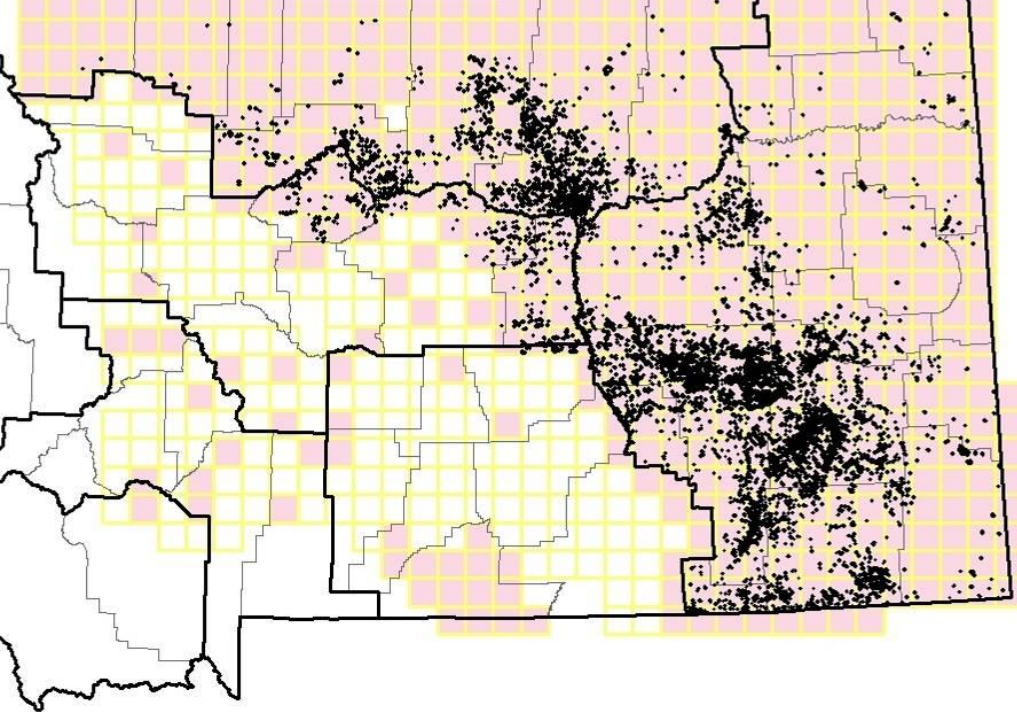
Recommendations

- Examine interaction of pathogens and CBNG discharge water
- When creating ponds, create saucers not cups
- Provide emergent vegetation whenever possible through planting and / or temporary fencing of livestock
- Reduce travel speeds to avoid collisions with animals - especially near hibernacula and breeding sites and in spring, fall, and at night
- Manage weeds to reduce fire risk and prevent cheatgrass and sweet clover from choking out basking habitats for reptiles

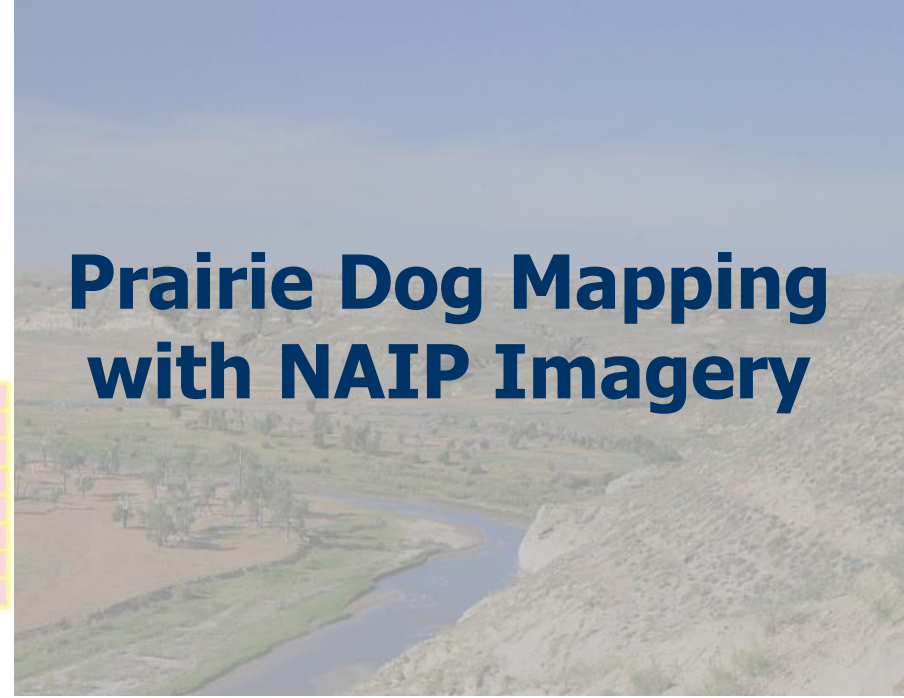


Decision Tree for Choices Between Impacts to Adjacent Habitat Patches

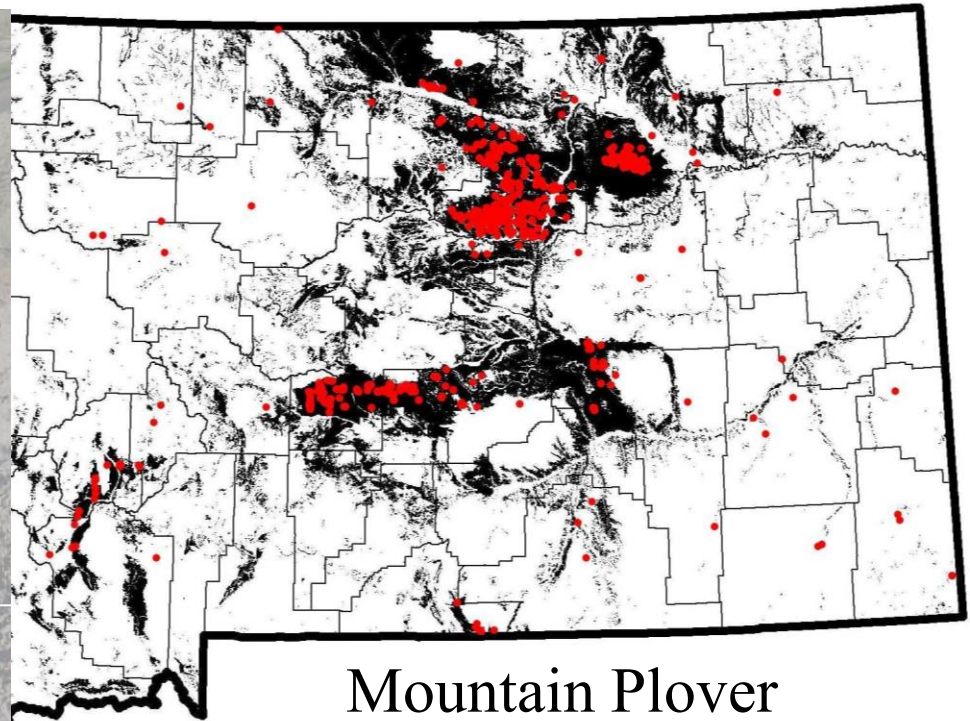
- 1. Riparian > Rock outcrop > Sandy Bluff > other**
(essentially protect places with higher structural diversity in habitat first)
 - 2. Larger habitat patch > smaller habitat patch**
(larger patches more likely to be colonized and less likely to be extirpated from)
 - 3. For rock outcrops and sandy bluffs S, SE, SW facing slopes > N, NE, NW facing slopes**
(many species dependent on more solar exposure in winter and summer)
 - 4. Protect habitat patches with greater structural diversity (e.g. regenerating and old growth cottonwoods or greater diversity of sizes of rocks and crevices).**
 - 5. Always stay as far away from these habitat patches as possible.**
-



Prairie Dog Mapping with NAIP Imagery



Predicted Distribution Models



Mountain Plover

Other Herp Resources

- **Montana Field Guide** - <http://fieldguide.mt.gov/>
- **Montana Herp Conservation Plan**
http://mtnhp.org/reports/Amphibian_Reptile_Conservation_Plan.pdf
- **Montana TRACKER Application** (point observation data, site photos, numerous map layers)
<http://mtnhp.org/Tracker/>
- **Internet Herp Links**
<http://mtnhp.org/links.asp?key=17>
- **Predicted Distribution Models**
Contact respective Heritage Program Zoologists