

Distribution, Identification, Status, and Habitat Use of Montana's Amphibians and Reptiles

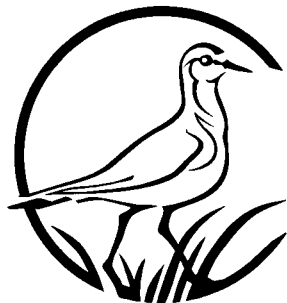
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MONTANA

**Natural Heritage
Program**

<http://mtnhp.org>

Montana Salamanders

Long-toed Salamander



Tiger Salamander



Coeur d'Alene Salamander



Idaho Giant Salamander



Montana Toads

Plains Spadefoot



Western Toad



Great Plains Toad



Woodhouse's Toad



Montana Frogs

**Rocky Mountain
Tailed Frog**



Pacific Treefrog



Boreal Chorus Frog



American Bullfrog



Exotic!

Columbia Spotted Frog



Northern Leopard Frog



Montana Turtles

Snapping Turtle



Spiny Softshell



Painted Turtle



Montana Lizards

Greater Short-horned Lizard



Common Sagebrush Lizard



Northern Alligator Lizard



Western Skink



Montana Snakes

Rubber Boa



Western Hog-nosed Snake



Eastern Racer



Gophersnake



Milksnake



Smooth Greensnake



Terrestrial Gartersnake



Plains Gartersnake



Common Gartersnake



Western Rattlesnake



Undocumented Species Possibly Native to Montana

Wood Frog
Rana sylvatica



Canadian Toad
Bufo hemiophrys



Great Basin Spadefoot
Scaphiopus intermontanus



Pigmy Short-horned Lizard
Phrynosoma douglasii

Long-toed Salamander (*Ambystoma macrodactylum*)



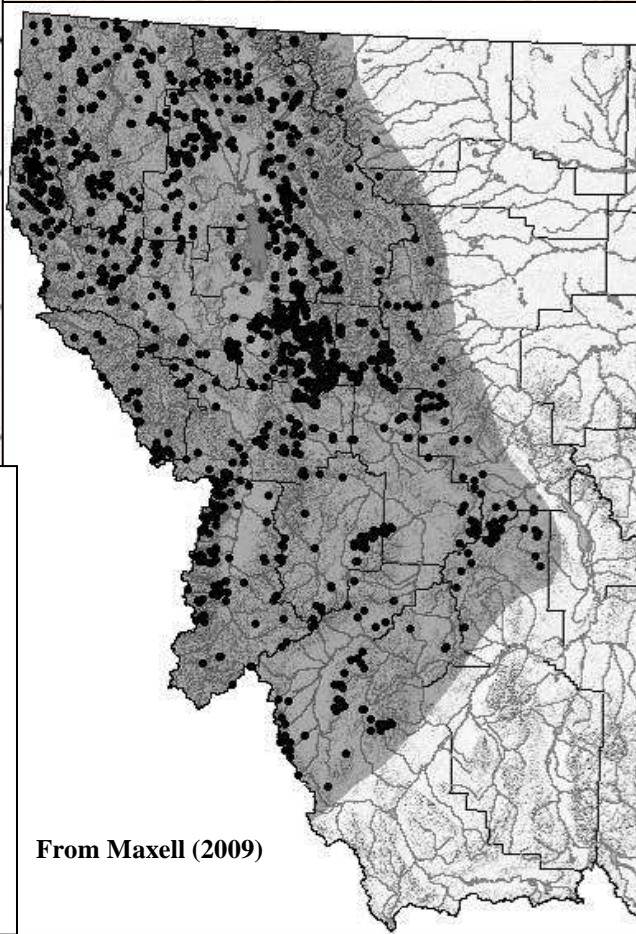
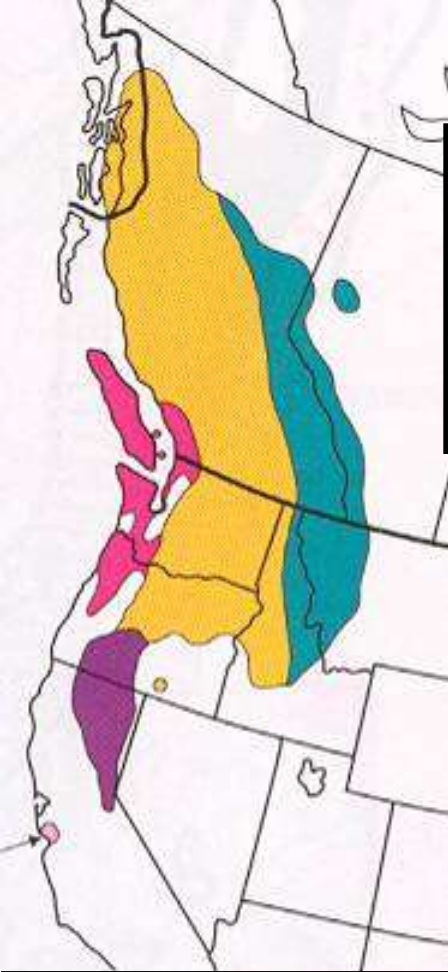
Identification

- Eggs:**
- Ovum diameter \approx 2.5mm
 - Total diameter \approx 12-17mm
 - Ovum surrounded by 2 jelly layers
 - Singly or in clusters of up to 81

- Larvae:**
- Translucent, black, or tan dorsally
 - White to pinkish ventrally
 - 3 pairs of feather gills on sides of head (9-13 gill rakers)
 - TL up to 85mm

- Adults:**
- 4th toe on hind foot longer than sole
 - Incomplete to full yellow, orange, or red dorsal stripe
 - Lateral and ventral white flecking
 - No nasolabial groove

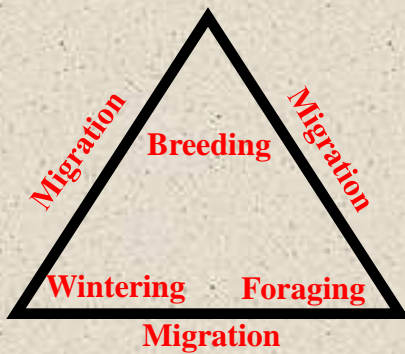
Vocalization: None



From Maxell (2009)

From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles

Long-toed Salamander (*Ambystoma macrodactylum*)



Habitat Use

Breeding: -Temporary or permanent standing waters with or without emergent vegetation
-Usually near forested areas

Foraging: -Terrestrial habitats with soil cover
-Usually near forested areas

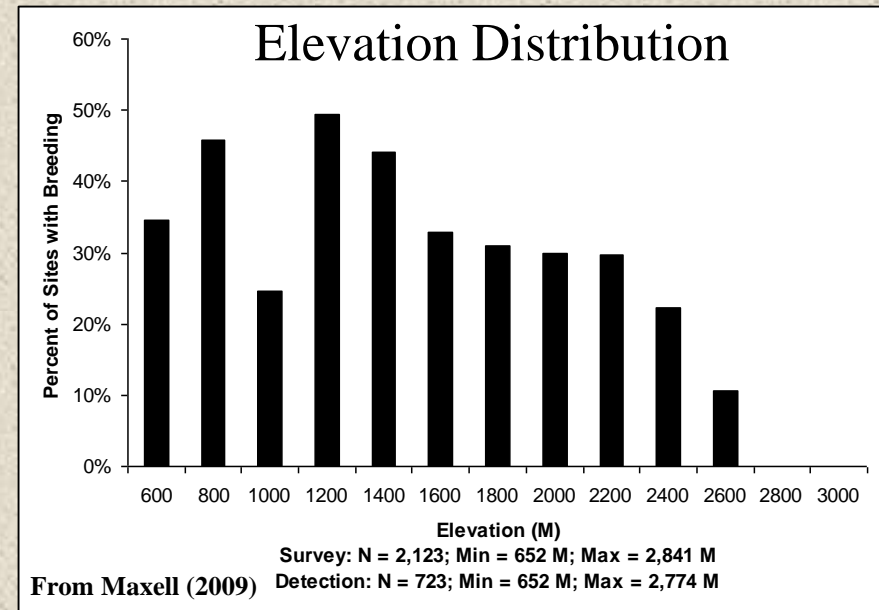
Overwintering: -Terrestrial habitats with soil cover
-Usually near forested areas

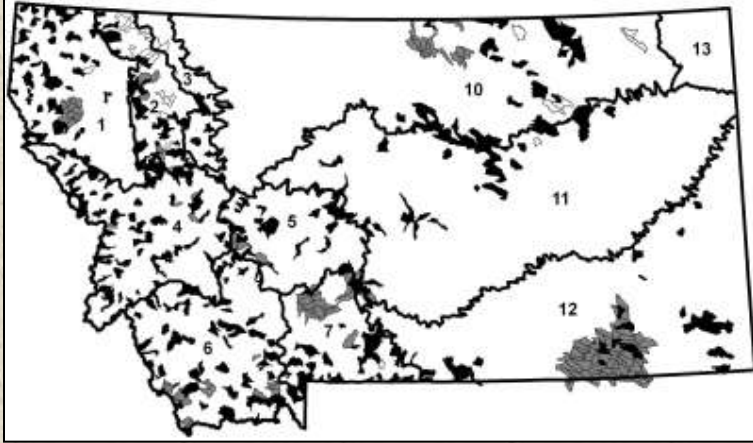
Migration: -Numerous individuals have been found in terrestrial habitats more than 600 meters from the nearest breeding site

Elevation: -Up to and slightly above treeline

Issues of Concern

- Fish stocking





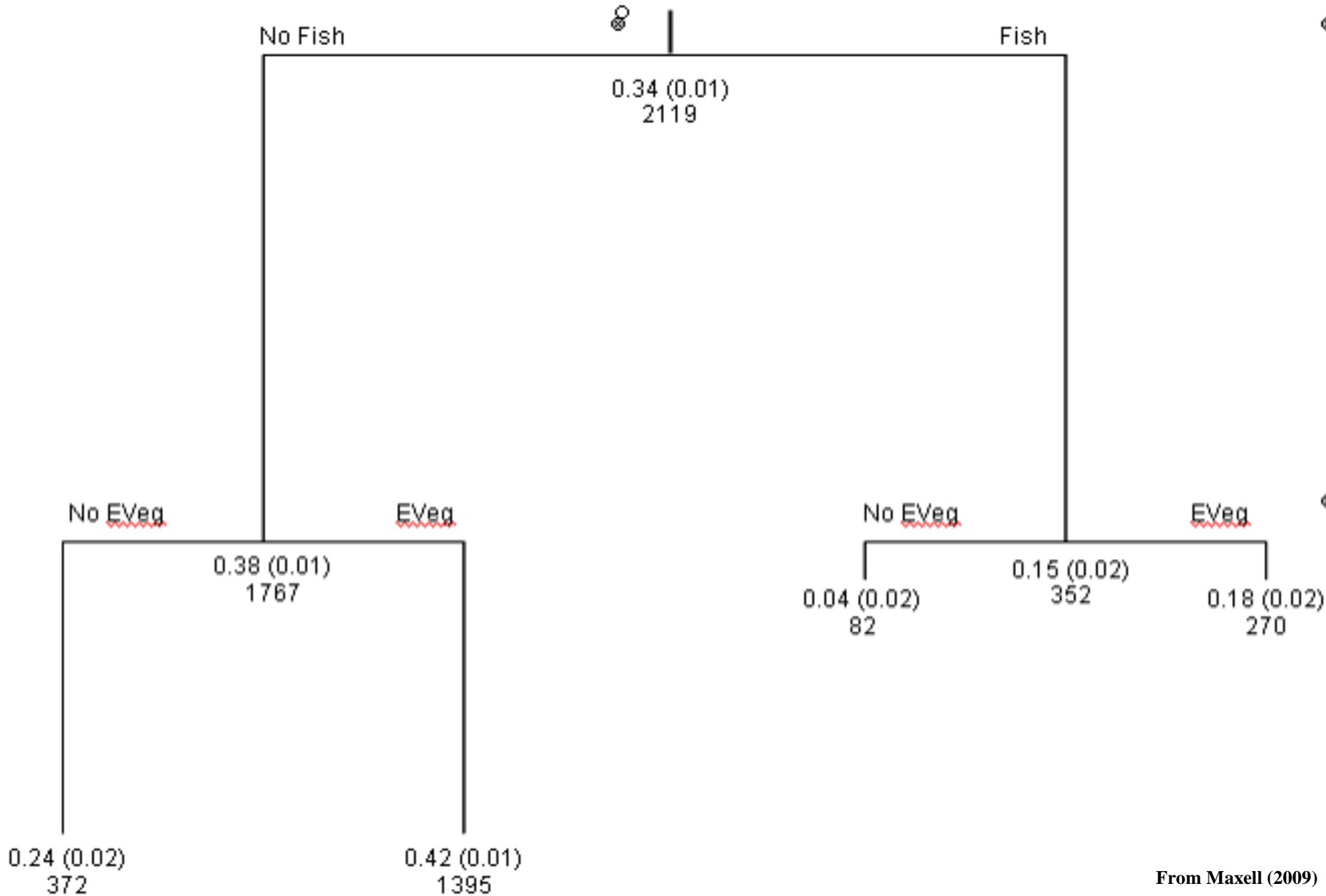
Long-toed Salamander (*Ambystoma macrodactylum*)

Occupancy Rates

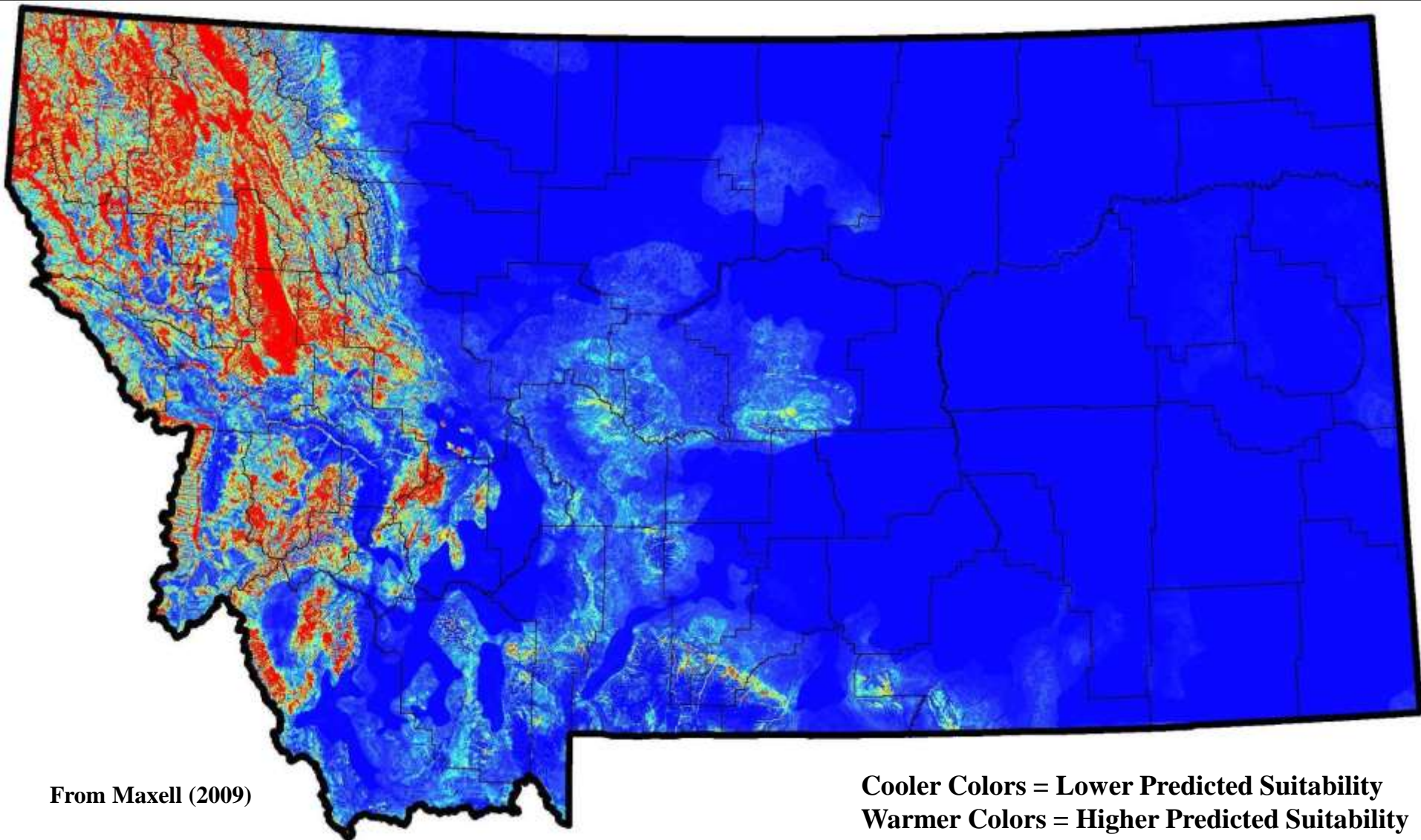
Strata	Total Number Watersheds / Sites	Percent Watershed Occupancy (95% CI)	Percent Site Occupancy (95% CI)
1	53 / 286	66 (55–77)	44 (39 – 50)
2	36 / 638	75 (63–87)	31 (28 – 35)
3	4 / 43	24 (2–98)	12 (2 – 21)
4	65 / 803	77 (68–86)	44 (41 – 48)
5	3 / 11	33 (0–87)	18 (0 – 41)
6	24 / 338	58 (39–78)	10 (7 – 13)
Overall	185 / 2119	70 (64–76)	34 (32 – 36)

Long-toed Salamander (*Ambystoma macrodactylum*)

CART Model



Long-toed Salamander (*Ambystoma macrodactylum*) Statewide Predicted Habitat Suitability Model



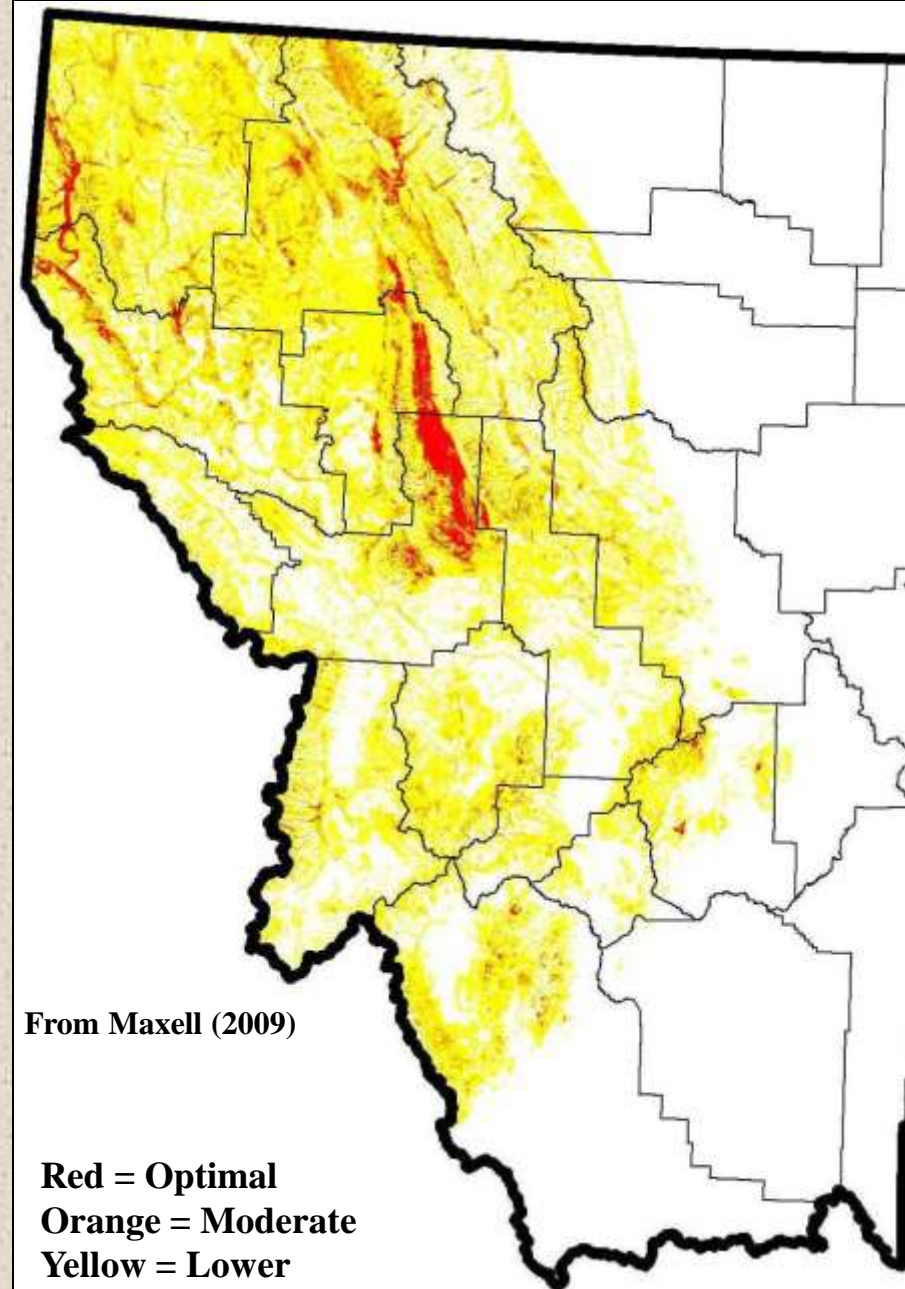
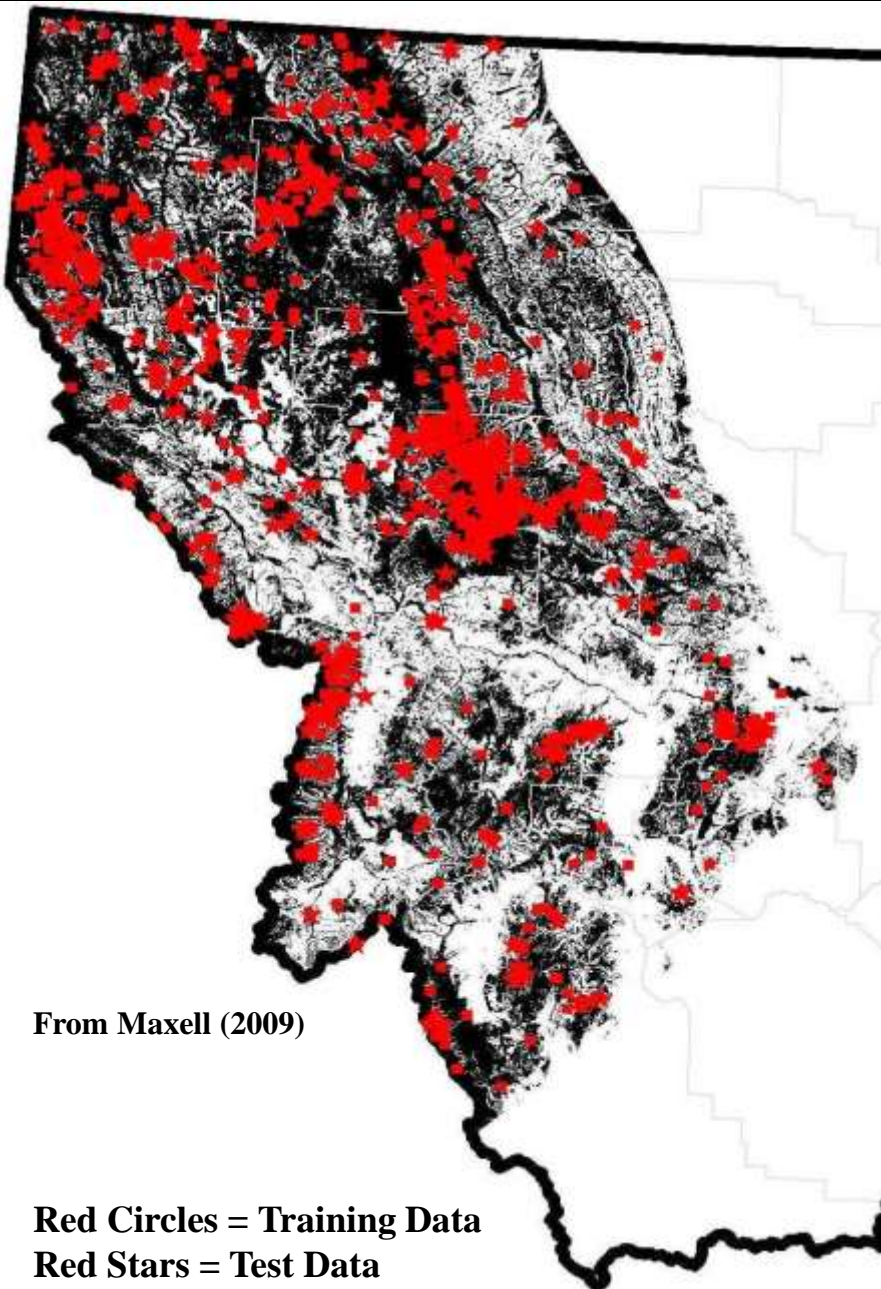
From Maxell (2009)

Cooler Colors = Lower Predicted Suitability
Warmer Colors = Higher Predicted Suitability

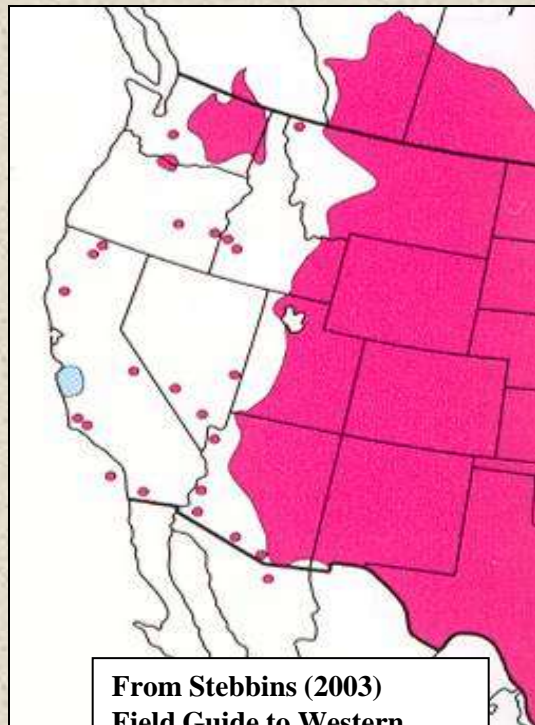
Long-toed Salamander (*Ambystoma macrodactylum*)

Binary Model with Point Observations

Habitat Suitability Classes



Tiger Salamander (*Ambystoma tigrinum*)



From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles



Identification

Eggs:

- Ovum diameter \approx 2-3mm
- Total diameter \approx 7-9mm
- Ovum surrounded by 3 jelly layers
- Singly or in linear clusters

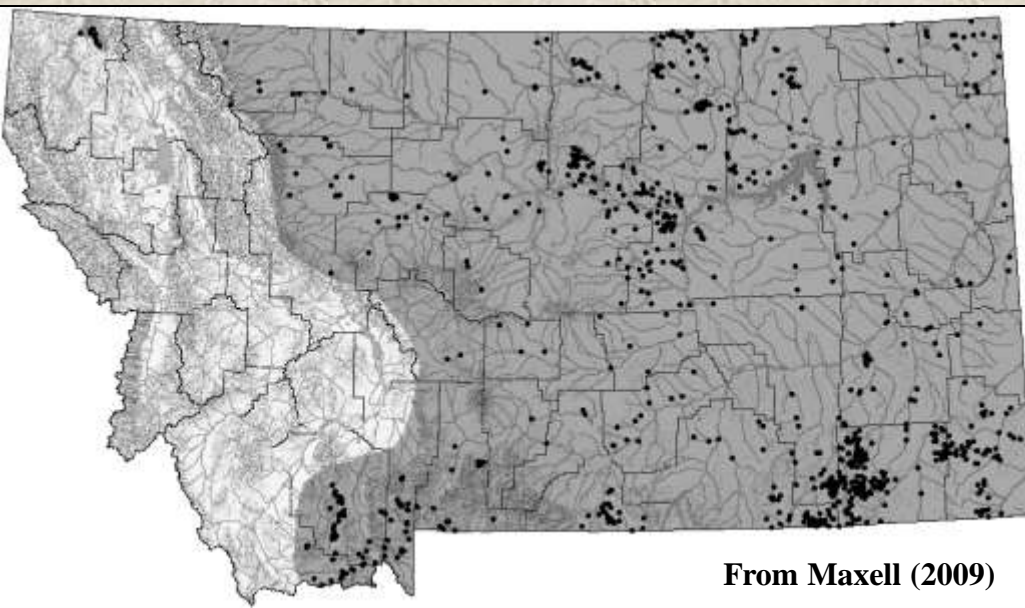
Larvae:

- Olive green dorsally
- Silvery white ventrally
- 3 pairs of feather gills on sides of head (15-25 gill rakers)
- SVL up to 98mm

Adults:

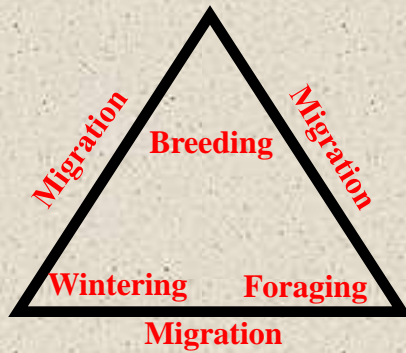
- Mottled dorsally with green, yellow, or tan on a brown or black background
- Ventrally gray or same as dorsal pattern

Vocalization: None.



From Maxell (2009)

Tiger Salamander (*Ambystoma tigrinum*)

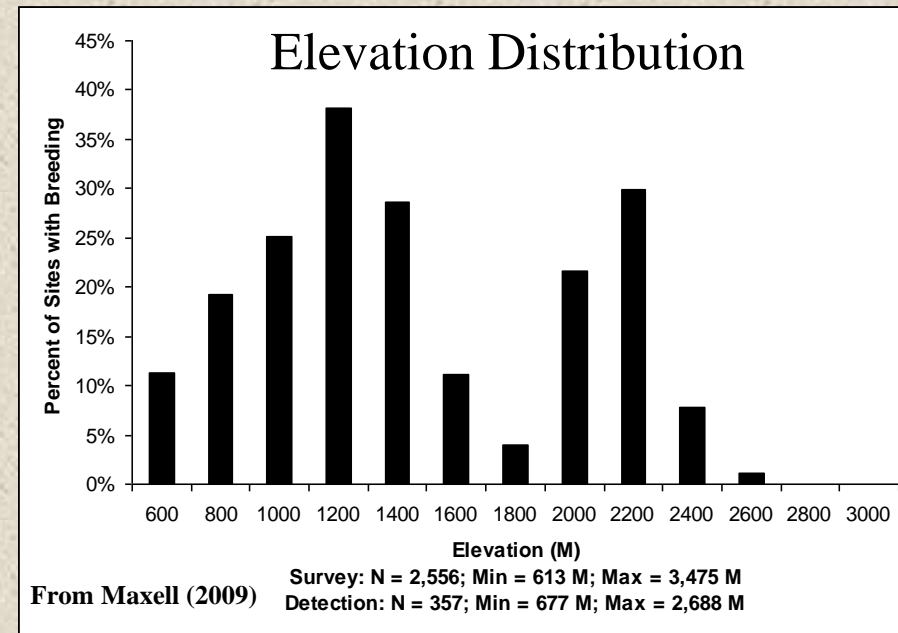


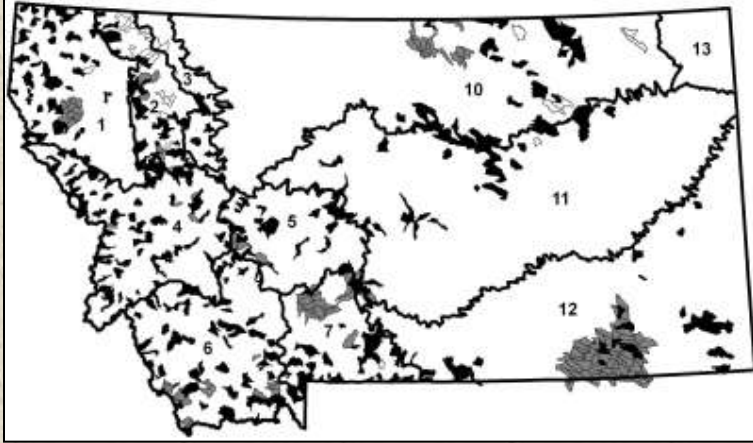
Habitat Use

- Breeding:** -Temporary or permanent standing waters with or without emergent vegetation
- Foraging:** -Terrestrial habitats with soil cover
-Often in areas with mammal burrows
- Overwintering:** -Terrestrial habitats with soil cover
-Often in areas with mammal burrows
- Migration:** -Individuals are known to migrate several hundred meters between terrestrial burrows and breeding sites
- Elevation:** -Up to and slightly above treeline

Issues of Concern

- Fish stocking
- Tilled agriculture
- Use as bait
- Pathogens





Tiger Salamander

(*Ambystoma tigrinum*)

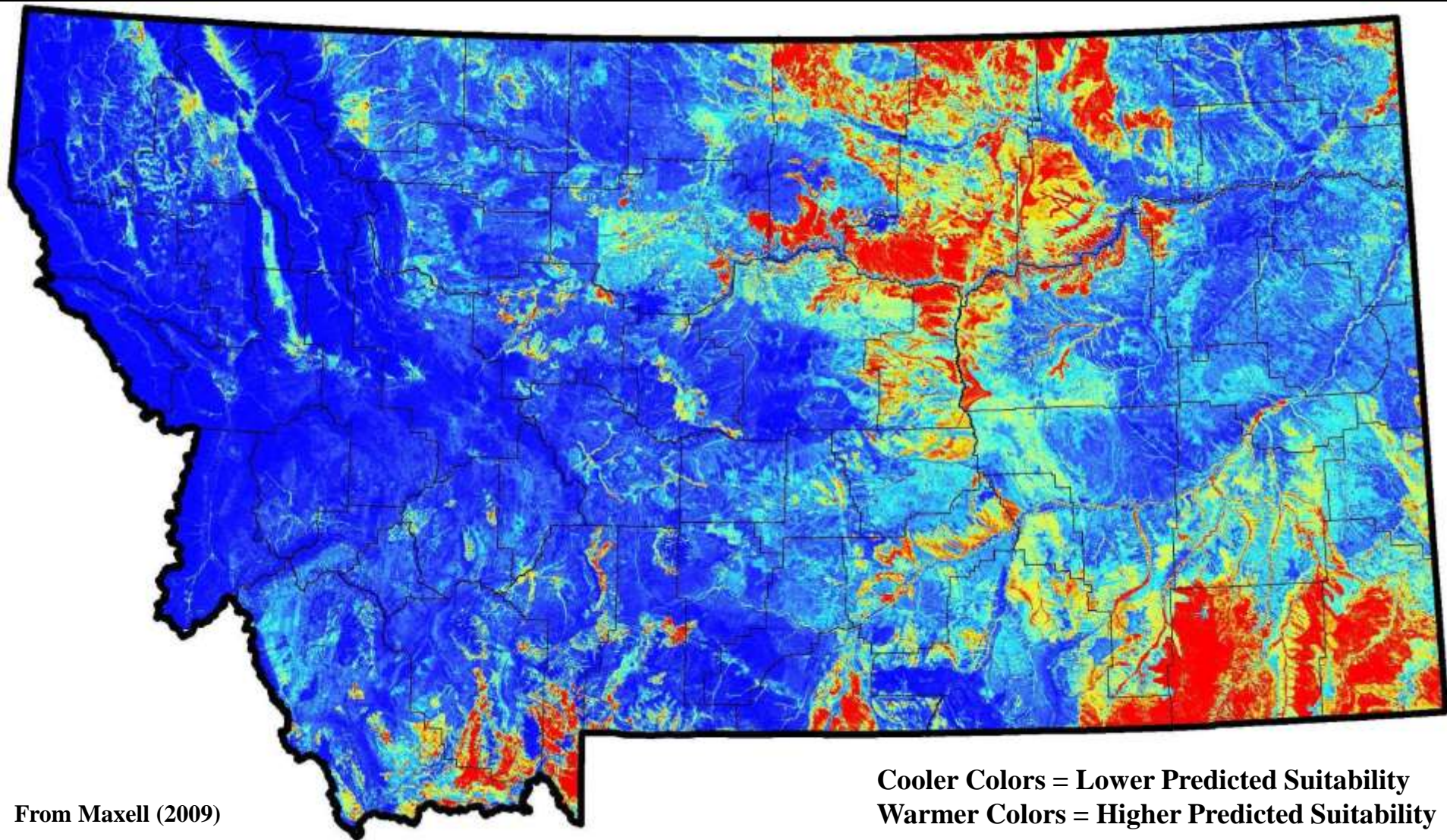
Occupancy Rates

Strata	Total Number Watersheds / Sites	Percent Watershed Occupancy (95% CI^a)	Percent Site Occupancy (95% CI^b)
1	2 / 17	0 (-)	0 (-)
6	14 / 222	50 (13–24)	20 (14–25)
7	27 / 749	30 (14–45)	3 (2–4)
10	37 / 922	73 (60–86)	11 (9–13)
11	26 / 139	77 (62–92)	40 (31–48)
12	34 / 487	79 (67–91)	28 (24–32)
Overall	140 / 2536	64 (56–71)	14 (13–15)

Tiger Salamander (*Ambystoma tigrinum*) CART Model

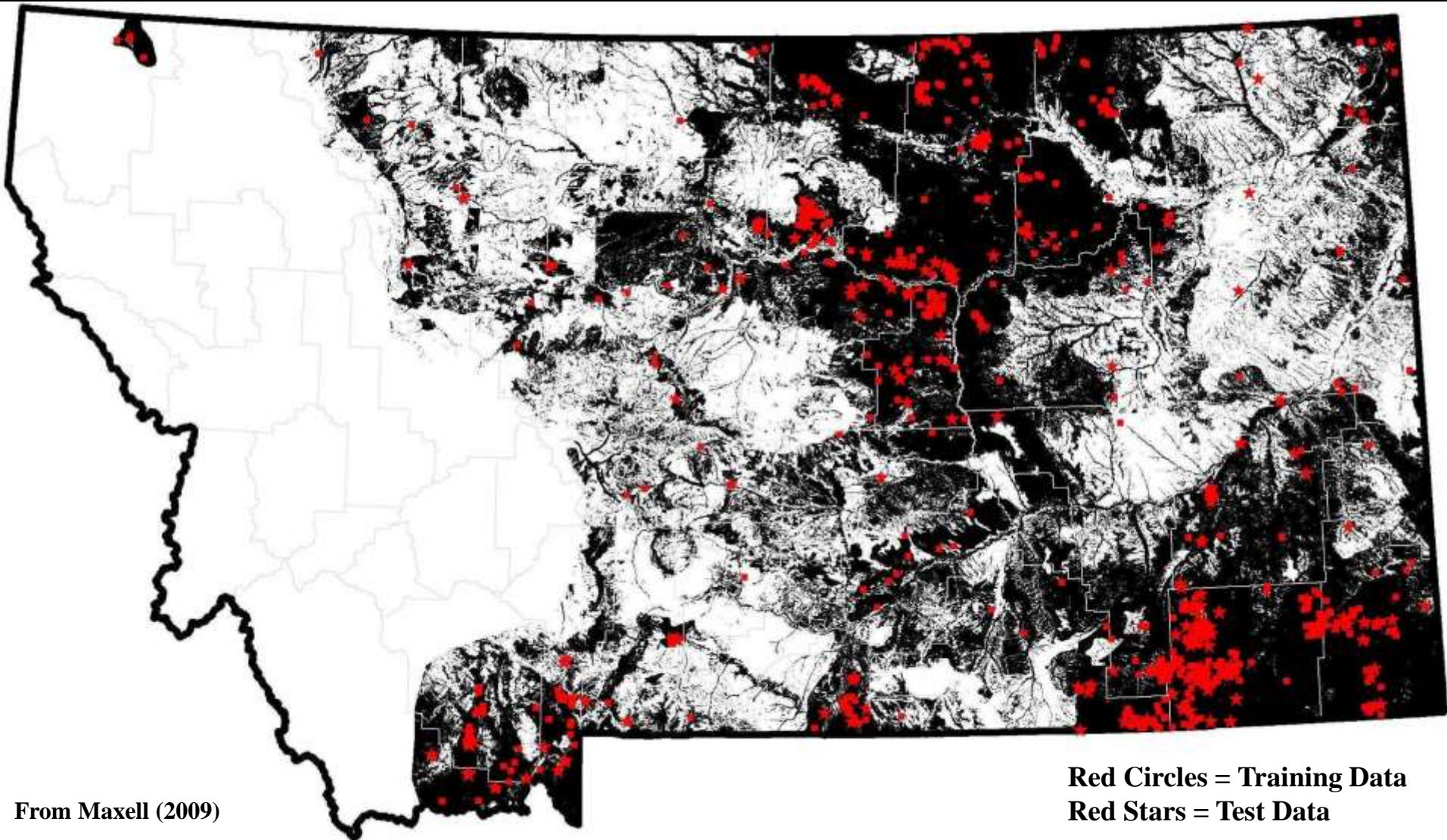


Tiger Salamander (*Ambystoma tigrinum*) Statewide Predicted Habitat Suitability Model



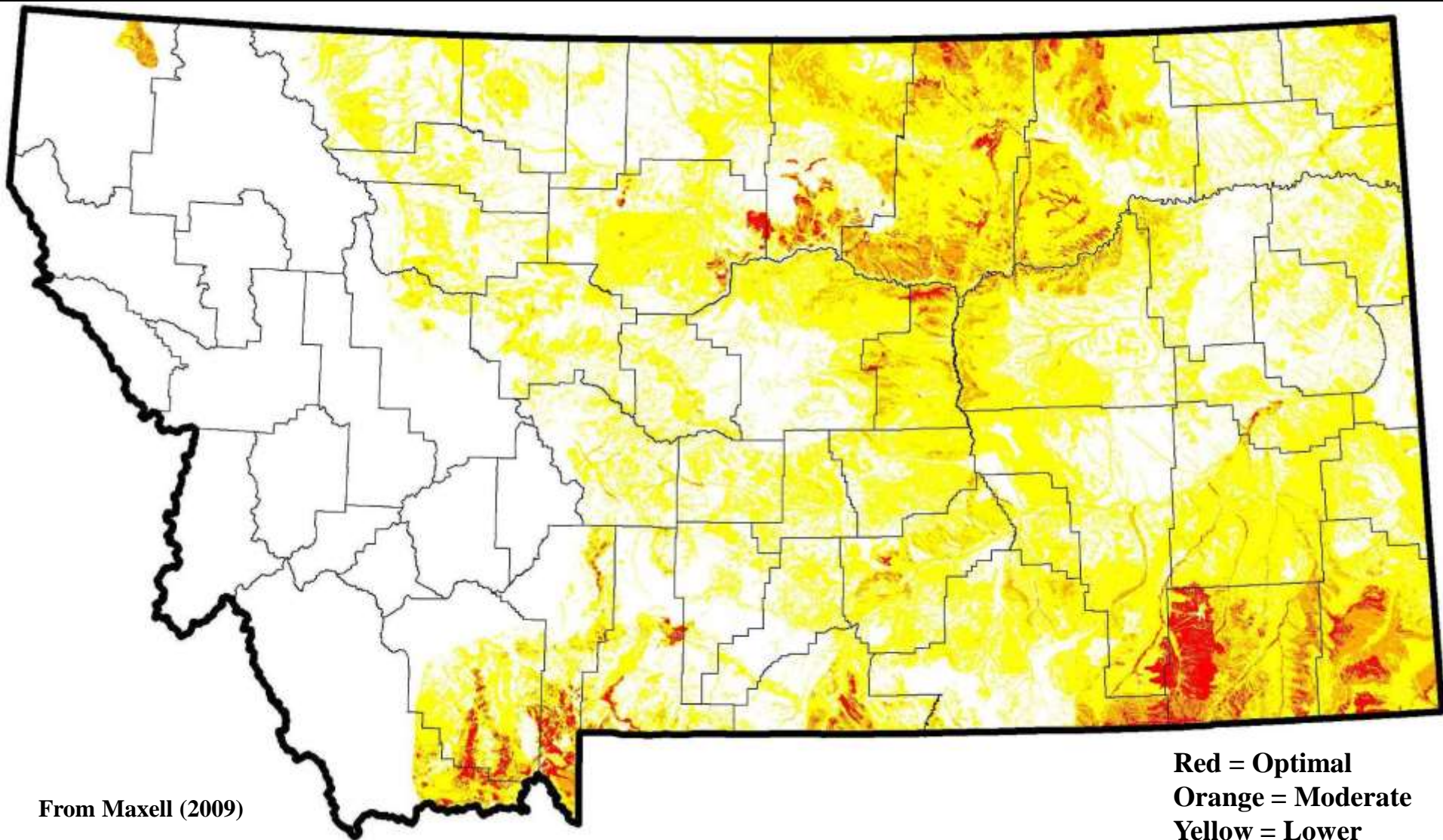
From Maxell (2009)

Tiger Salamander (*Ambystoma tigrinum*) Binary Model with Point Observations



From Maxell (2009)

Tiger Salamander (*Ambystoma tigrinum*) Habitat Suitability Classes







Idaho Giant Salamander (*Dicamptodon aterrimus*)



GIANT SALAMANDERS

Dicamptodon

-  CALIFORNIA *D. ensatus*
-  PACIFIC *D. tenebrosus*
-  COPE'S *D. copei*
-  IDAHO *D. aterrimus*



Identification

Eggs:

- Ovum pure white \approx 6.5mm
- Total diameter \approx 16-21mm
- Ovum surrounded by 6 jelly layers
- Attached singly to substrate in chambers behind rocks in streams

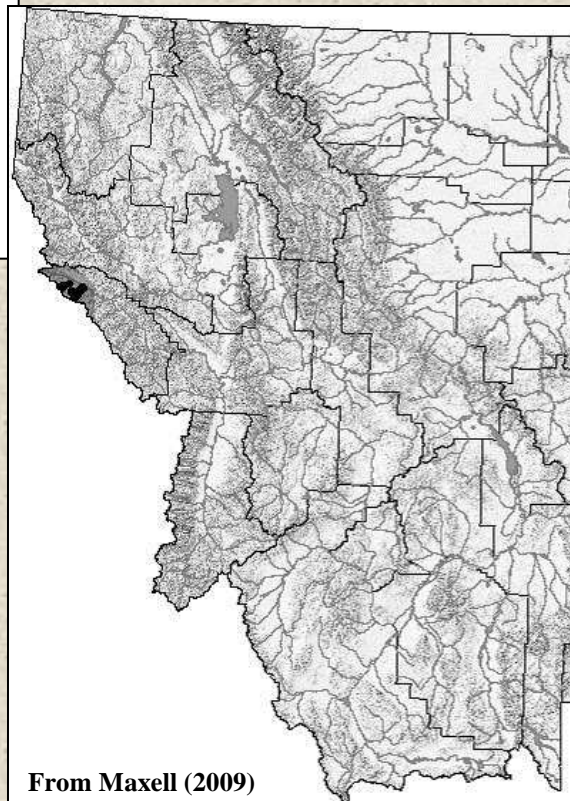
Larvae:

- Dark brown to black dorsally
- Bluish gray ventrally
- Short, feathery red gills
- Dorsal tail fin mottled
- TL \approx 34-351mm

Adults:

- Heavy-bodied with short, thick toes
- Dark brown or slate colored
- Light tan or coppery marbling dorsally
- TL up to 340mm

Vocalization: None

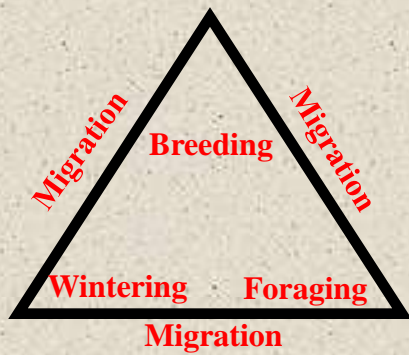


From Maxell (2009)

From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles

Idaho Giant Salamander

(*Dicamptodon aterrimus*)



Habitat Use

Breeding: - Cold, fast-moving headwater streams in moist coniferous forests often in steep terrain

Foraging: - Terrestrial riparian habitats along headwater streams in moist coniferous forests often in steep terrain

Overwintering: - Within crevices and spaces created by logs, rocks, and other forest debris in moist coniferous forests

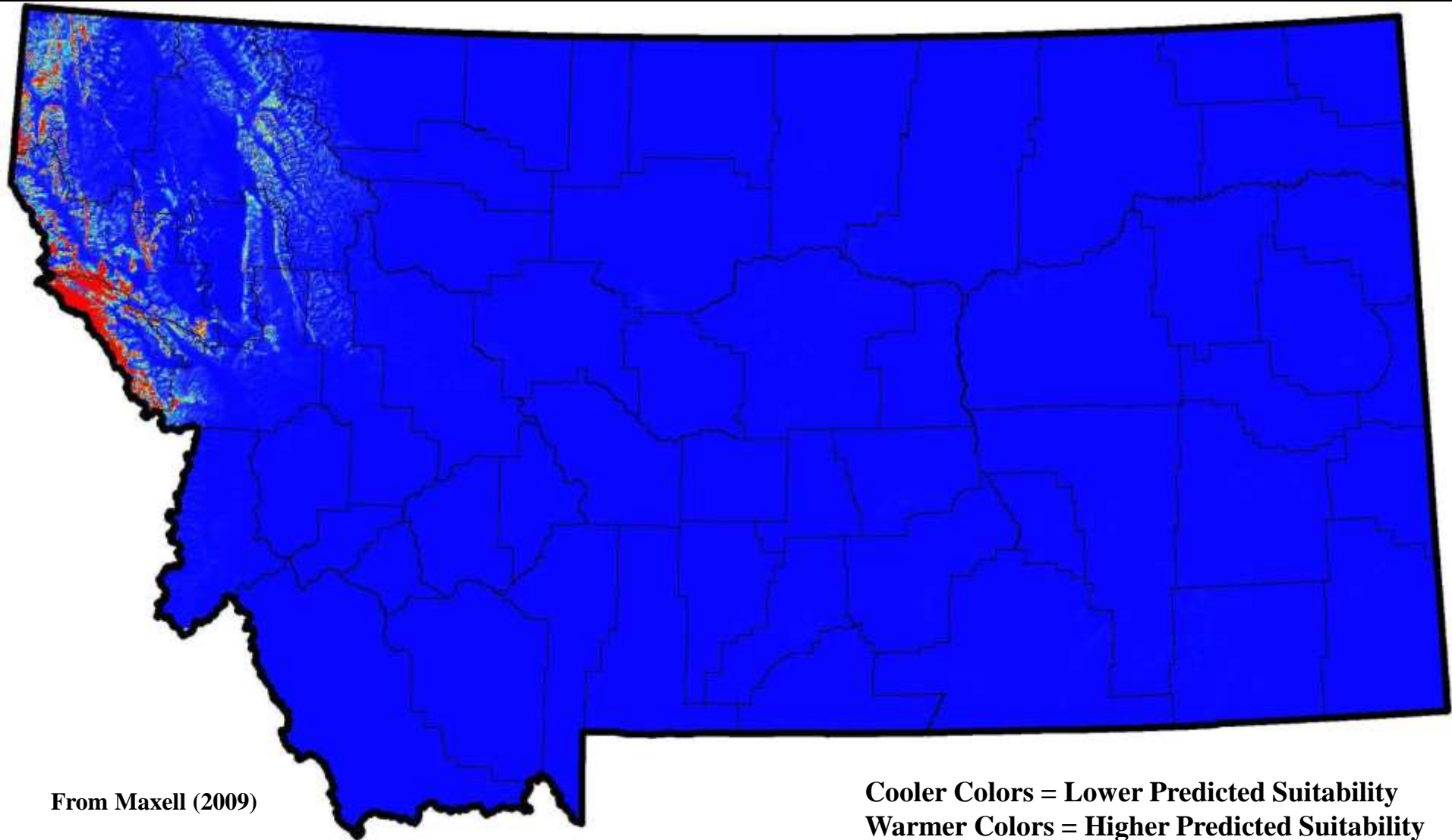
Migration: - Migrate unknown distances between stream breeding and upland terrestrial habitats

Elevation: - Up to treeline (documented to 5,700 ft in MT)

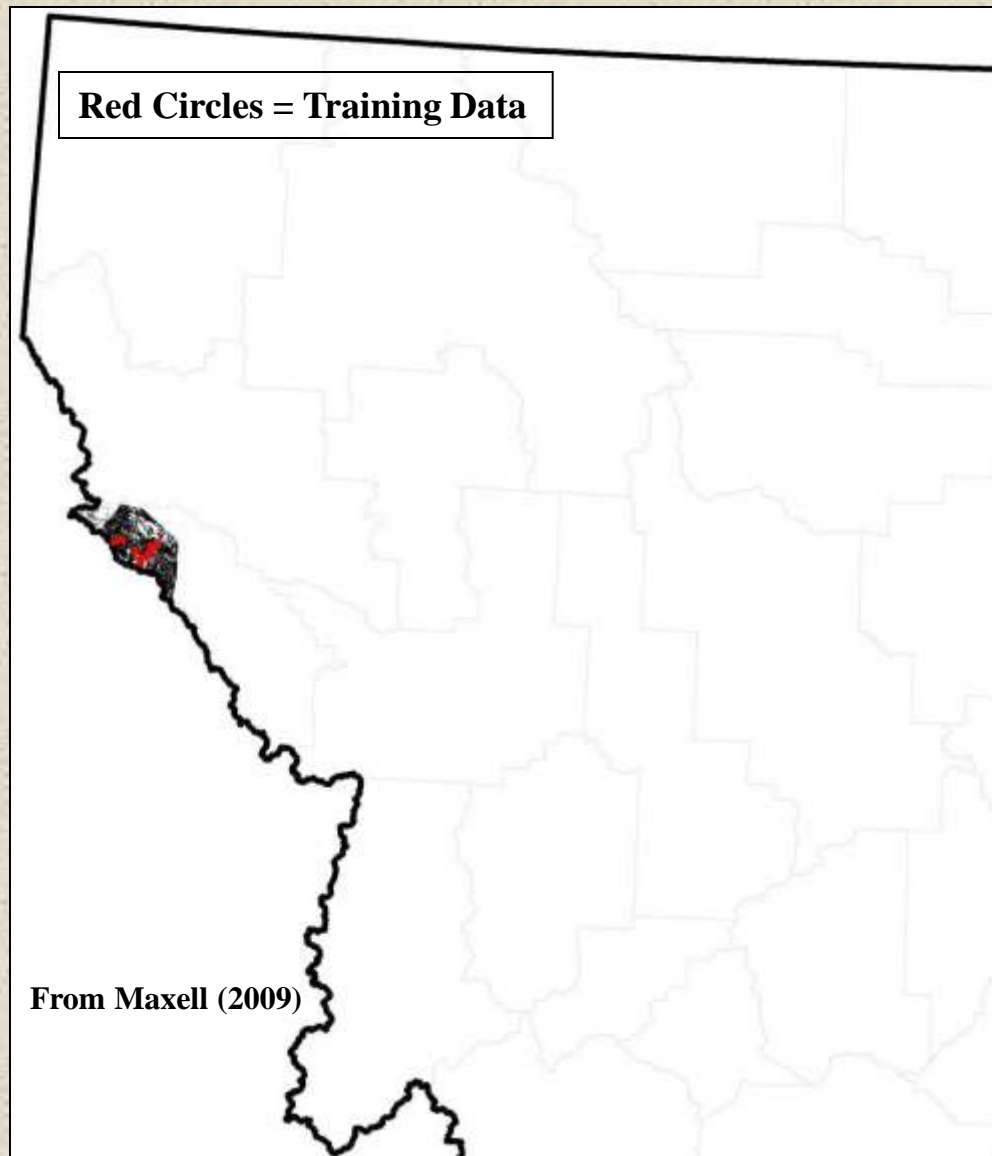
Issues of Concern

- Timber harvest
- Fire and fire management activities
- Piscicides
- Road and trail development
- On- and off-road vehicle use
- Habitat fragmentation
- Fish stocking

Idaho Giant Salamander (*Dicamptodon aterrimus*) Statewide Predicted Habitat Suitability Model

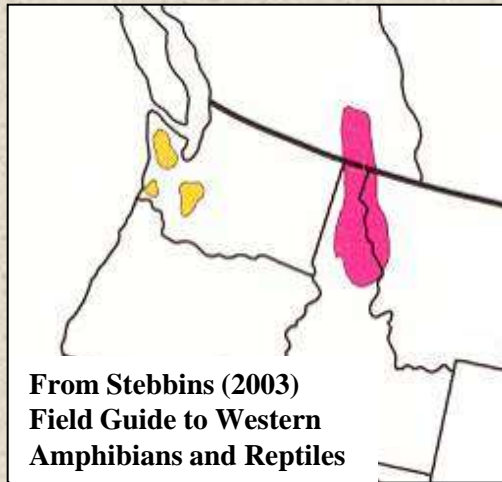


Idaho Giant Salamander (*Dicamptodon aterrimus*) Binary Model with Point Observations



Coeur d'Alene Salamander

(*Plethodon idahoensis*)



Identification

Eggs:

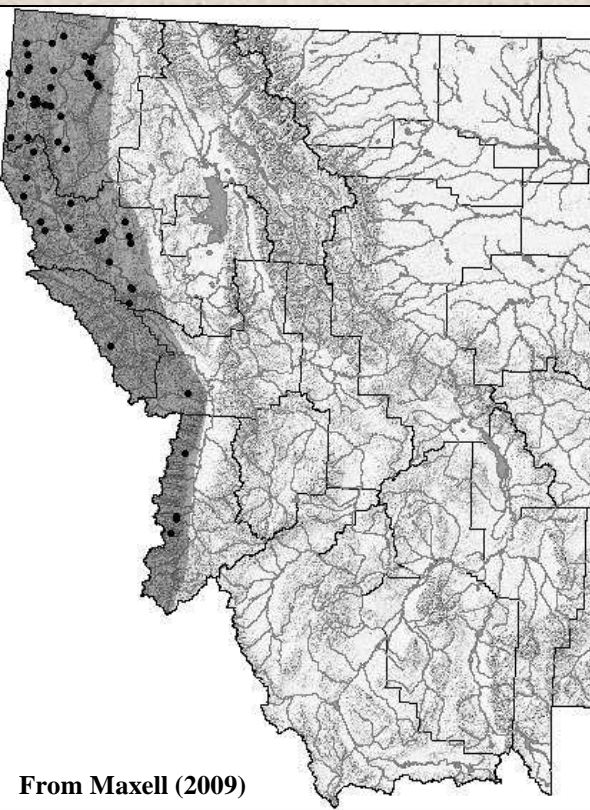
- Ovum unpigmented
- Total egg diameter \approx 5mm
- Ovum surrounded by 2 jelly layers
- Laid in subterranean sites in clusters of up to 13

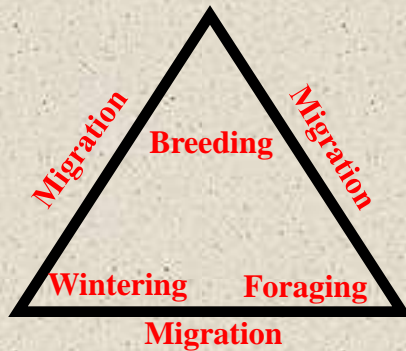
Larvae: -None. Juveniles hatch from eggs

Adults:

- Toes are slightly webbed and shorter than sole
- Nasolabial groove present between nostril and upper lip
- Yellow, orange, or red dorsal stripe
- Lateral and ventral white flecking

Vocalization: None





Coeur d'Alene Salamander

(*Plethodon idahoensis*)



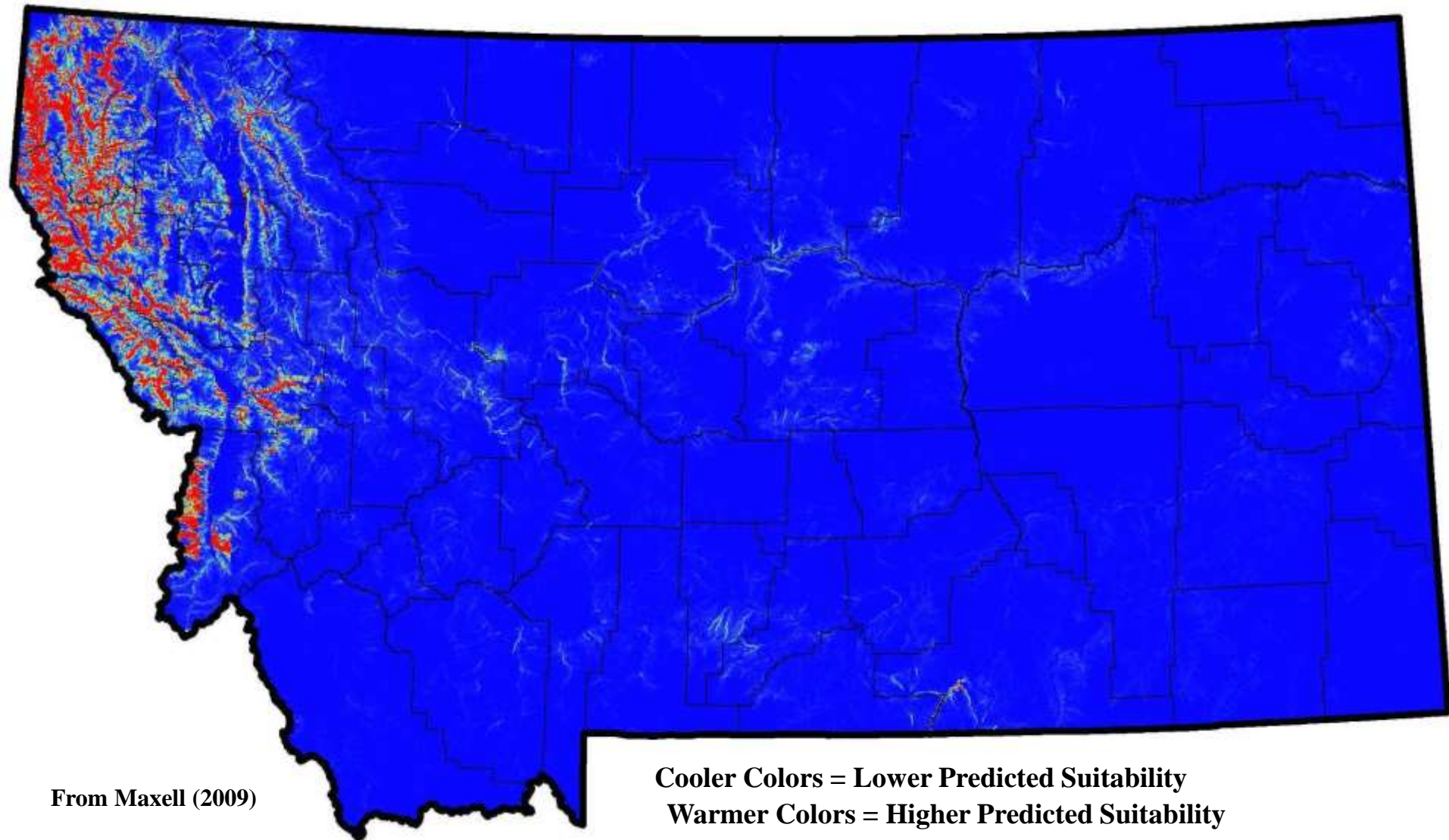
Habitat Use

- Breeding:** -Subterranean sites with adequate moisture
- Foraging:** -Springs or seeps, waterfall spray zones and damp streambeds in talus or fractured rock sites, usually with a forest canopy cover
- Overwintering:** -Same as foraging, but below the frost line
- Migration:** -Populations are believed to be isolated from one another and restricted to the immediate vicinities of surface or subterranean moist microhabitats
- Elevation:** -Common up to 5,000 ft, but may occur at up to 8,000 ft where habitat is suitable

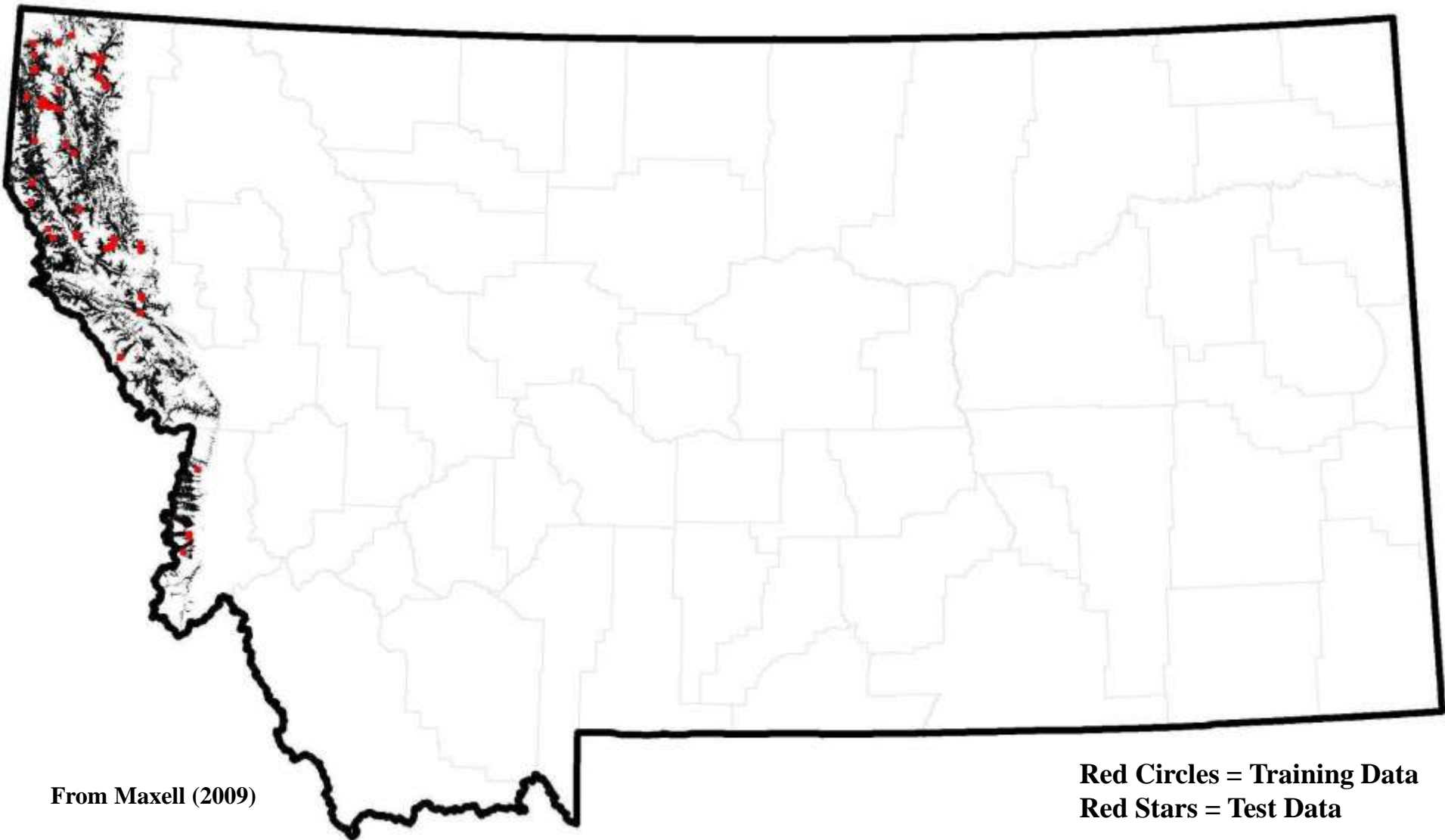
Issues of Concern

- Identification of refuge sites
- Protection of hydrological regime, water quality, and canopy cover
- Road construction

Coeur d'Alene Salamander (*Plethodon idahoensis*) Statewide Predicted Habitat Suitability Model



Coeur d'Alene Salamander (*Plethodon idahoensis*) Binary Model with Point Observations



Rocky Mountain Tailed Frog

(*Ascaphus montanus*)



Identification

- Eggs:**
- Ovum unpigmented and \simeq 4-5mm
 - Ovum surrounded by 3 jelly layers
 - Total egg diameter \simeq 6-7mm
 - Laid in streams in a jelly string as a globular mass

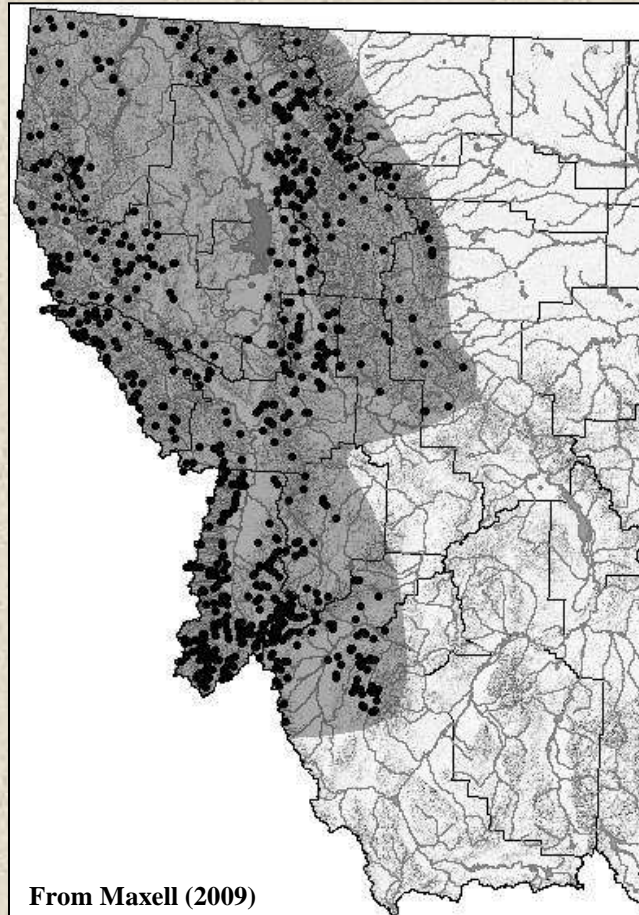
- Larvae:**
- Gray, greenish brown, or black
 - Often with a white spot on tail tip
 - Large sucking disc around mouth
 - Usually found in streams

- Adults:**
- Vertical eye pupil
 - No external ear drum (tympanum)
 - Male cloaca forms a tear shaped copulatory organ
 - Granulated skin texture
 - Dorsal color varies, yellow to pink ventrally

Vocalization: None



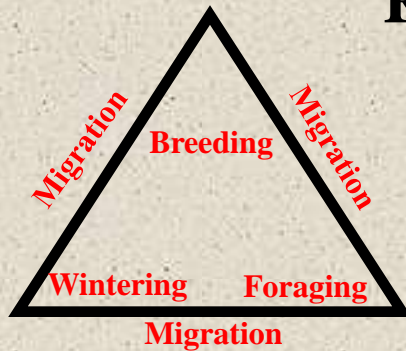
From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles



From Maxell (2009)

Rocky Mountain Tailed Frog

(*Ascaphus montanus*)



Habitat Use

Breeding: -Usually cold mountain streams, but more rarely they breed in mountain lakes
-Eggs laid under large stones in areas with slight current

Foraging: -Terrestrially along stream edges

Overwintering: -Permanent forest streams with clear, cold water, cobble or boulder substrates, and little silt

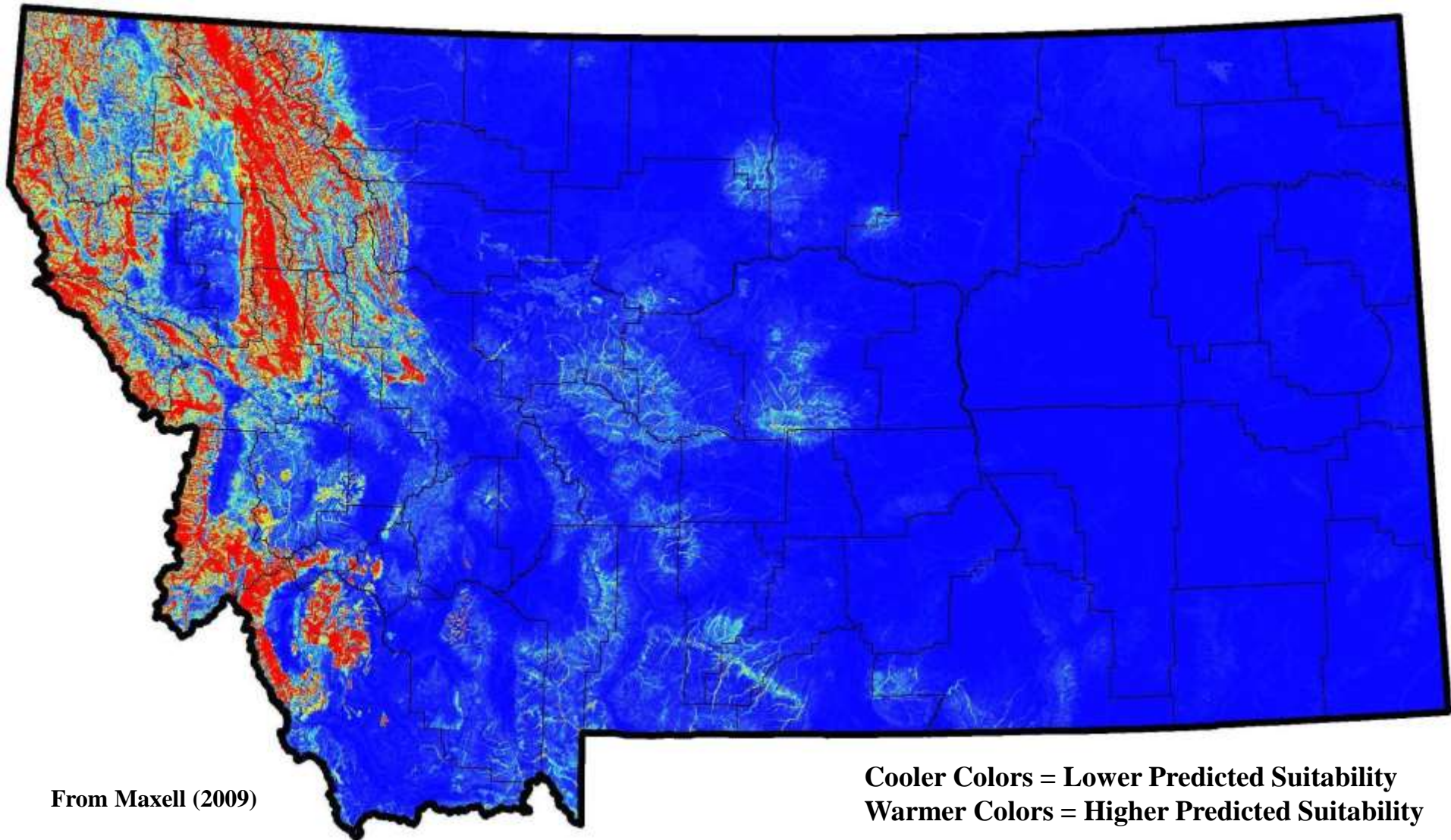
Migration: -Migration is not well documented, but individuals will travel up to or more than 100 meters from the edges of streams

Elevation: -Approximately treeline

Issues of Concern

-Timber harvest (sedimentation)
-Piscicides

Rocky Mountain Tailed Frog (*Ascaphus montanus*) Statewide Predicted Habitat Suitability Model

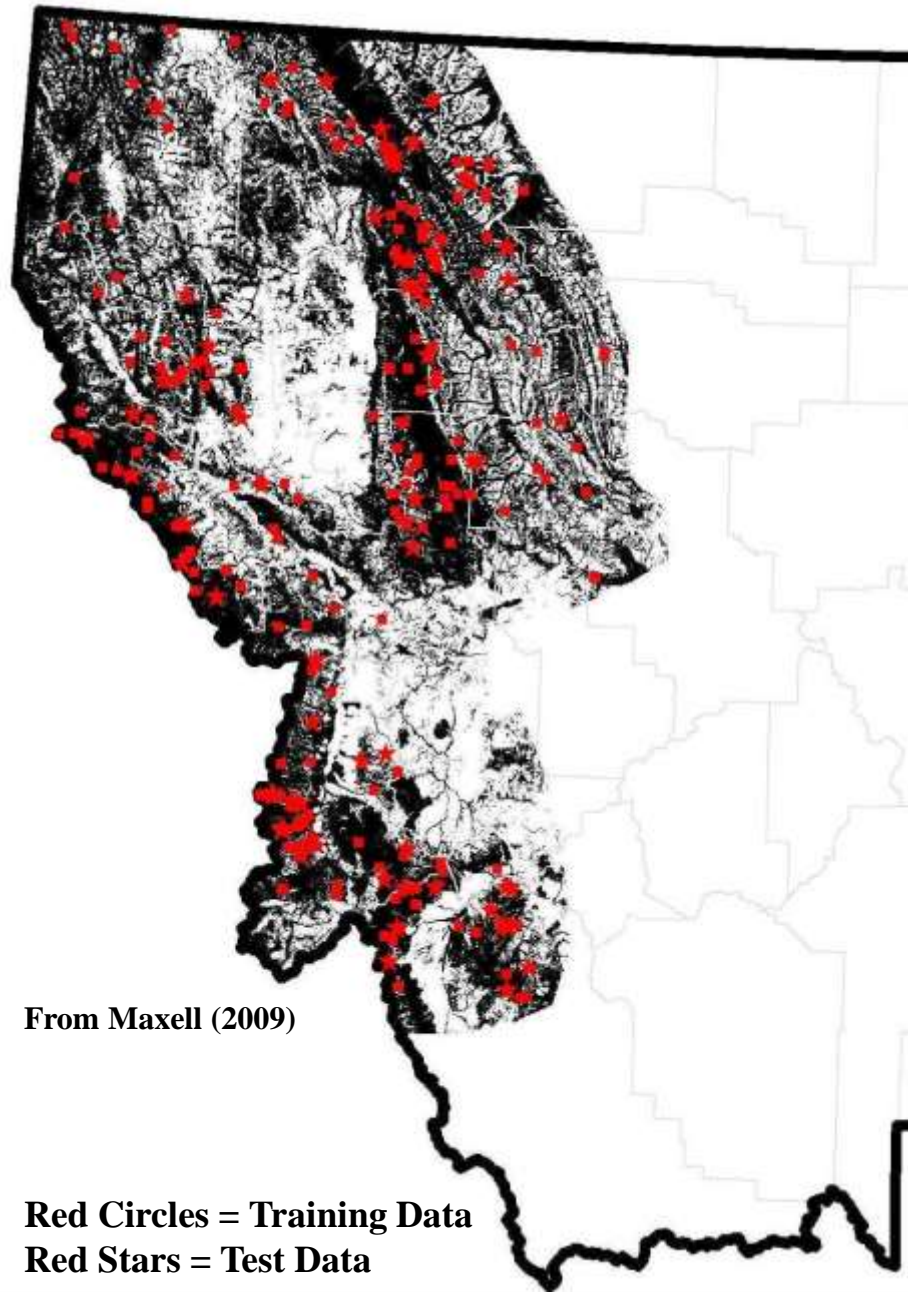


From Maxell (2009)

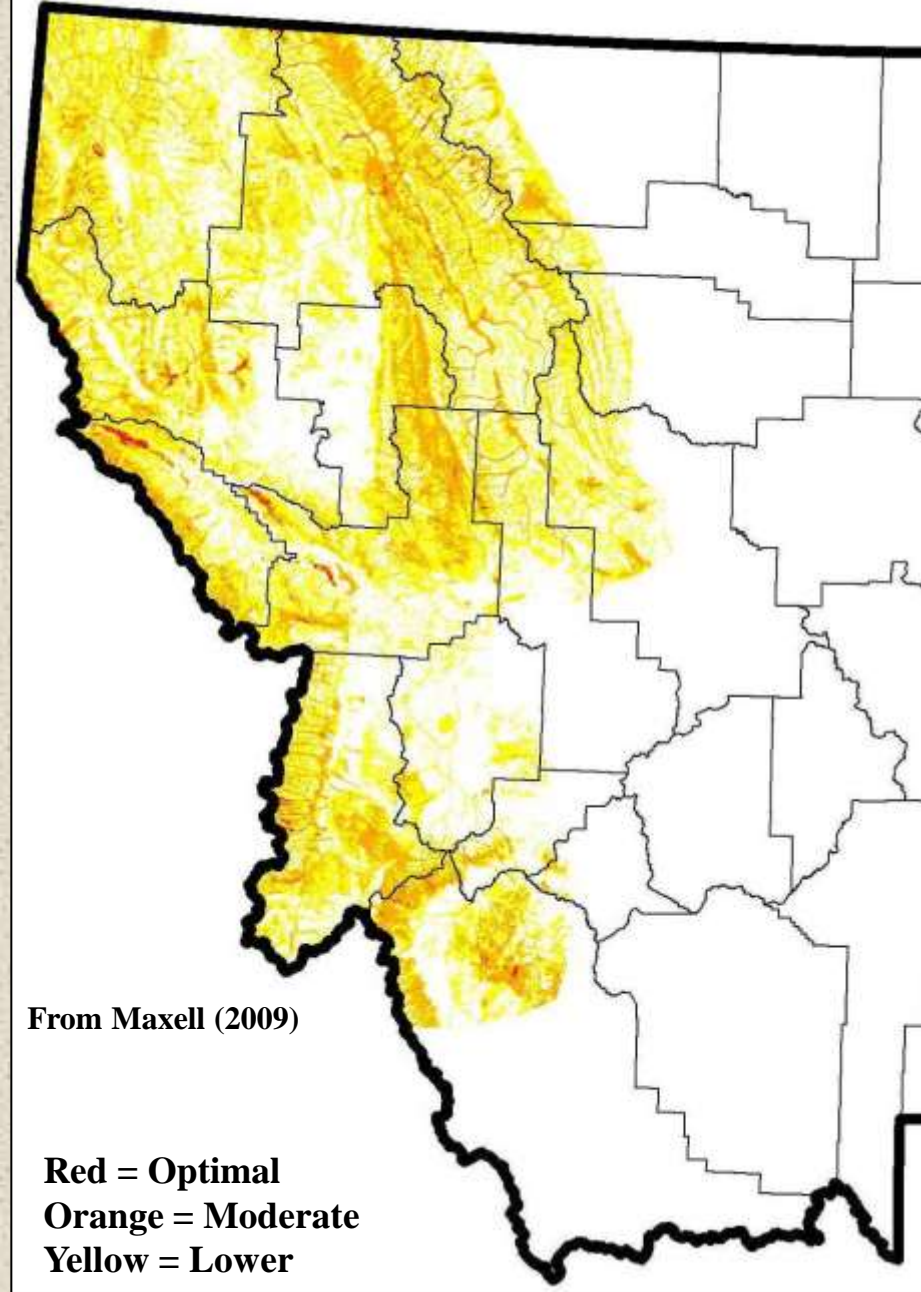
Cooler Colors = Lower Predicted Suitability
Warmer Colors = Higher Predicted Suitability

Rocky Mountain Tailed Frog (*Ascaphus montanus*)

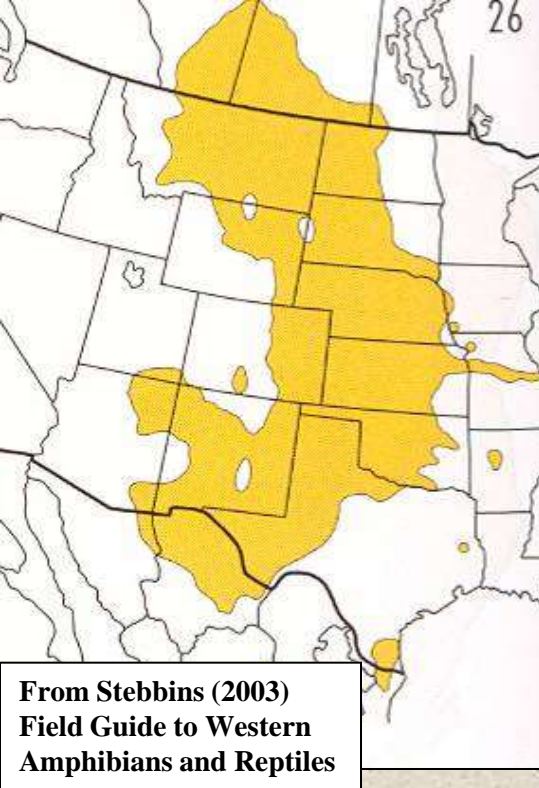
Binary Model with Point Observations



Habitat Suitability Classes



Plains Spadefoot (*Spea bomifrons*)



Identification

Eggs:

- Ovum brown and ≈ 1.5 mm dia.
- Ovum surrounded by 3 jelly layers
- Total egg diameter ≈ 3 mm
- Laid in clusters of 10-250

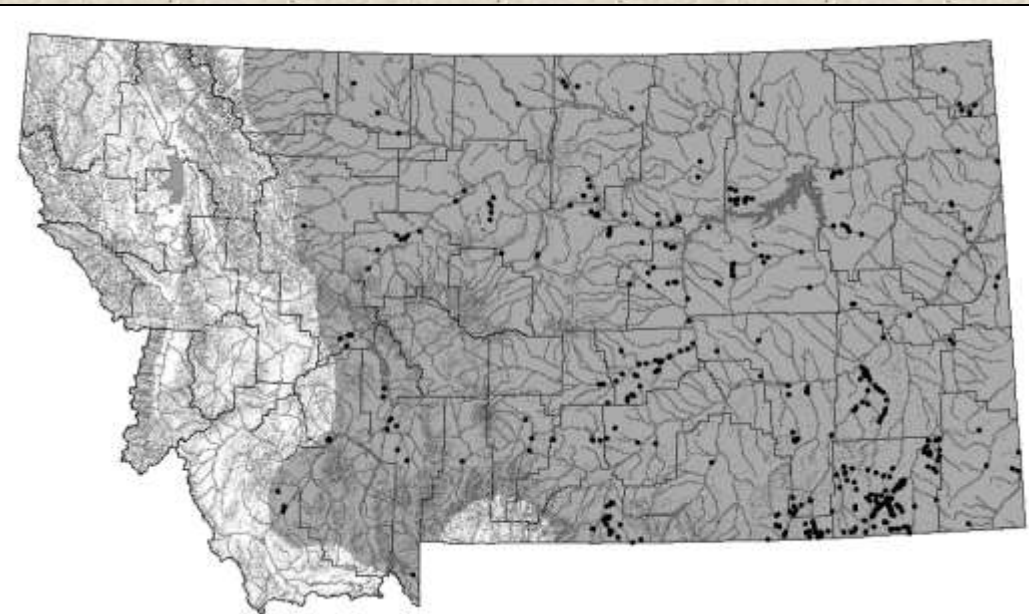
Larvae:

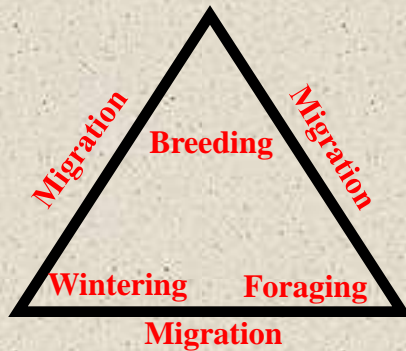
- Light gray or brown dorsally
- Iridescent gold ventrally
- Tail fin is clear with yellow flecks
- Eyes located dorsally

Adults:

- Vertical eye pupil
- Bony bump or boss between eyes
- Single black digging spade on soles of hind feet
- Four light stripes and a few darker blotches are usually present dorsolaterally

Vocalization: A loud nasal snore





Plains Spadefoot

(*Spea bomifrons*)



Habitat Use

Breeding: -Usually in warm temporary waters with little or no emergent vegetation

Foraging: -On or adjacent to sandy soils in native grasslands and shrublands as well as pastures and haylands with non-native vegetation

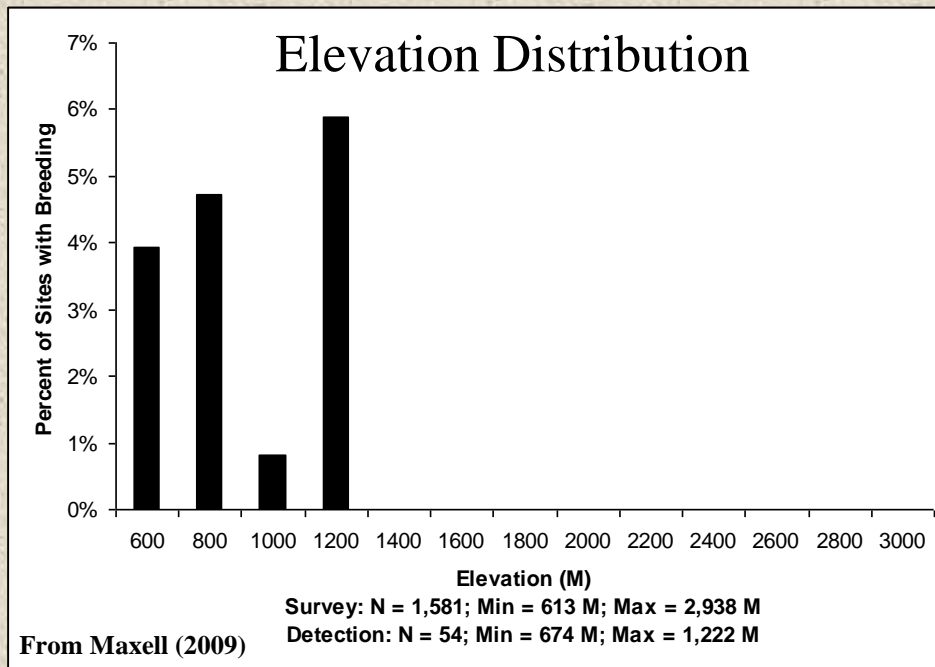
Overwintering: -Below the frost line in sandy soils

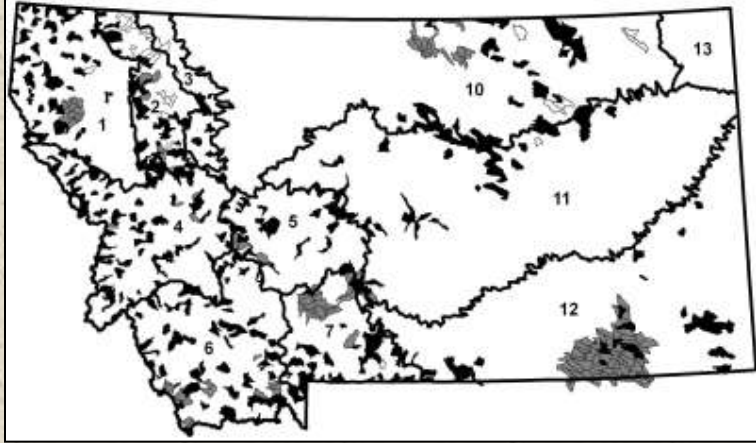
Migration: -Individuals are known to migrate more than 2.25 kilometers between terrestrial burrows and breeding sites

Elevation: -Up to or slightly above 5,000 ft across plains and in mountain valley bottoms

Issues of Concern

- Status unknown
- Lack of knowledge
- Agricultural activities
- Roads



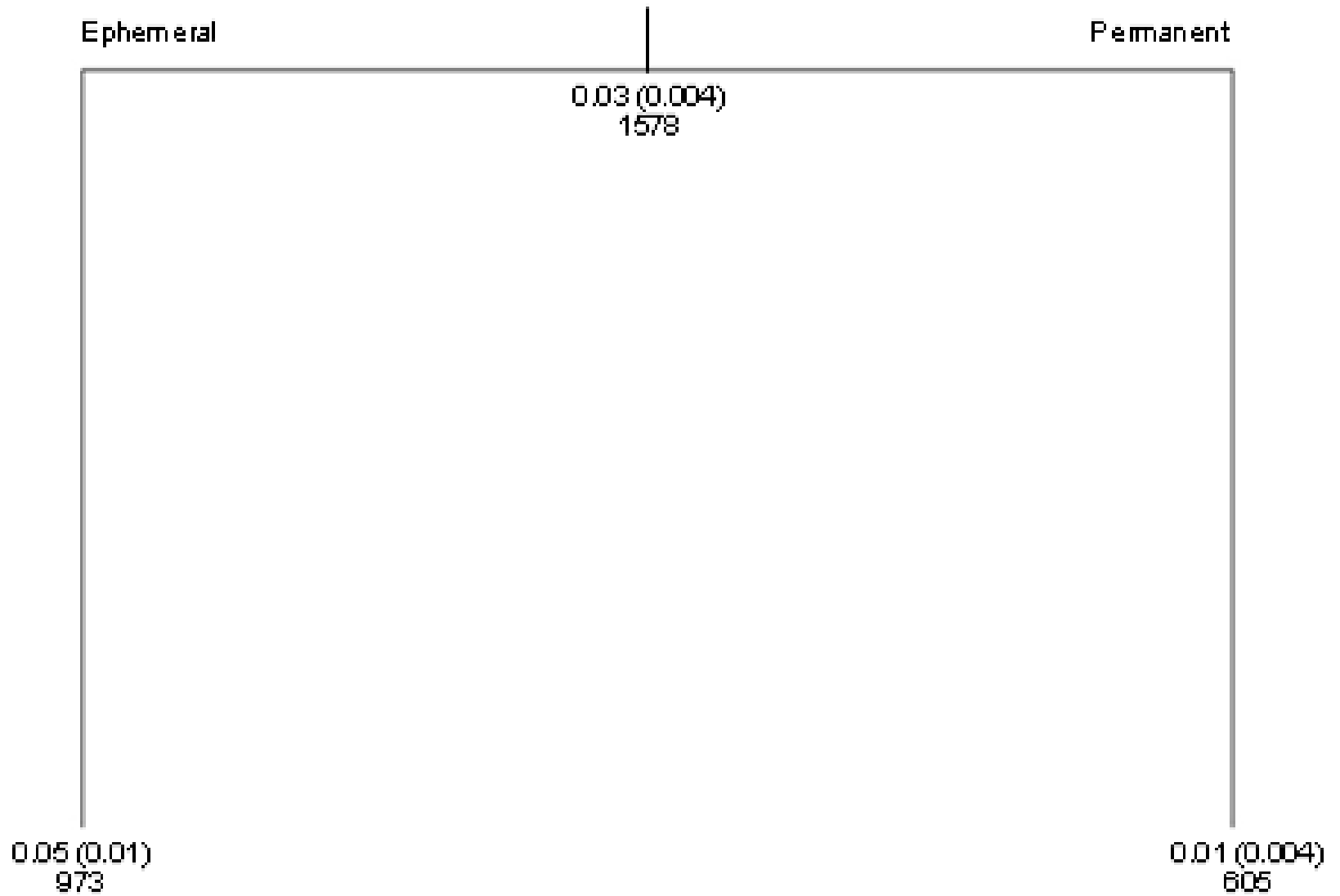


Plains Spadefoot (*Spea bomifrons*)

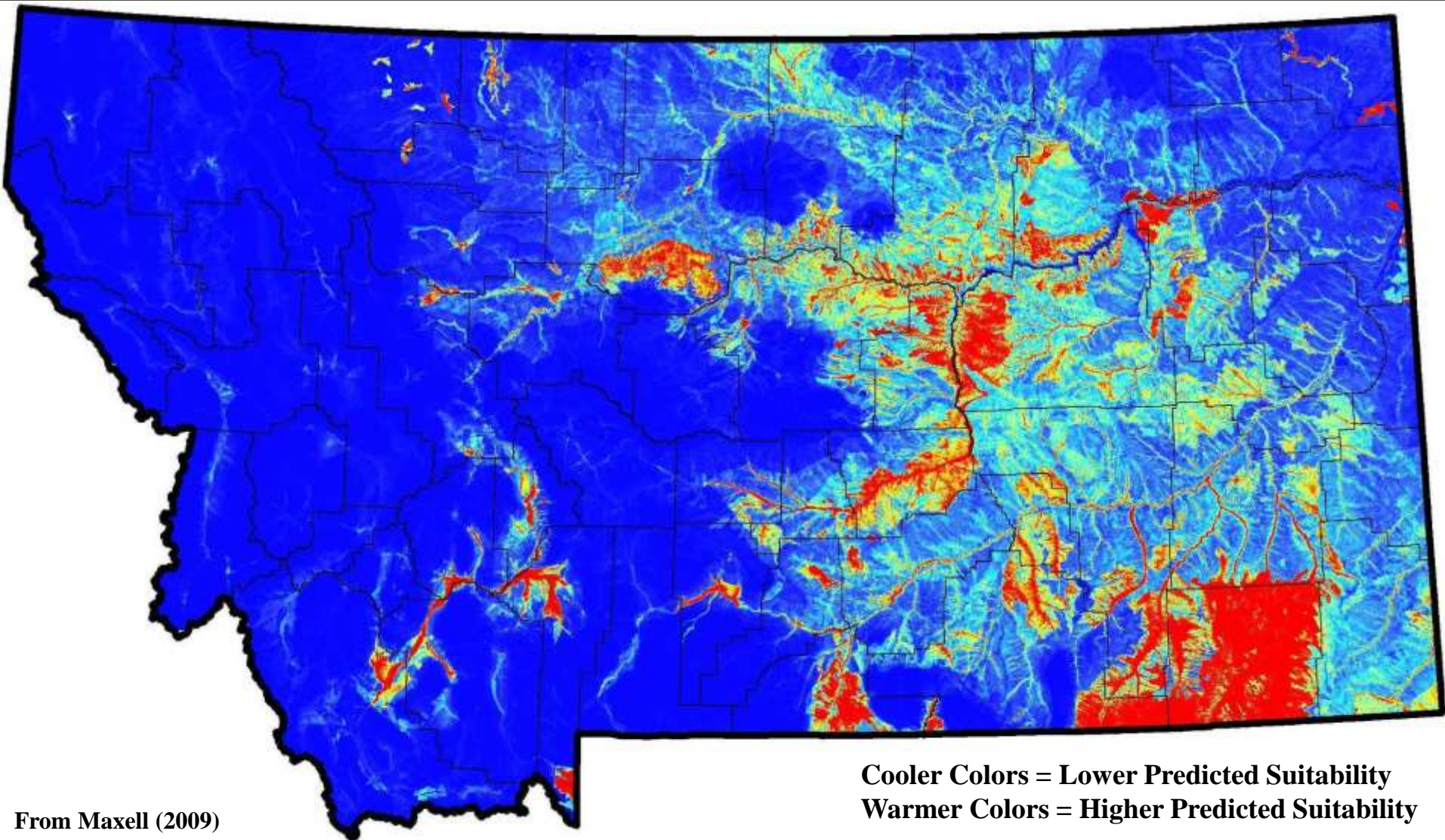
Occupancy Rates

Strata	Total Number Watersheds / Sites	Percent Watershed Occupancy (95% CI ^a)	Percent Site Occupancy (95% CI ^b)
10	37 / 848	14 (4–24)	2 (1–3)
11	29 / 1084	21 (7–34)	3 (2–4)
12	34 / 491	24 (11–36)	4 (2–6)
Overall	100 / 1578	19 (12–26)	3 (3–4)

Plains Spadefoot (*Spea bomifrons*) CART Model

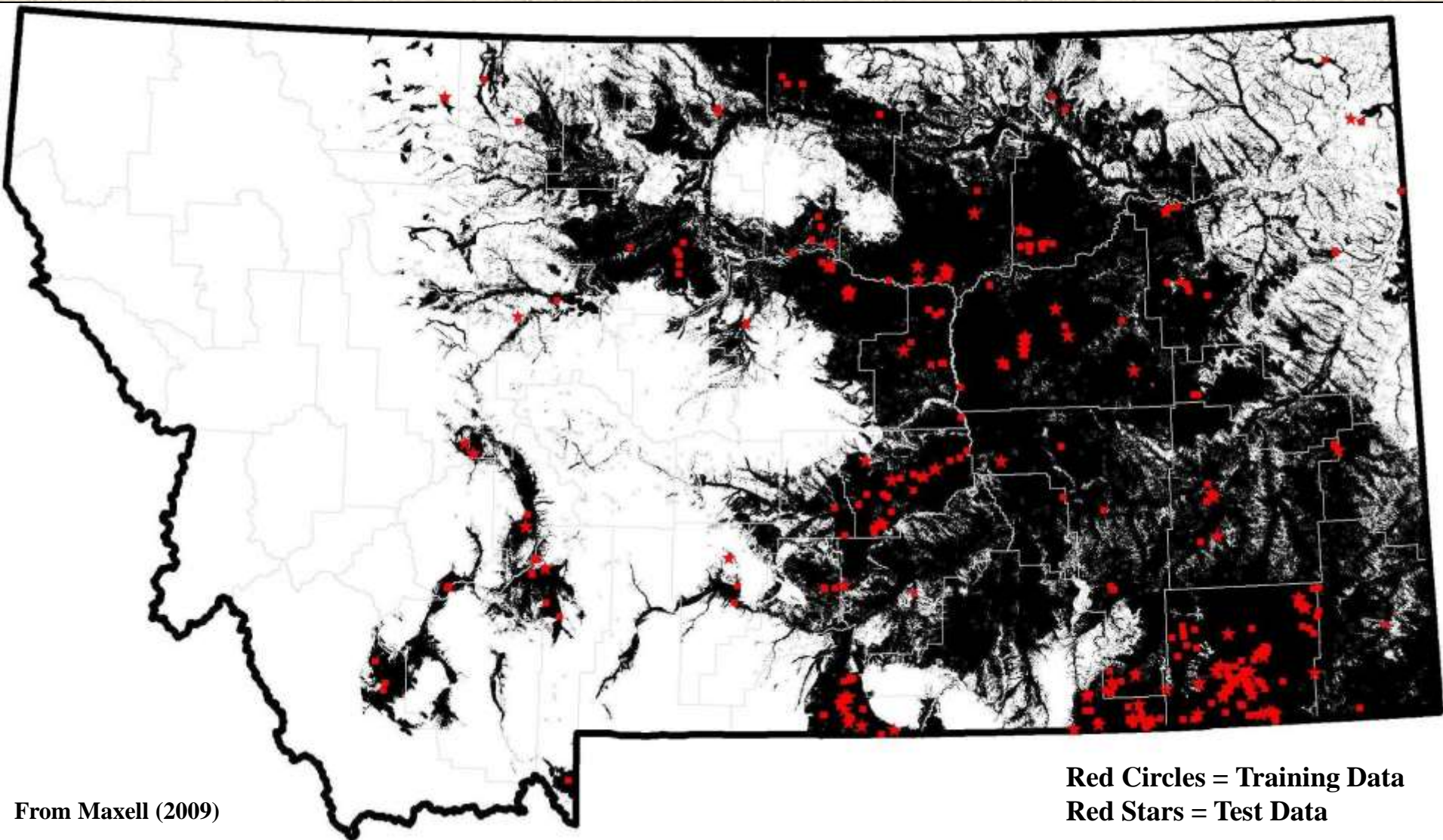


Plains Spadefoot (*Spea bomifrons*) Statewide Predicted Habitat Suitability Model



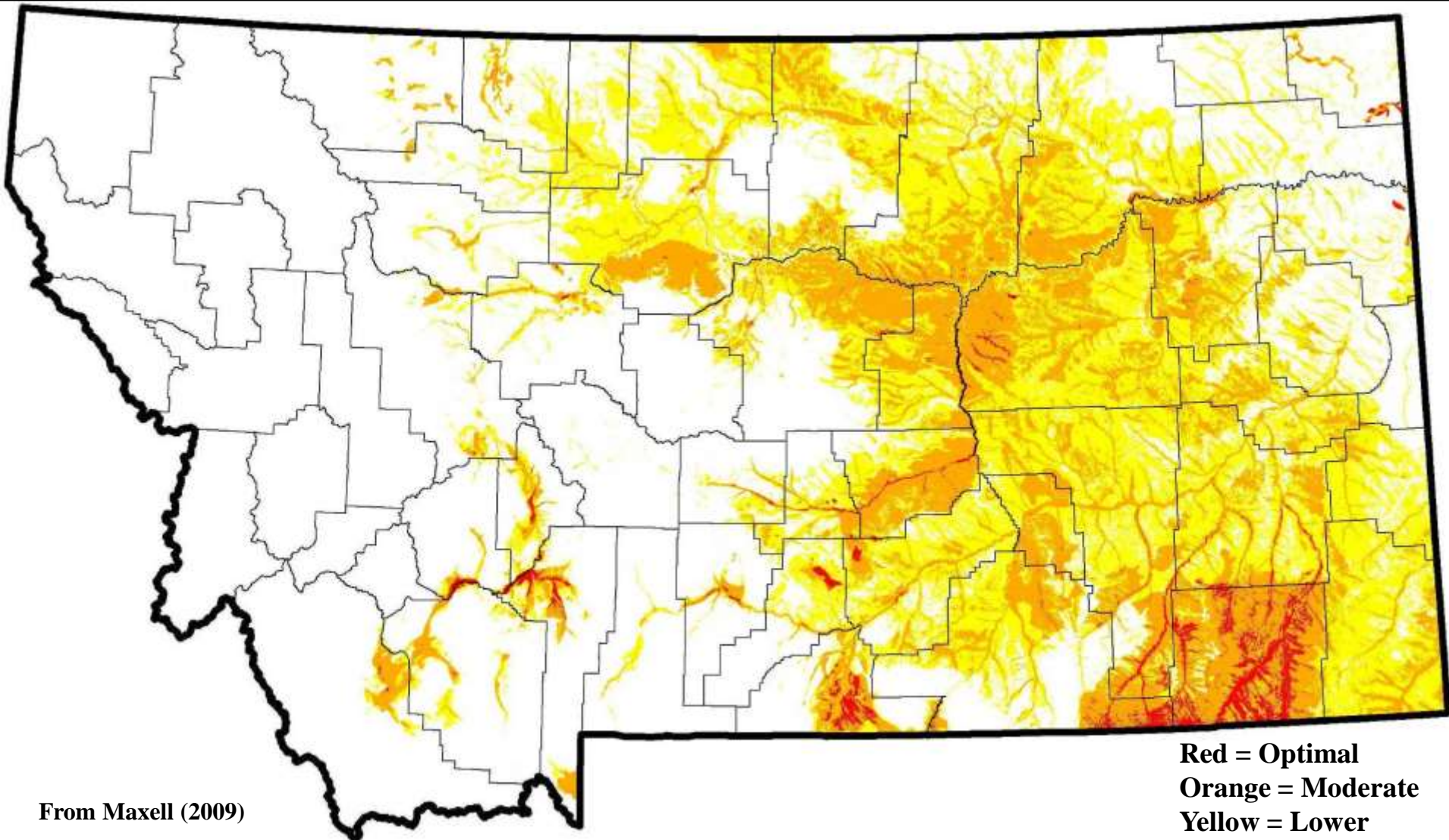
From Maxell (2009)

Plains Spadefoot (*Spea bomifrons*) Binary Model with Point Observations



From Maxell (2009)

Plains Spadefoot (*Spea bomifrons*) Habitat Suitability Classes



From Maxell (2009)



Western Toad

(*Bufo boreas*)

Identification

Eggs:

- Eggs in long strings 1-3 eggs wide
- Ovum black and \approx 1.6mm dia.
- Ovum surrounded by 2 jelly layers
- Total egg string diameter \approx 5mm

Larvae:

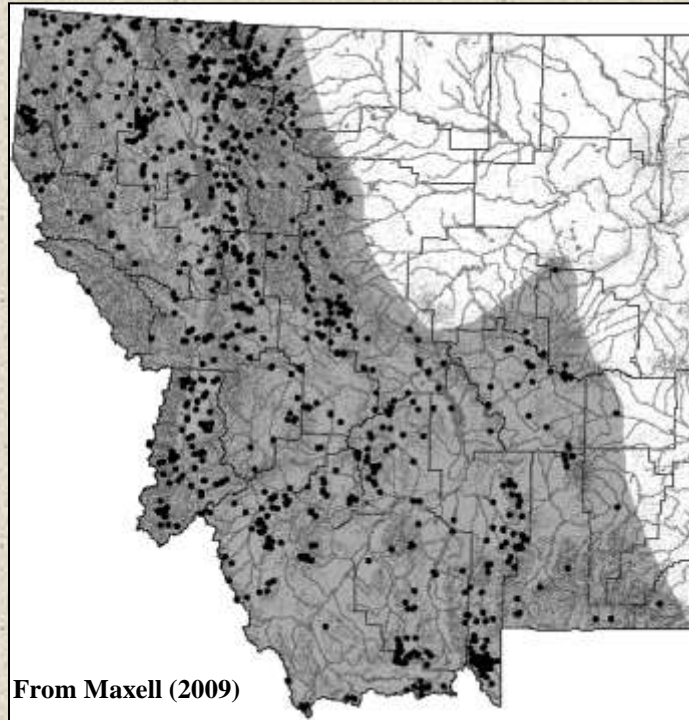
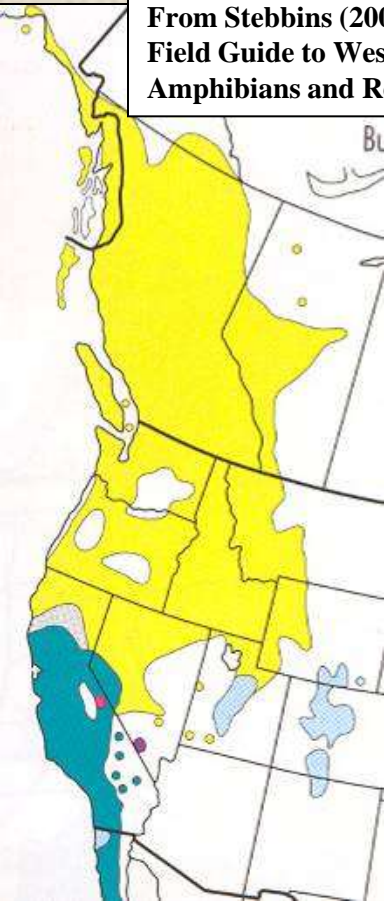
- Body and tail musculature black or more rarely gray
- Black or grey ventrally
- Upper and lower tail fins are clear with dendritic pigmentation
- Eyes located dorsally

Adults:

- Skin dry and warty with large parotoid glands behind eyes
- Soles of hind feet have light brown digging spades
- Dorsal color varies from olive to reddish brown with red and black spotting
- Ventral color is cream to tan, often with dark blotches
- A white stripe often extends down the back
- No cranial crests

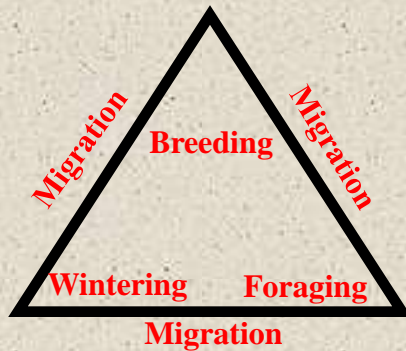
Vocalization: Like young geese or chicks

From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles



From Maxell (2009)





Western Toad

(*Bufo boreas*)

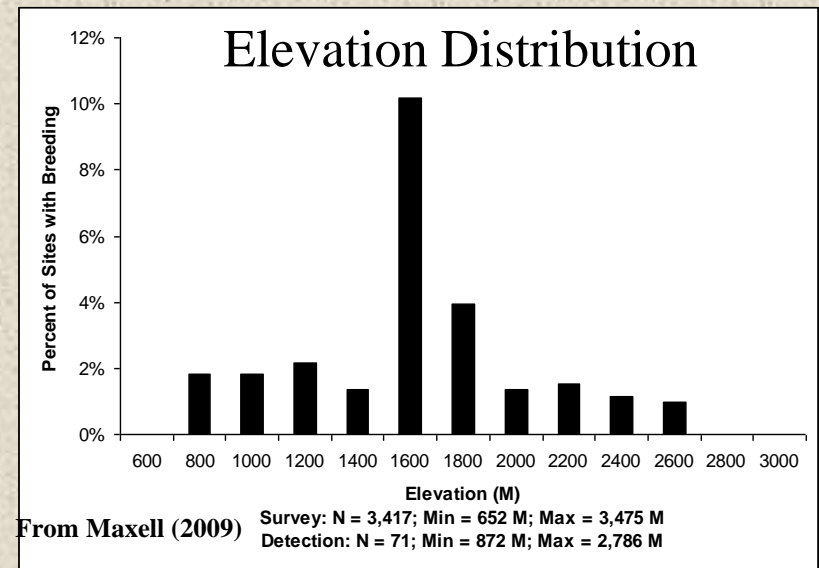


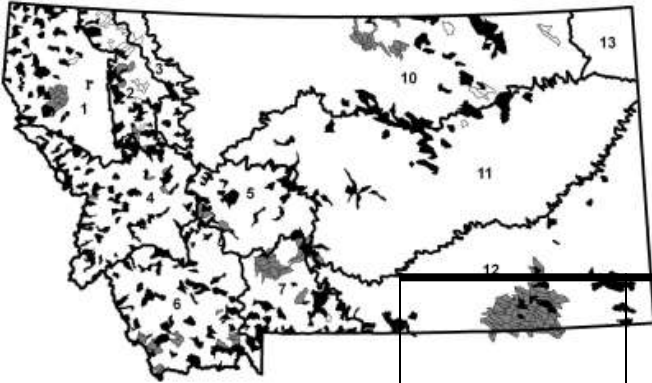
Issues of Concern

- Regional Declines
- Still widespread but rare
- Pathogens
- Local population viability?
- Roads
- Mesopredators (crows/raccoons)
- Grazing (trampling hazard during breeding and at metamorphosis)
- Pest/Herbicides

Habitat Use

- Breeding:** -Shallow areas of large and small lakes, beaver ponds, temporary ponds, slow-moving streams, & backwater channels of rivers
- Foraging:** -Wetlands, forests, woodlands, sagebrush, meadows, and floodplains in mountains and valleys
- Overwintering:** -Terrestrial habitats below the frost line
- Migration:** -Individuals are known to migrate more than 4.0 kilometers between terrestrial burrows and breeding sites
- Elevation:** -Up to and above tree line

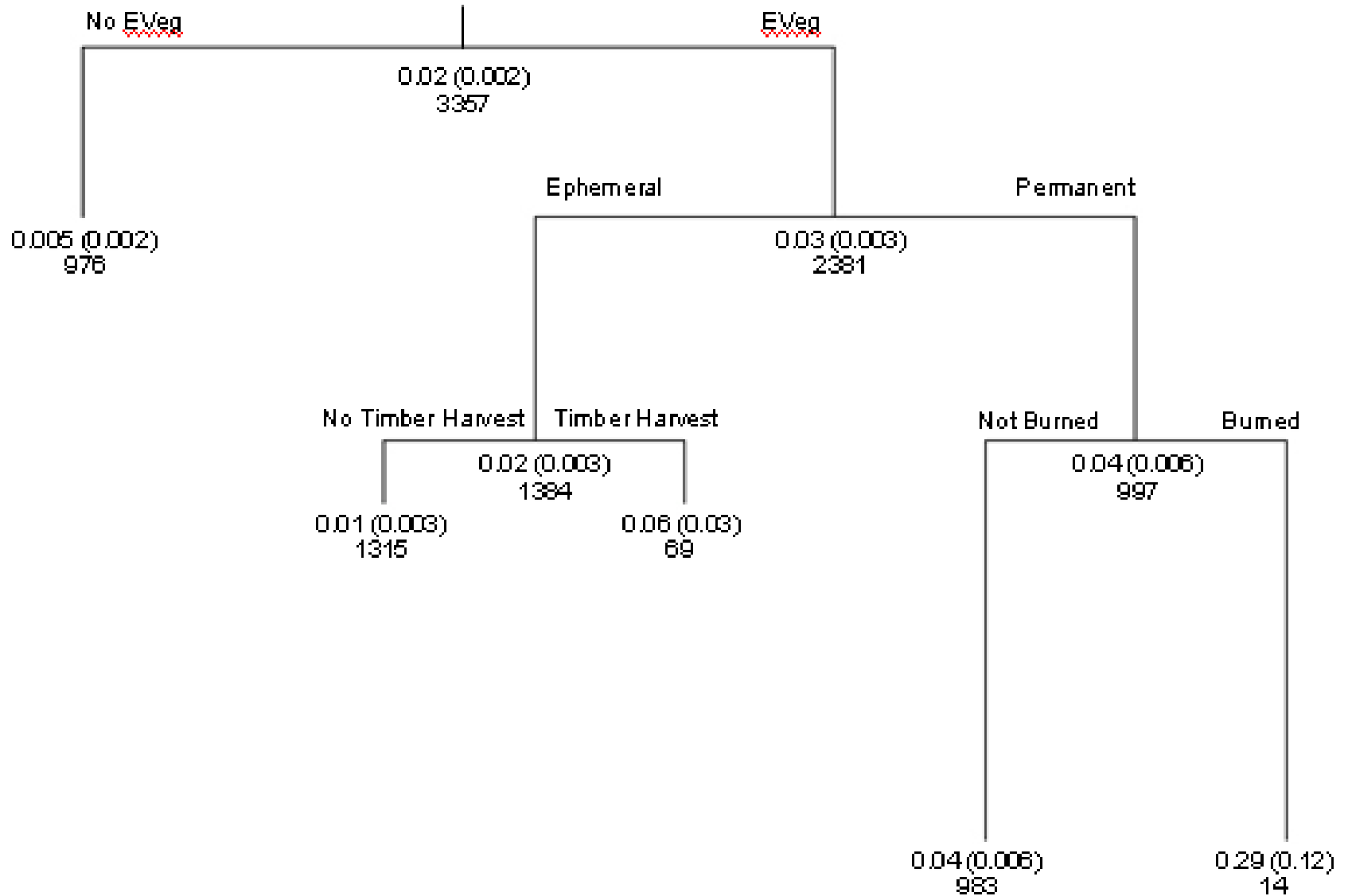




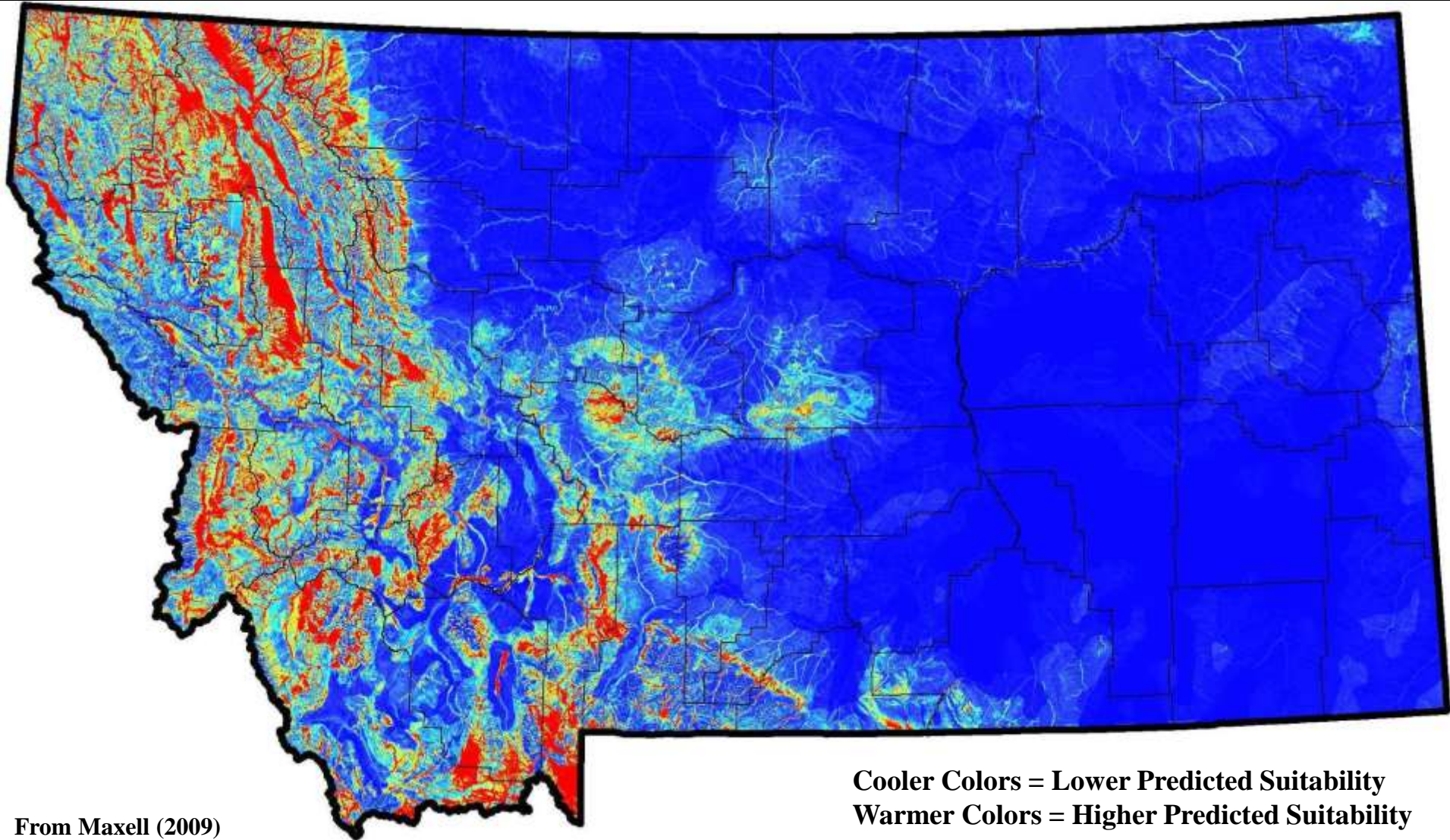
Western Toad (*Bufo boreas*) Occupancy Rates

Strata	Total Number Watersheds / Sites	Percent Watershed Occupancy (95% CI ^a)	Percent Site Occupancy (95% CI ^b)
1	52 / 283	17 (8–26)	3 (1–5)
2	36 / 626	17 (6–27)	1 (0–2)
3	4 / 43	50 (2–98)	5 (0–11)
4	64 / 788	23 (14–33)	4 (3–5)
5	19 / 82	11 (0–23)	2 (0–6)
6	53 / 729	23 (12–33)	3 (2–4)
7	29 / 768	0 (-)	0 (-)
10	1 / 1	0 (-)	0 (-)
11	7 / 30	0 (-)	0 (-)
12	1 / 7	0 (-)	0 (-)
Overall	266 / 3357	17 (13–22)	2 (2–3)

Western Toad (*Bufo boreas*) CART Model



Western Toad (*Bufo boreas*) Statewide Predicted Habitat Suitability Model

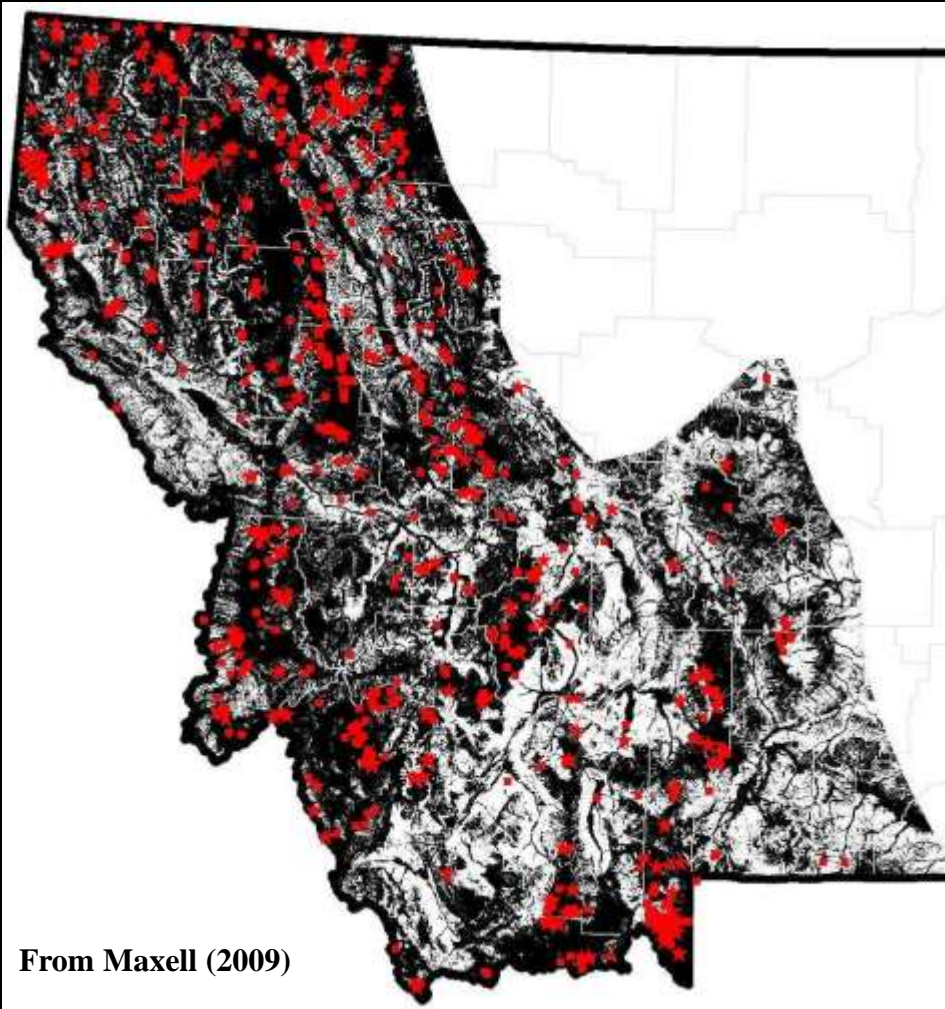


Cooler Colors = Lower Predicted Suitability
Warmer Colors = Higher Predicted Suitability

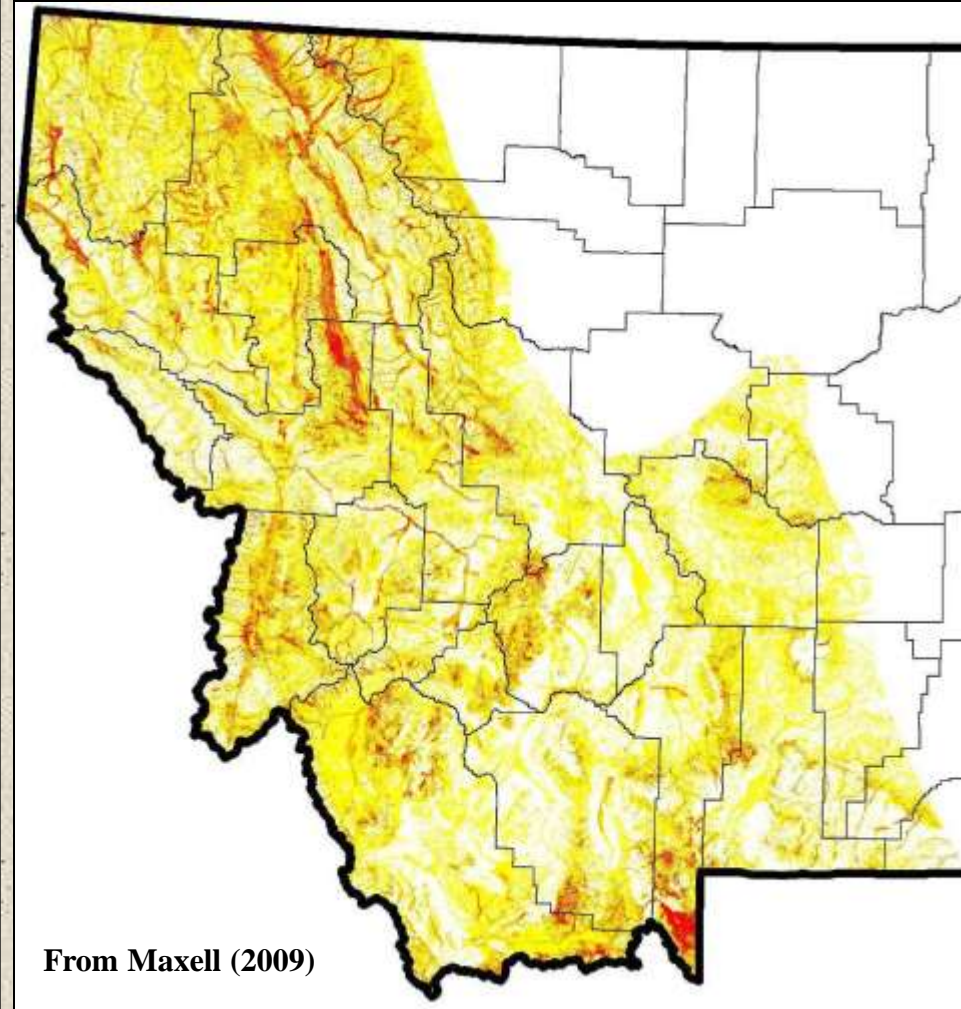
From Maxell (2009)

Western Toad (*Bufo boreas*)

Binary Model with Point Observations



Habitat Suitability Classes



Red = Optimal
Orange = Moderate
Yellow = Lower

Red Circles = Training Data
Red Stars = Test Data

Great Plains Toad

(*Bufo cognatus*)

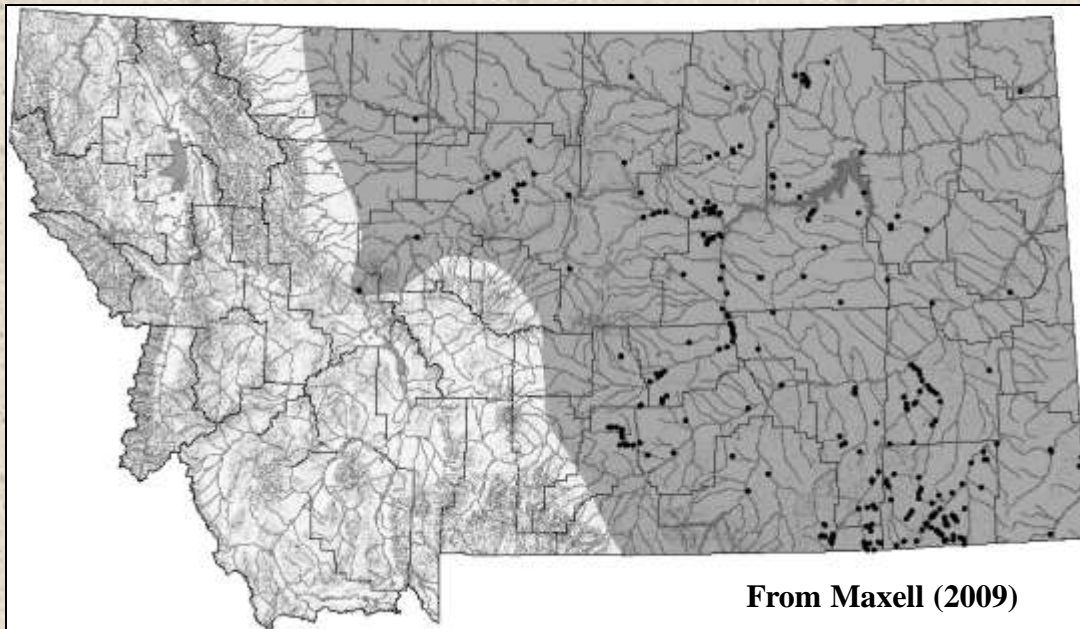
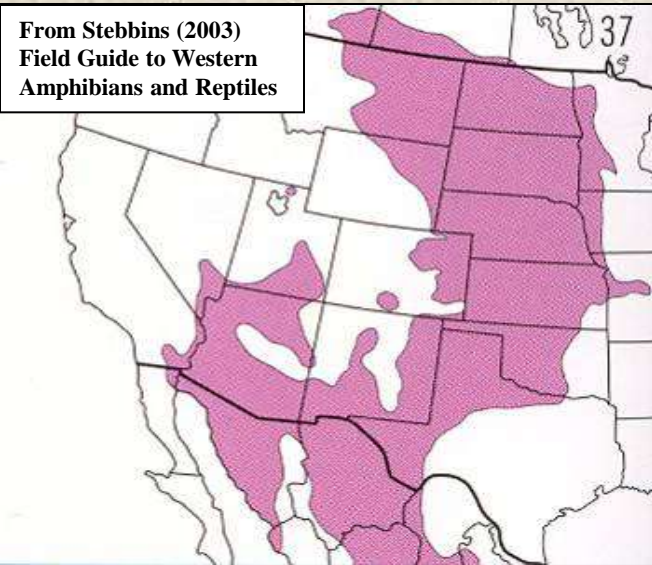
Identification

- Eggs:**
- Eggs in long strings 1-2 eggs wide and pinched between eggs
 - Ovum black and \approx 1.2mm diameter
 - Ovum surrounded by 2 jelly layers
 - Total egg string diameter \approx 2mm

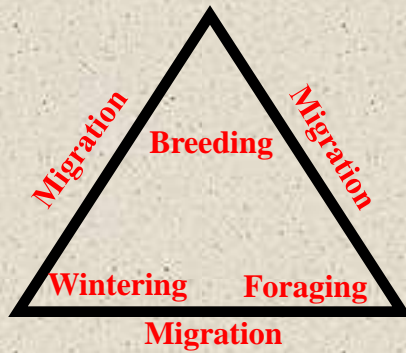
- Larvae:**
- Body and tail musculature black or more rarely gray
 - Black or grey ventrally
 - Upper and lower tail fins are clear with dendritic pigmentation
 - Eyes located dorsally

- Adults:**
- Cranial crests are present behind the eyes and converge to form a “V” between the eyes with a bony plate covering the tip of the snout
 - Dorsal paired green to brown blotches are outlined by white
 - Skin dry and warty with large parotoid glands behind eyes
 - Soles of hind feet have two dark digging spades
 - Ventral color is cream to white

Vocalization: Loud crickets or high pitched jackhammer



From Maxell (2009)



Great Plains Toad

(*Bufo cognatus*)



Habitat Use

Breeding: -Warm temporary pools after late spring or summer rains

Foraging: -Upland native grasslands and shrublands or pastures and haylands with non-native vegetation. Also floodplains

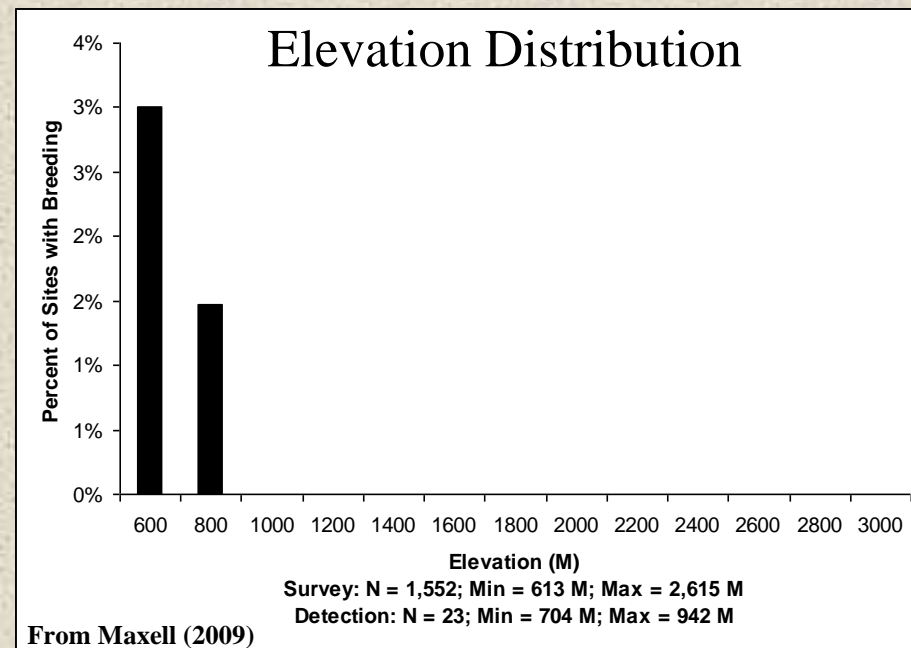
Overwintering: -Terrestrial habitats below the frost line

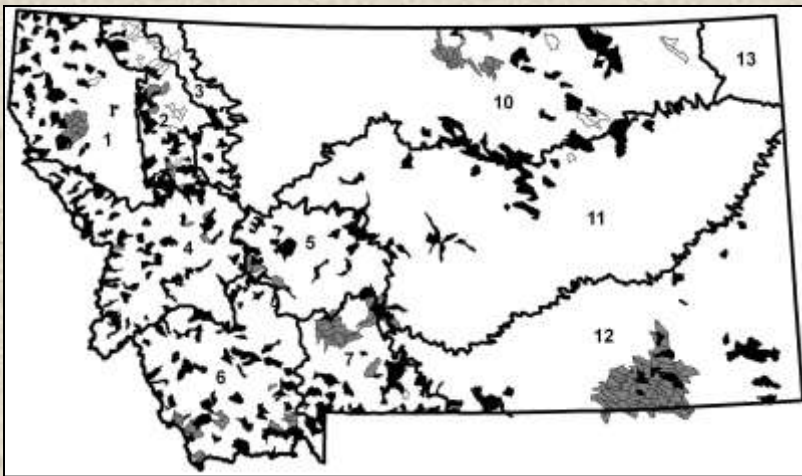
Migration: -Individuals are thought to migrate up to or more than 1.6 kilometers between terrestrial burrows and breeding sites

Elevation: -Up to approximately 4,000 ft

Issues of Concern

- Status unknown
- Lack of knowledge
- Roads
- Loss of prairie dog burrows
- Agricultural activities





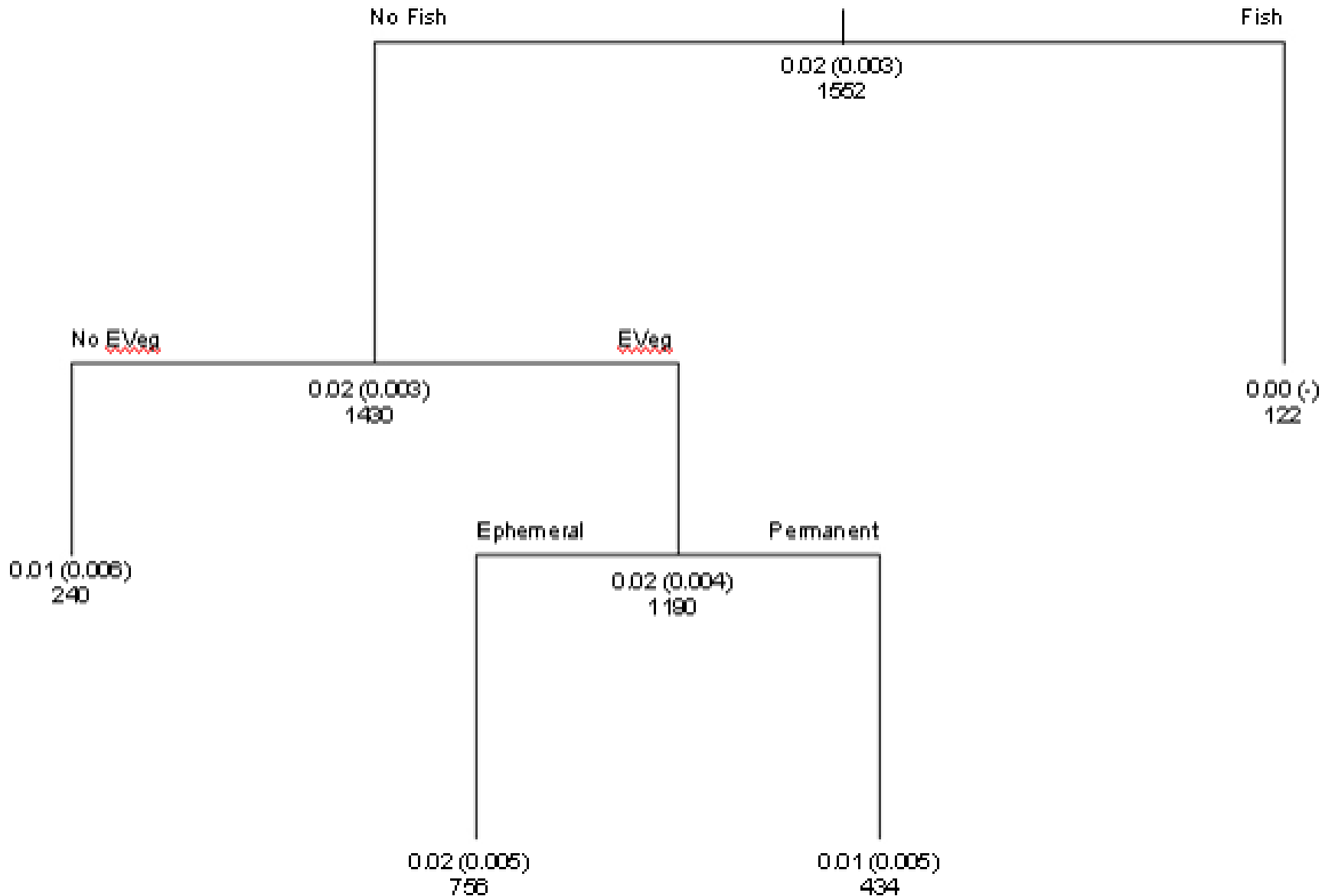
Great Plains Toad

(Bufo cognatus)

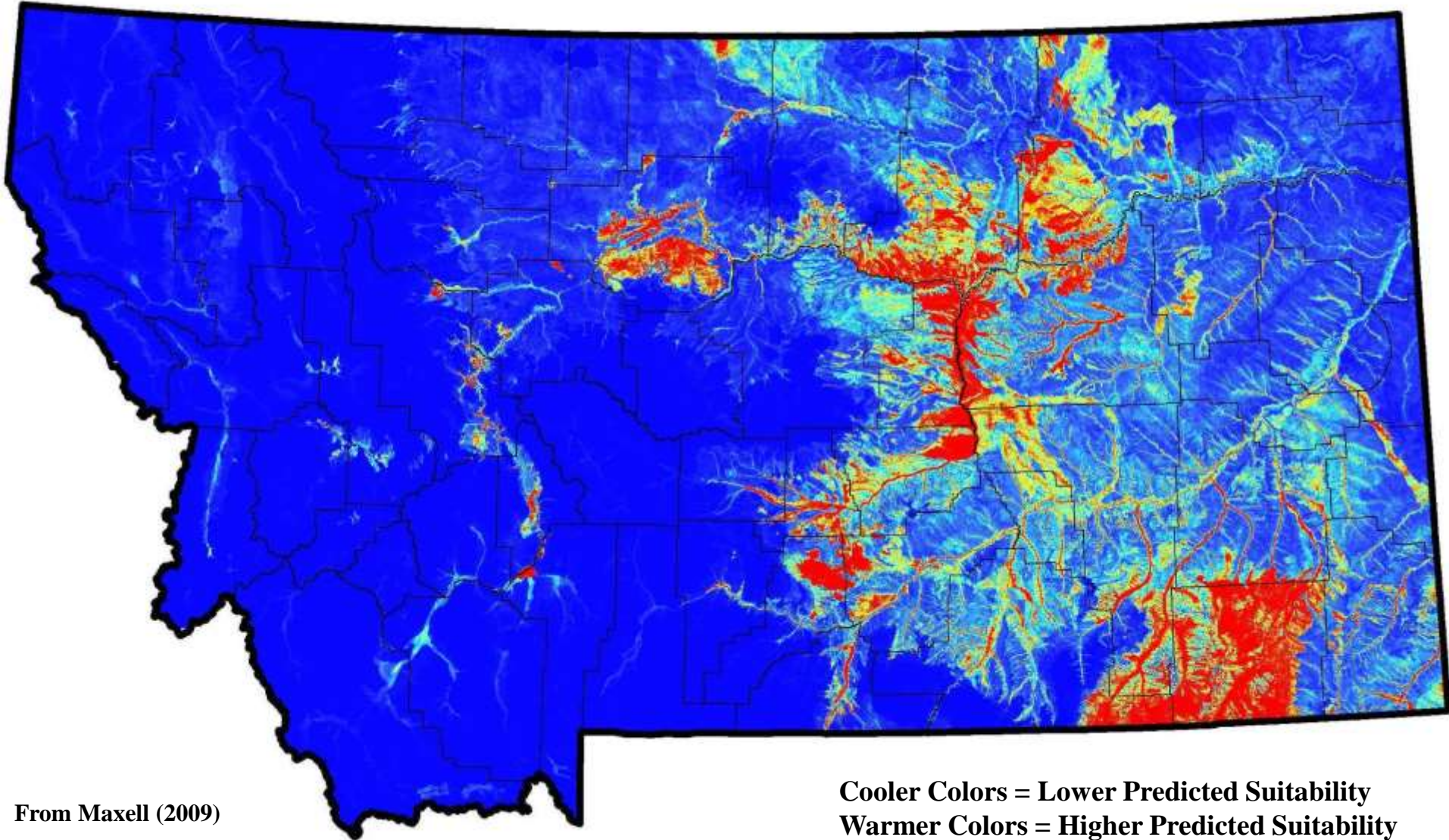
Occupancy Rates

Strata	Total Number Watersheds / Sites	Percent Watershed Occupancy (95% CI ^a)	Percent Site Occupancy (95% CI ^b)
10	37 / 929	22 (10–34)	2 (1–3)
11	26 / 139	15 (2–28)	3 (0–6)
12	33 / 484	3 (0–8)	1 (0–1)
Overall	96 / 1552	14 (7–20)	1 (1–2)

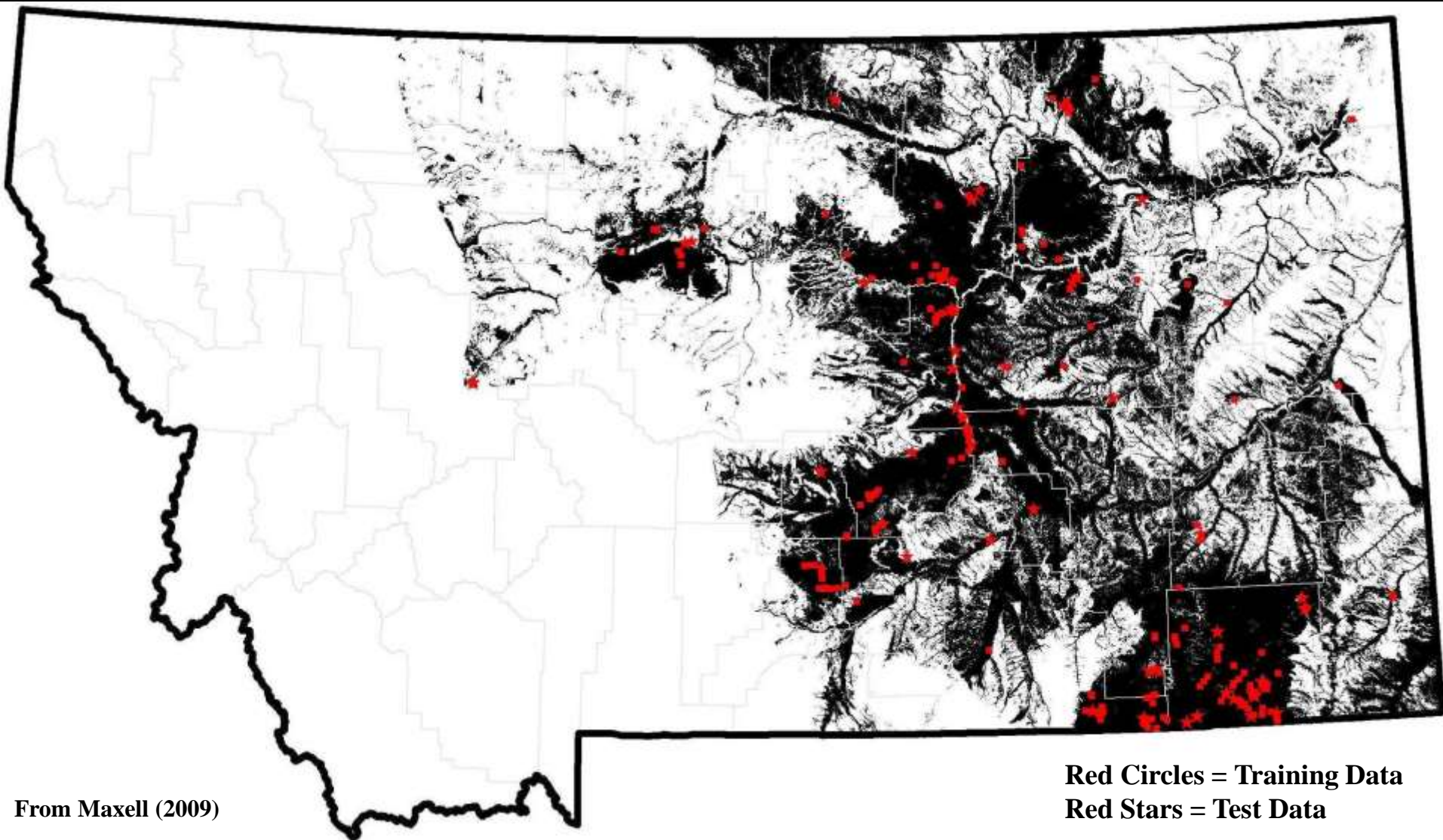
Great Plains Toad (*Bufo cognatus*) CART Model



Great Plains Toad (*Bufo cognatus*) Statewide Predicted Habitat Suitability Model



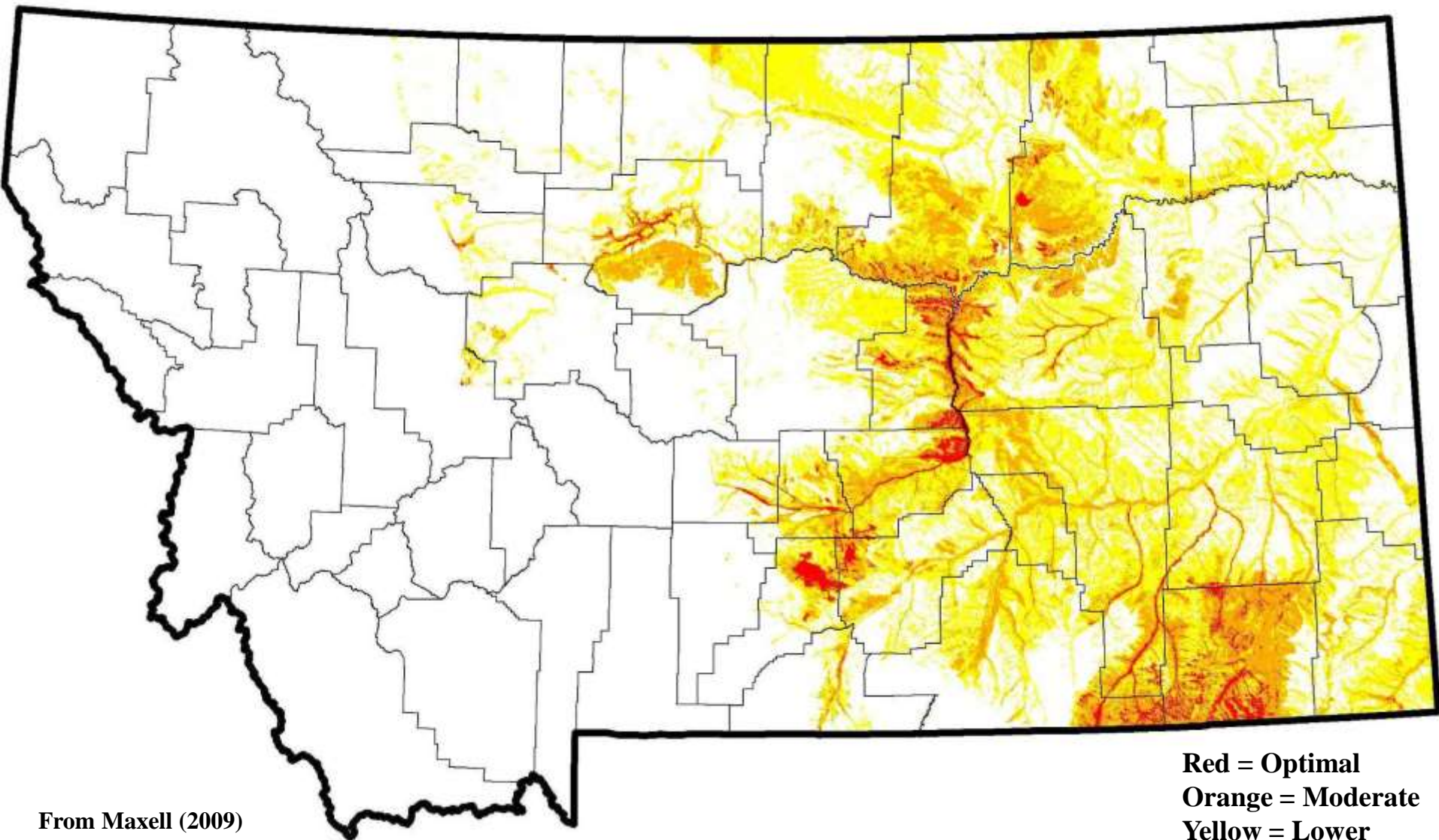
Great Plains Toad (*Bufo cognatus*) Binary Model with Point Observations



From Maxell (2009)

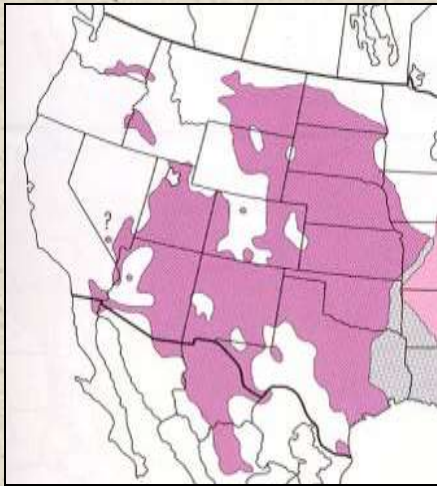
Red Circles = Training Data
Red Stars = Test Data

Great Plains Toad (*Bufo cognatus*) Habitat Suitability Classes

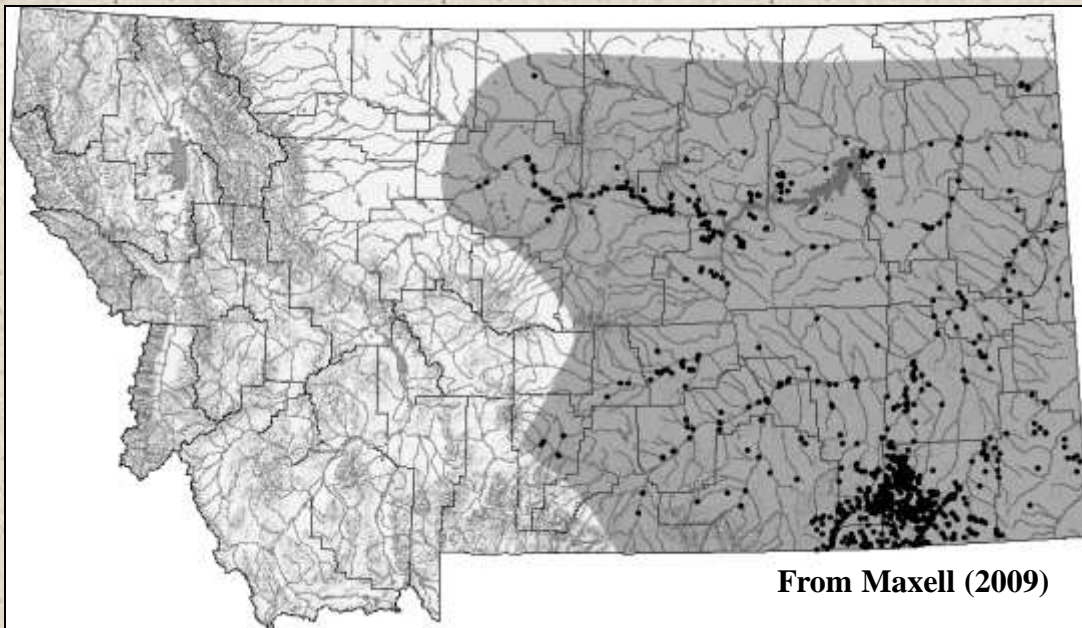


From Maxell (2009)

Woodhouse's Toad (*Bufo woodhousii*)



From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles



From Maxell (2009)

Identification

- Eggs:**
- Eggs in strings 1-2 eggs wide
 - Ova black and \approx 1.2mm dia.
 - Ova enclosed by outer jelly layer
 - Egg string diameter \approx 3.5mm

- Larvae:**
- Body and tail musculature black or brown with gold flecking
 - Grey to white ventrally
 - Dorsal tail fin dendritically pigmented
 - Ventral tail fin mostly clear
 - Eyes located dorsally

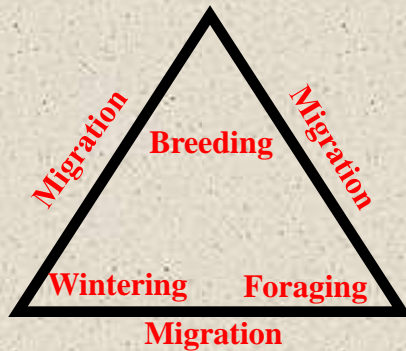
- Adults:**
- Parallel cranial crests are present behind and between the eyes forming back to back "L"s
 - Mottled green and creamy yellow dorsally with a light center line
 - Skin dry and warty with large parotoid glands behind eyes
 - Soles of hind feet have two dark digging spades
 - Ventral color is cream to whitish, often with black specks

Vocalization: Long nasal "waaaaah"



Woodhouse's Toad

(*Bufo woodhousii*)



Habitat Use

Breeding: -In shallow areas of lakes, reservoirs, river backwaters, floodplain pools, and irrigation ditches with or without emergent vegetation

Foraging: -Floodplain habitats and upland native grasslands and shrublands or pastures and haylands with non-native vegetation

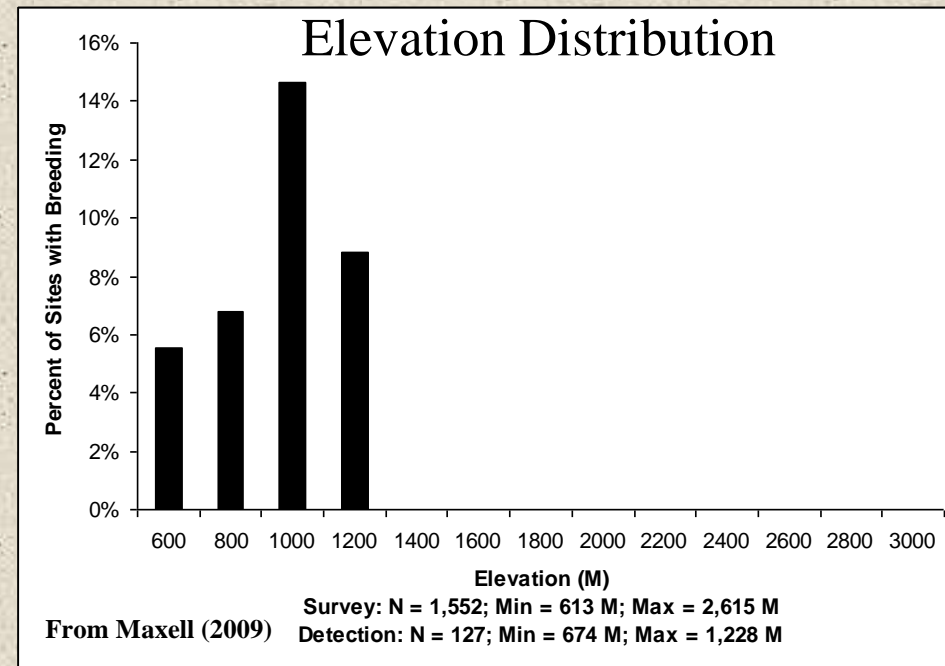
Overwintering: -Terrestrial habitats below the frost line

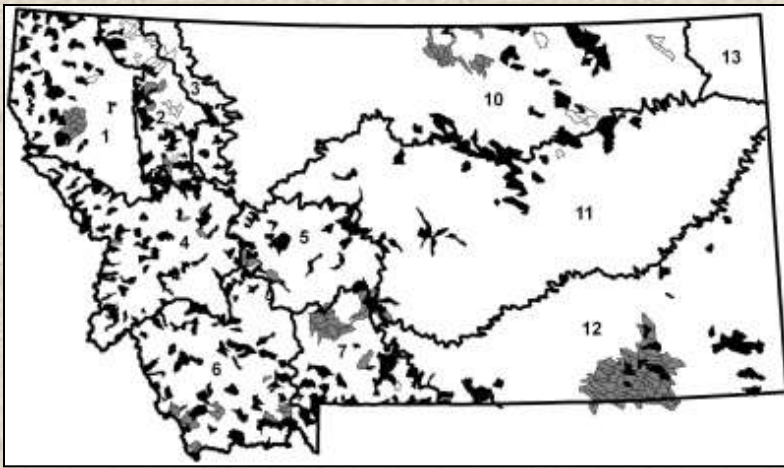
Migration: -Migration is not well documented, but individuals are known to travel up to or more than 2 kilometers from breeding sites

Elevation: -Up to approximately 4,000 ft

Issues of Concern

- Roads
- Agricultural activities



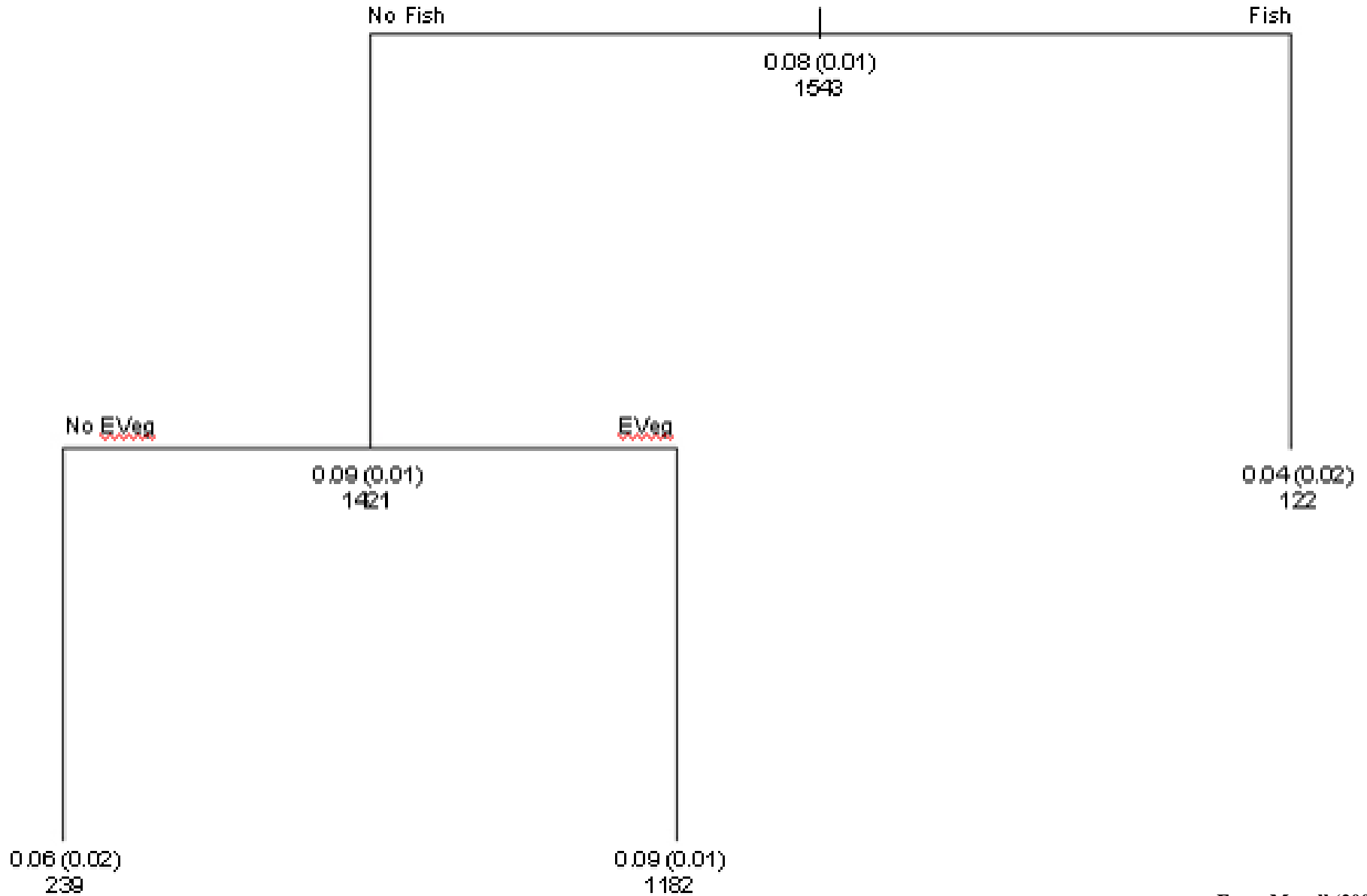


Woodhouse's Toad (*Bufo woodhousii*)

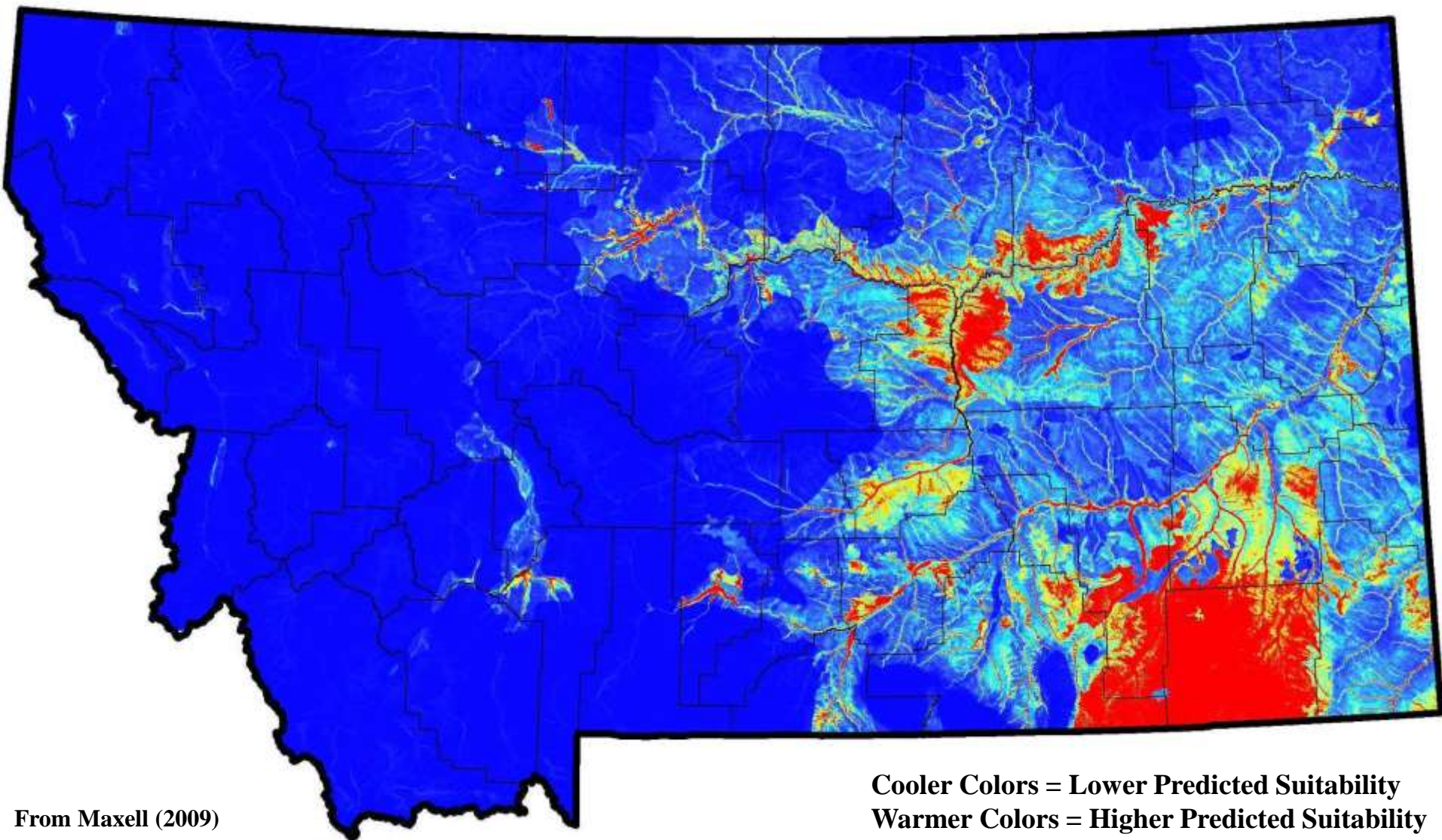
Occupancy Rates

Strata	Total Number Watersheds / Sites	Percent Watershed Occupancy (95% CI ^a)	Percent Site Occupancy (95% CI ^b)
10	37 / 928	19 (7–30)	2 (1–2)
11	63 / 137	19 (11–27)	26 (18–33)
12	33 / 478	42 (27–57)	16 (13–19)
Overall	133 / 1543	25 (18–31)	8 (7–9)

Woodhouse's Toad (*Bufo woodhousii*) CART Model

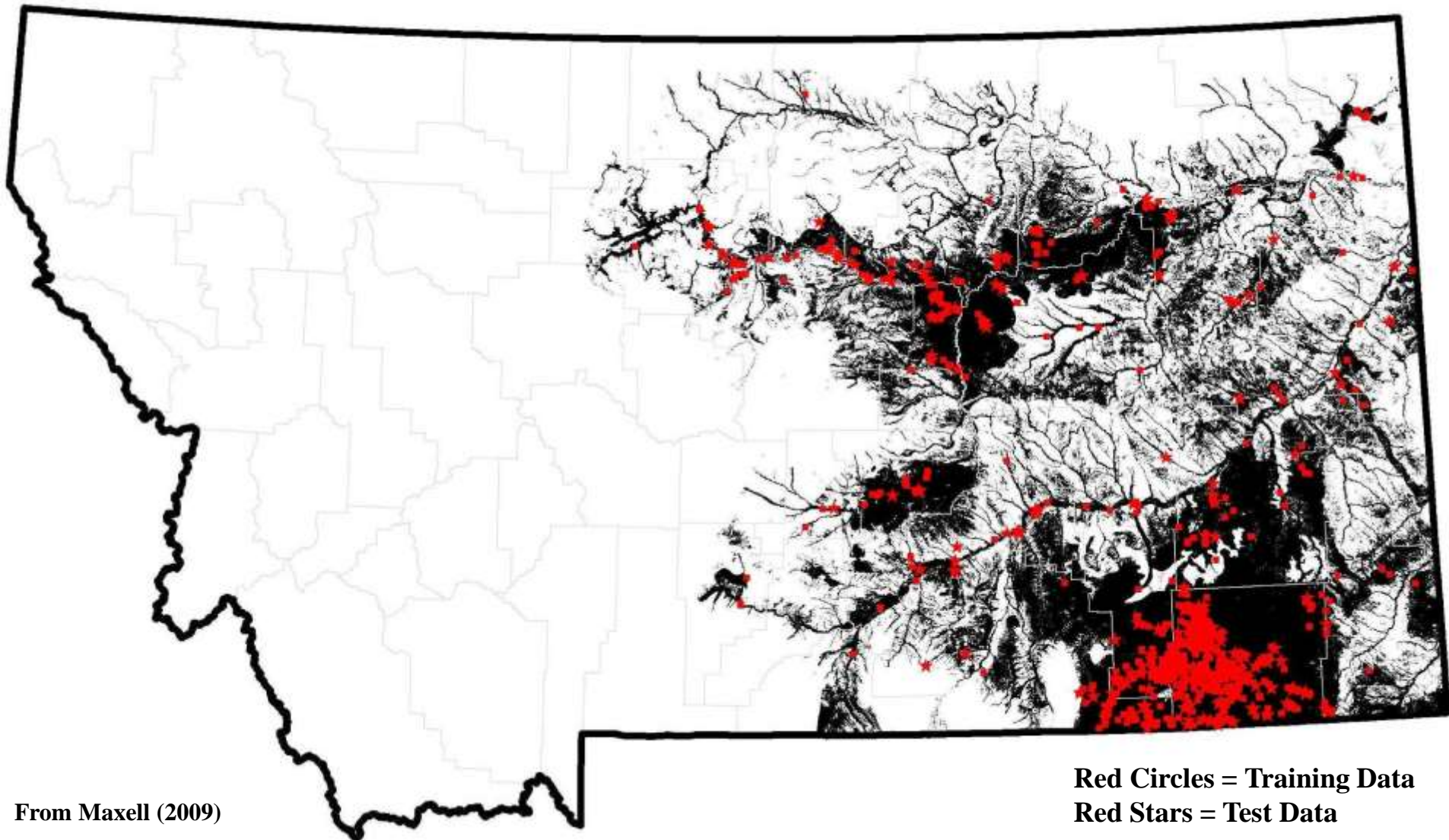


Woodhouse's Toad (*Bufo woodhousii*) Statewide Predicted Habitat Suitability Model



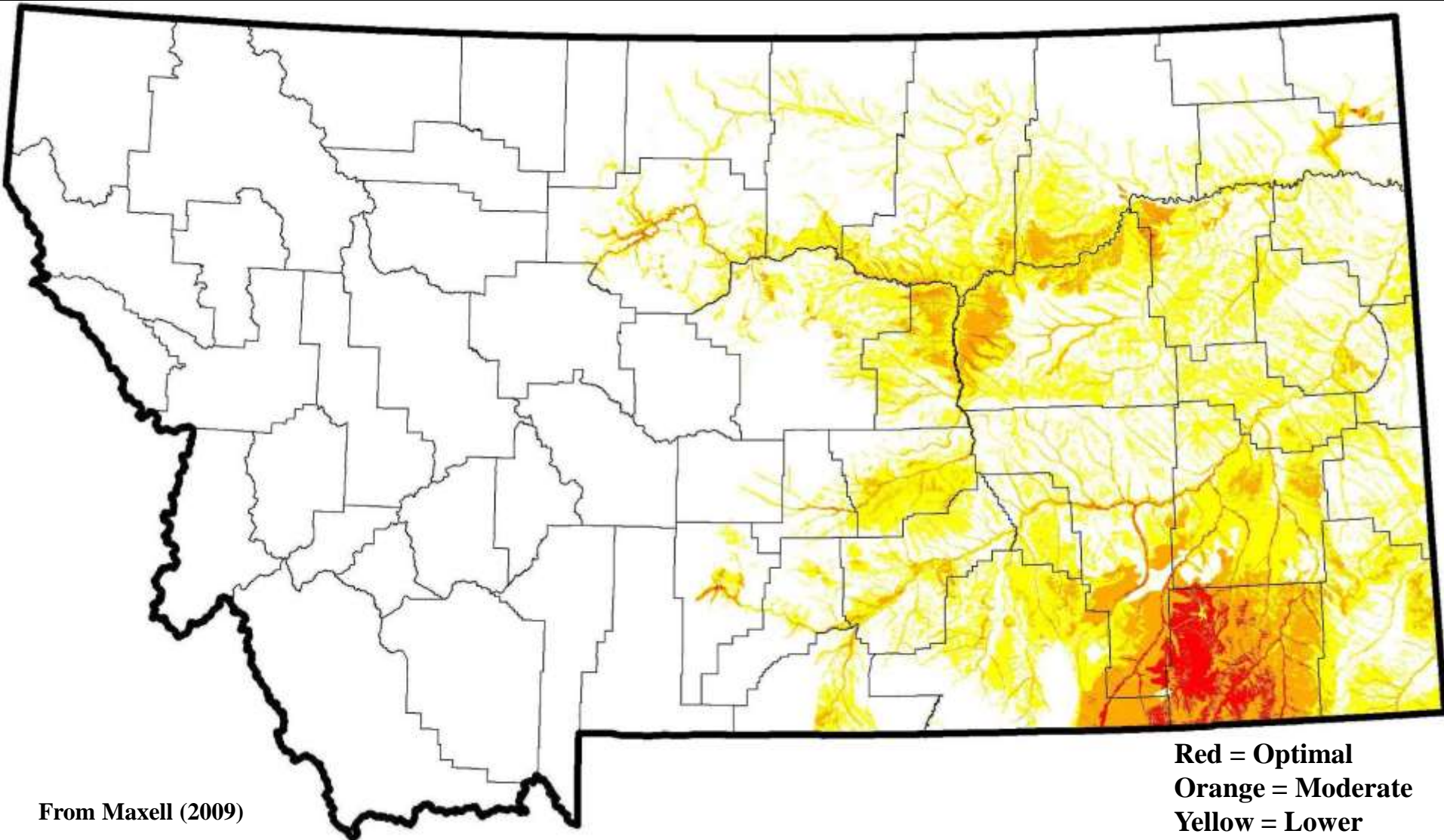
From Maxell (2009)

Woodhouse's Toad (*Bufo woodhousii*) Binary Model with Point Observations



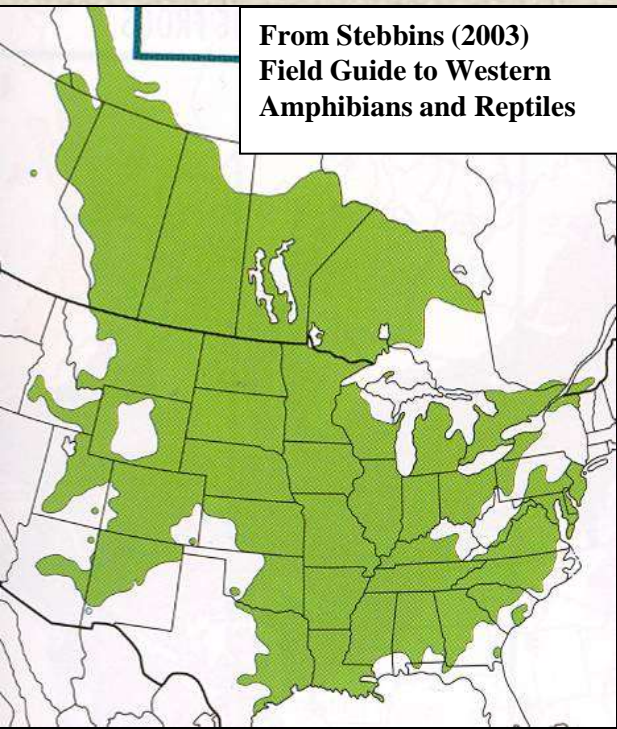
From Maxell (2009)

Woodhouse's Toad (*Bufo woodhousii*) Habitat Suitability Classes



From Maxell (2009)

From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles



Boreal Chorus Frog (*Pseudacris maculata*)

Identification

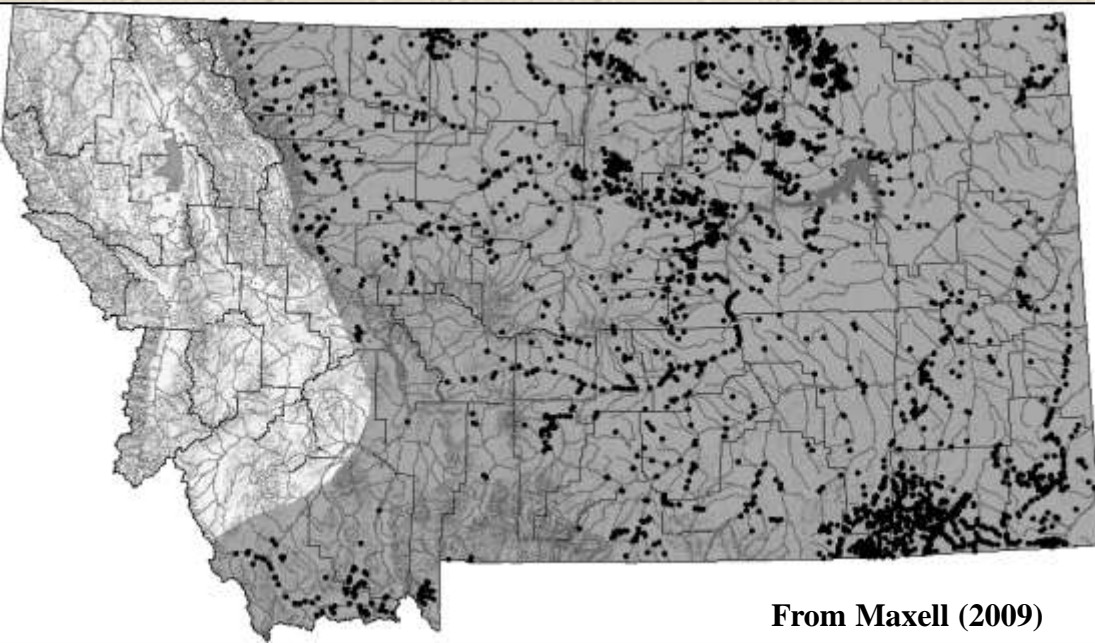


- Eggs:**
- Ovum black and $\approx 1.0\text{mm}$ dia.
 - Ovum surrounded by 1 jelly layer
 - Total egg diameter $\approx 5\text{mm}$
 - Laid in small clusters of ≤ 190

- Larvae:**
- Eyes outside body outline
 - Mottled brown and gold dorsally
 - Pale gold to translucent ventrally
 - Dorsal tail fin is highly arched and dendritically pigmented

- Adults:**
- Ends of toes have small discs/pads
 - Little webbing between any toes
 - 3 rows of green, brown, or gray stripes or spots on cream, brown, or green background dorsally
 - Cream colored, possibly with small black flecks ventrally

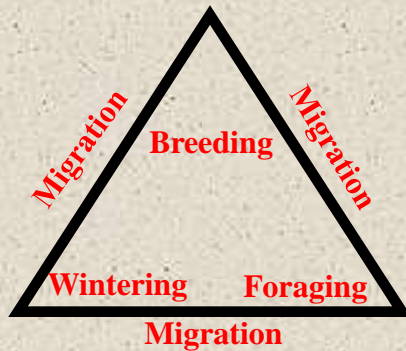
Vocalization: Thumb running down comb



From Maxell (2009)



Boreal Chorus Frog (*Pseudacris maculata*)



Habitat Use

Breeding: -Warm fishless temporary or permanent waters with at least some emergent vegetation

Foraging: -Usually within a few hundred meters of permanent or temporary waters in grasslands, shrublands, or forest parklands

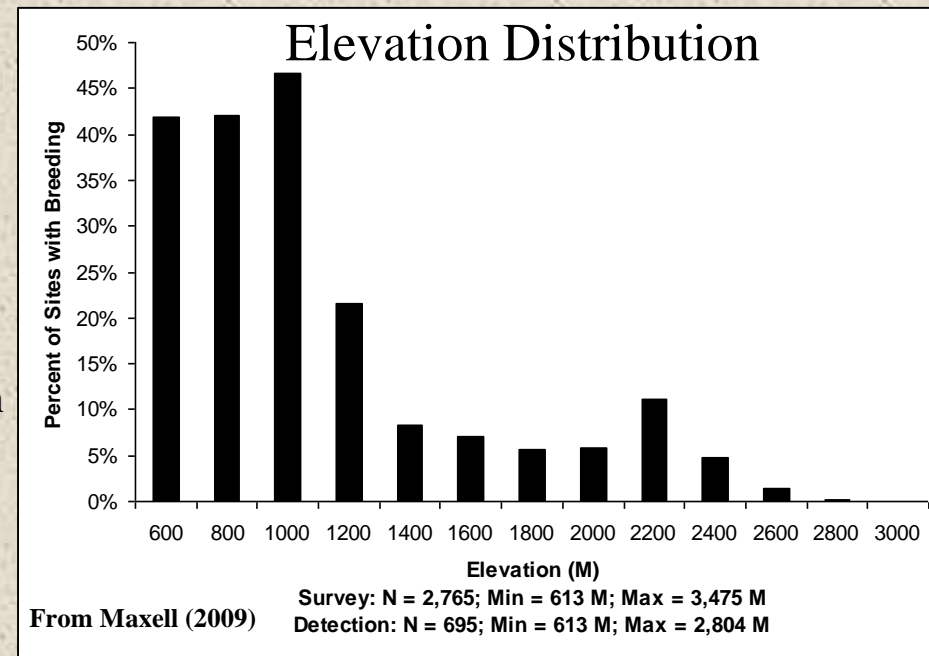
Overwintering: -Terrestrial habitats below or above frost line where they can survive temporary freezing

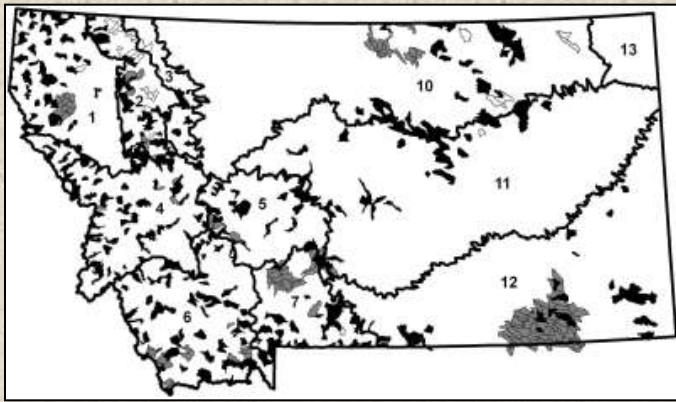
Migration: -Individuals are known to undergo seasonal migrations of 250 meters and can disperse more than 700 meters.

Elevation: -Up to or above 9,200 ft

Issues of Concern

-Pest/Herbicides and fertilizers





Boreal Chorus Frog

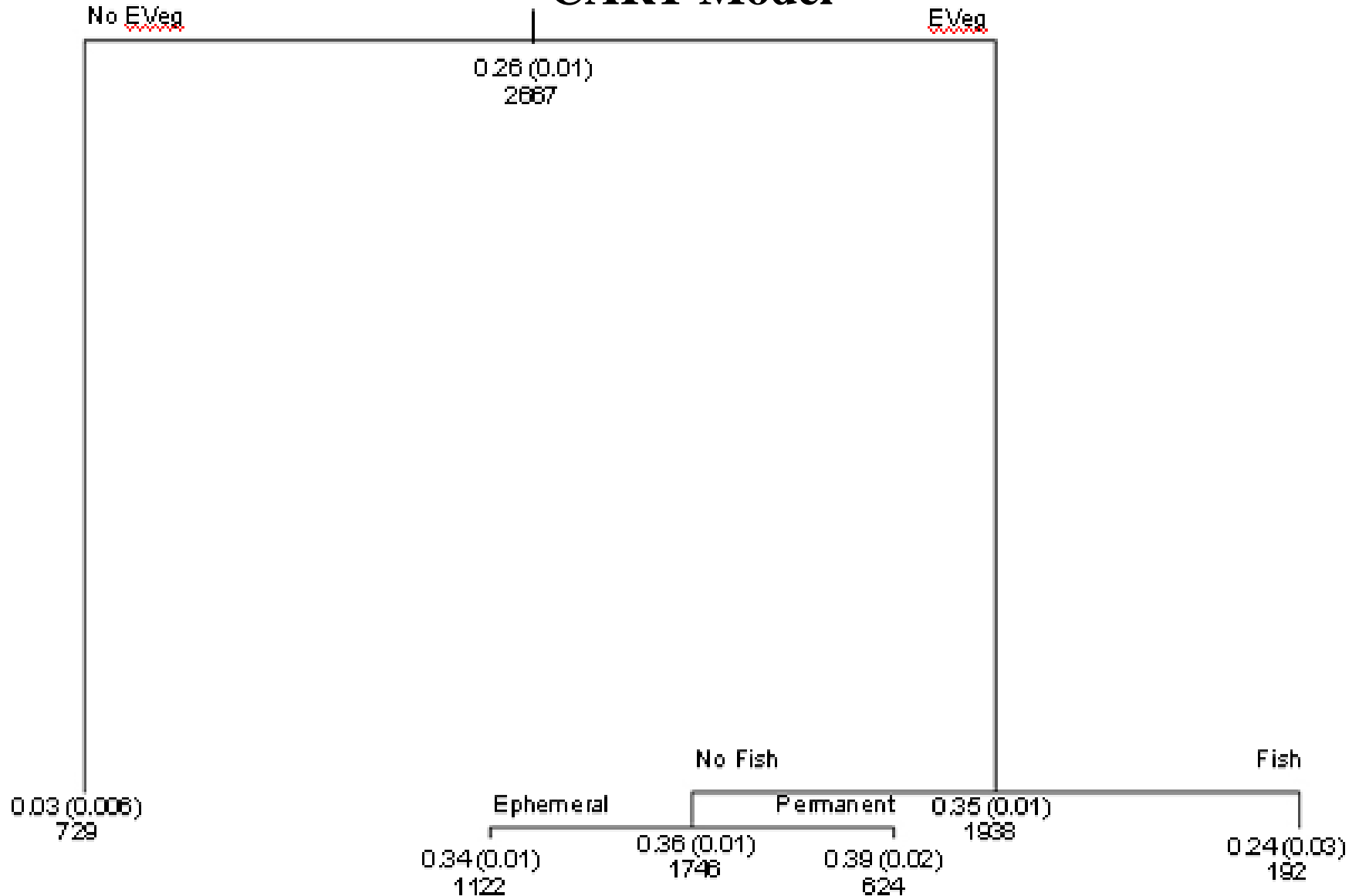
(Pseudacris maculata)

Occupancy Rates

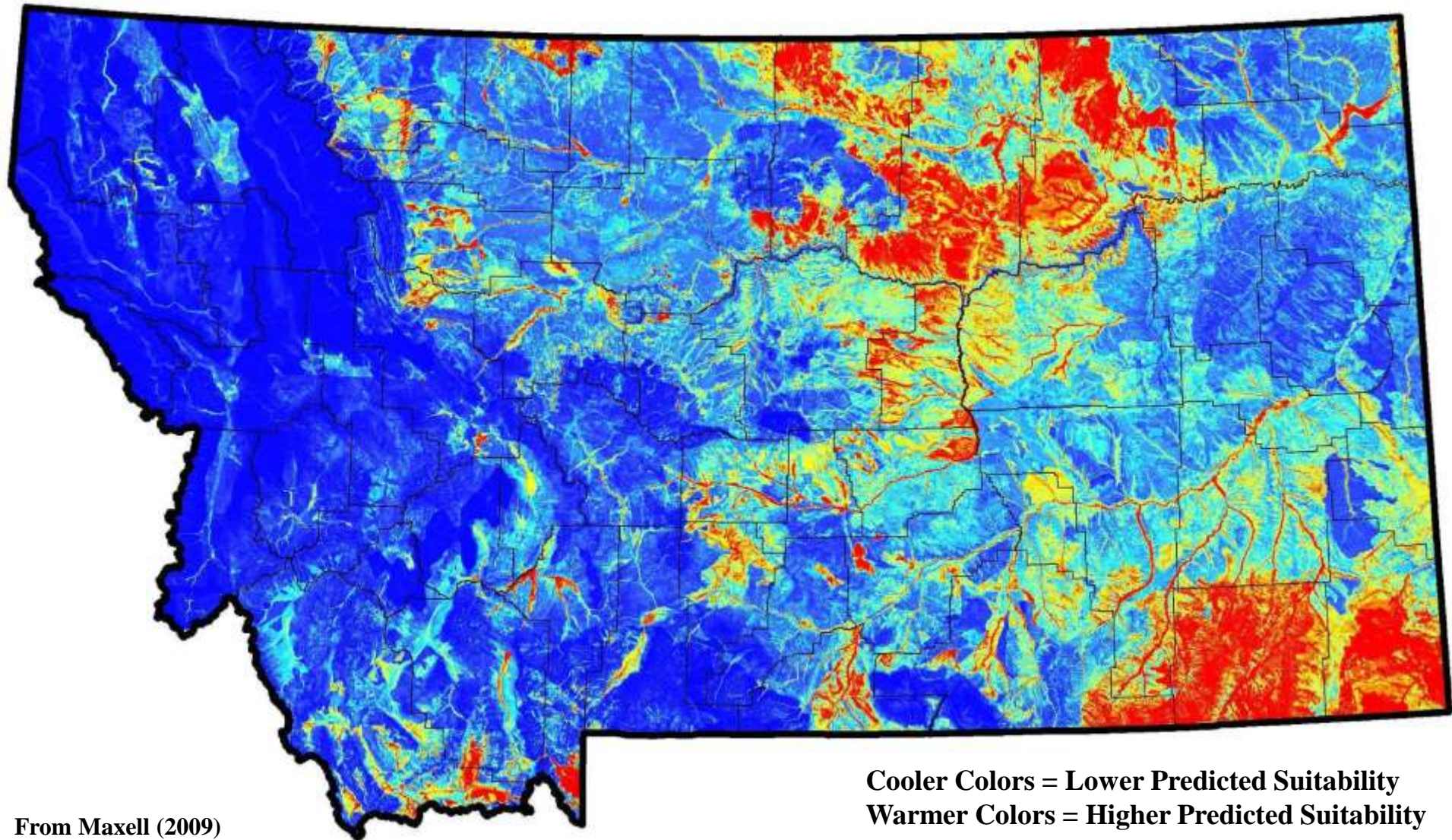
Strata	Total Number Watersheds / Sites	Percent Watershed Occupancy (95% CI^a)	Percent Site Occupancy (95% CI^b)
3	1 / 10	1 (-)	40 (9–71)
5	16 / 74	0 (-)	0 (-)
6	22 / 327	36 (17–56)	13 (9–17)
7	29 / 769	0 (-)	0 (-)
10	37 / 855	97 (92–100)	47 (44–51)
11	29 / 160	59 (42–75)	49 (41–57)
12	33 / 472	61 (46–75)	35 (31–39)
Overall	167 / 2667	49 (42–56)	26 (24–28)

Boreal Chorus Frog (*Pseudacris maculata*)

CART Model

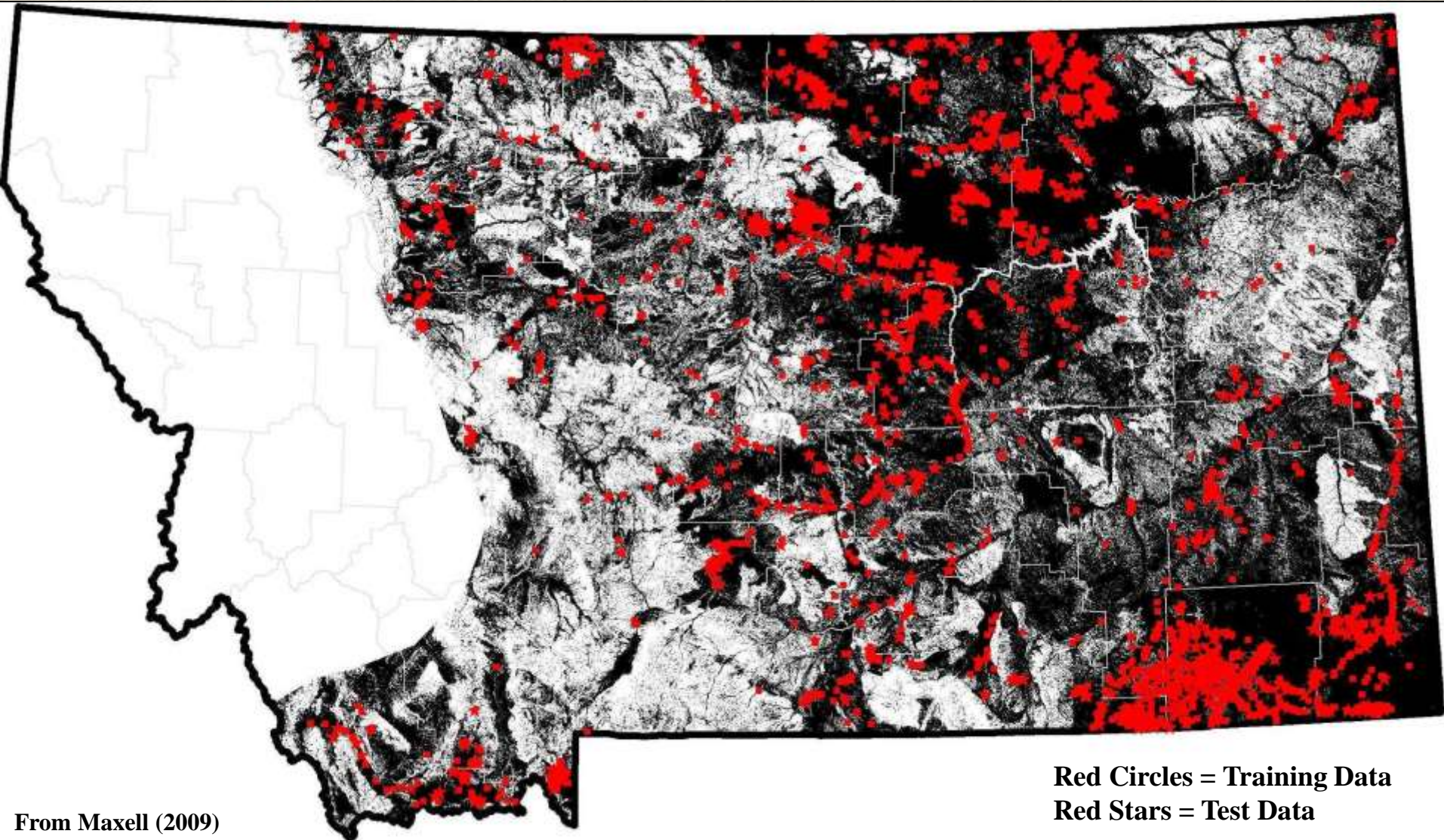


Boreal Chorus Frog (*Pseudacris maculata*) Statewide Predicted Habitat Suitability Model



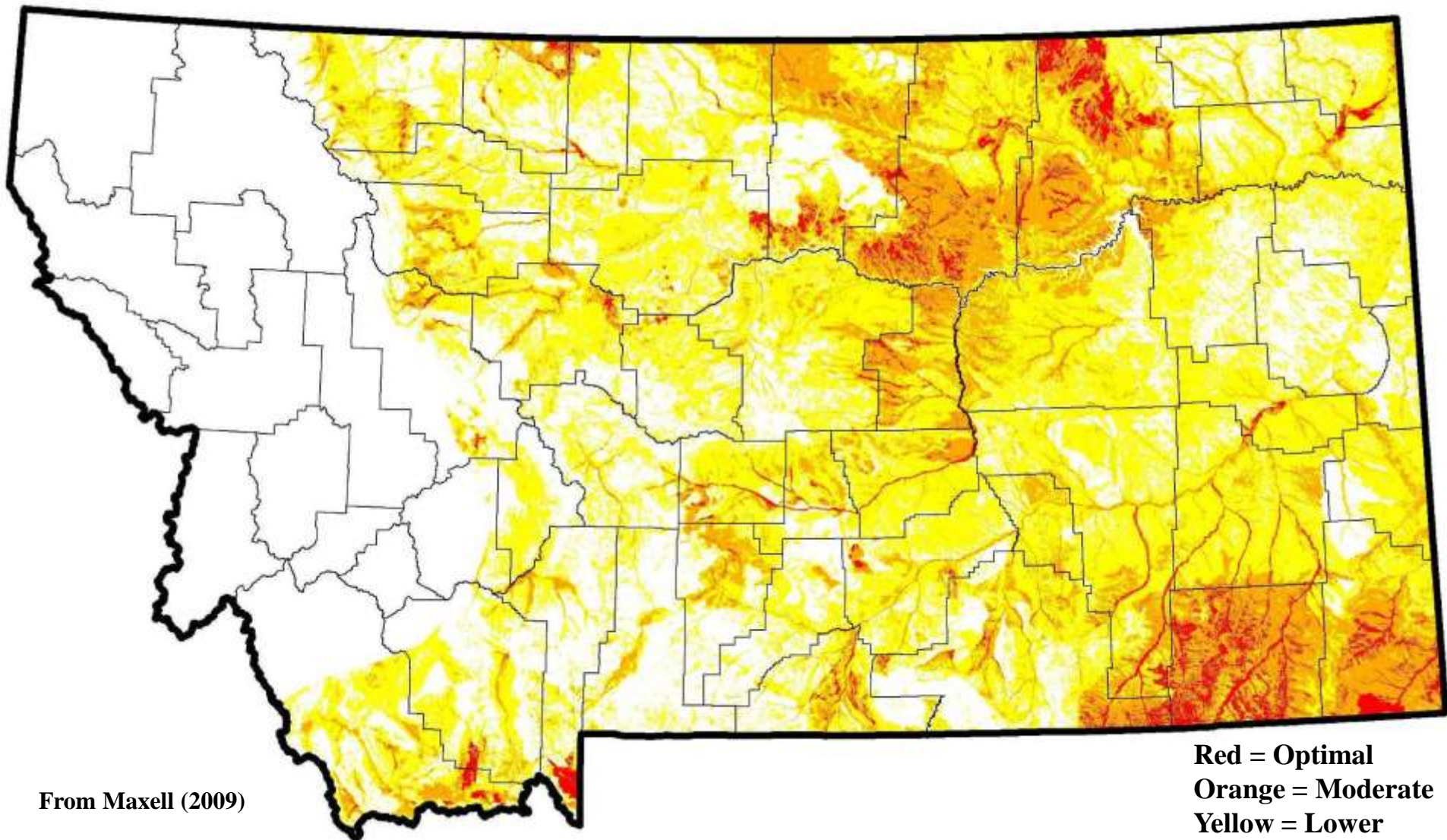
From Maxell (2009)

Boreal Chorus Frog (*Pseudacris maculata*) Binary Model with Point Observations



From Maxell (2009)

Boreal Chorus Frog (*Pseudacris maculata*) Habitat Suitability Classes

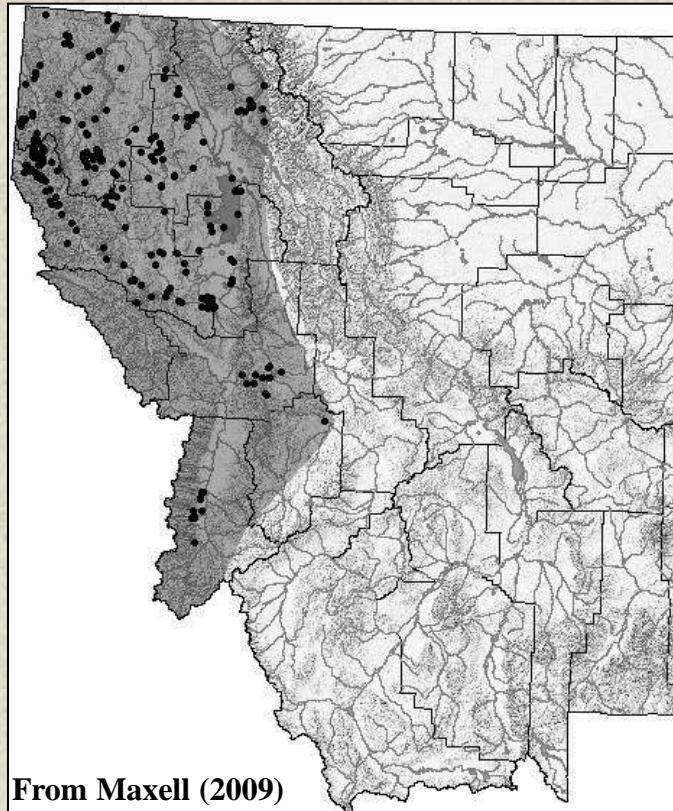


From Maxell (2009)

Pacific Treefrog (*Pseudacris regilla*)



From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles



From Maxell (2009)

Identification

Eggs:

- Ovum tan/gray and ≈ 1.3 mm dia.
- Ovum surrounded by 2 jelly layers
- Total egg diameter ≈ 4.6 -6.7mm
- Laid in small clusters of ≤ 120

Larvae:

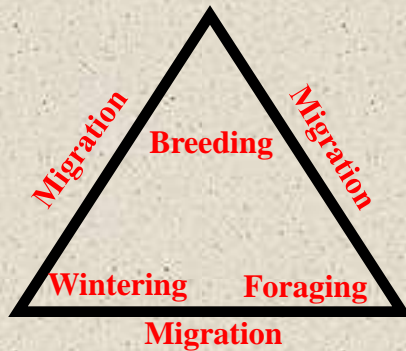
- Eyes outside body outline
- Mottled brown and gold dorsally
- Iridescent copper color laterally and translucent ventrally
- Tail fins are clear with numerous brown and metallic gold flecks

Adults:

- Ends of toes have large discs/pads
- Little webbing between any toes
- Black stripe extends from above shoulder, through eye to snout
- Dorsal base color is green or brown, often with dark brown or black spots
- "Y" shaped brown patch is often present
- Creamy white ventrally

Vocalization: "Krek ek" or "ribbit"





Pacific Treefrog (*Pseudacris regilla*)



Habitat Use

Breeding: -Warm fishless temporary or permanent waters with at least some emergent vegetation

Foraging: -Not far from forested habitats

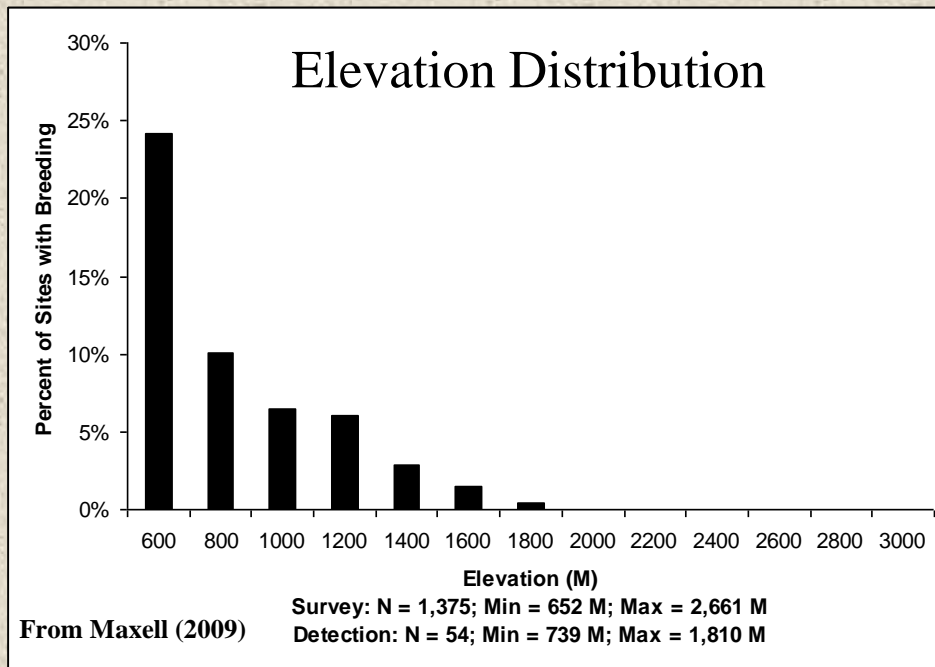
Overwintering: -Terrestrial habitats below or above frost line where they can survive temporary freezing

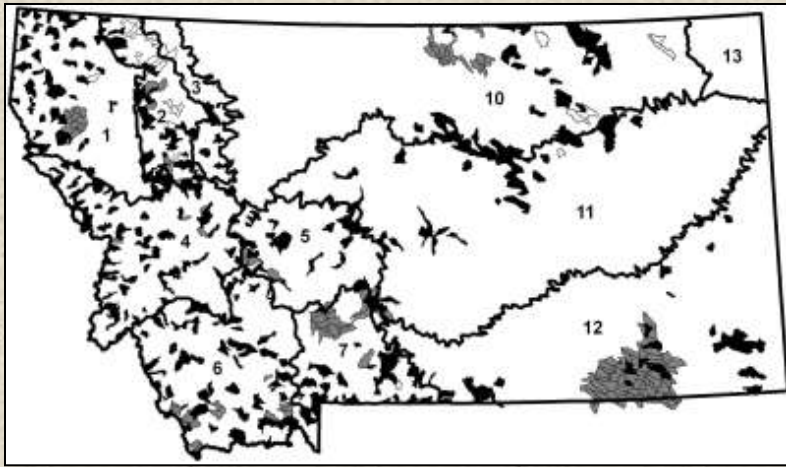
Migration: -Individuals are known to migrate up to 1 kilometer between foraging and breeding areas and disperse more than 3.25 kilometers

Elevation: -Usually valley bottoms, but up to 5,750 ft

Issues of Concern

- Exotic predators
- Pathogens
- Pest/Herbicides and Fertilizers



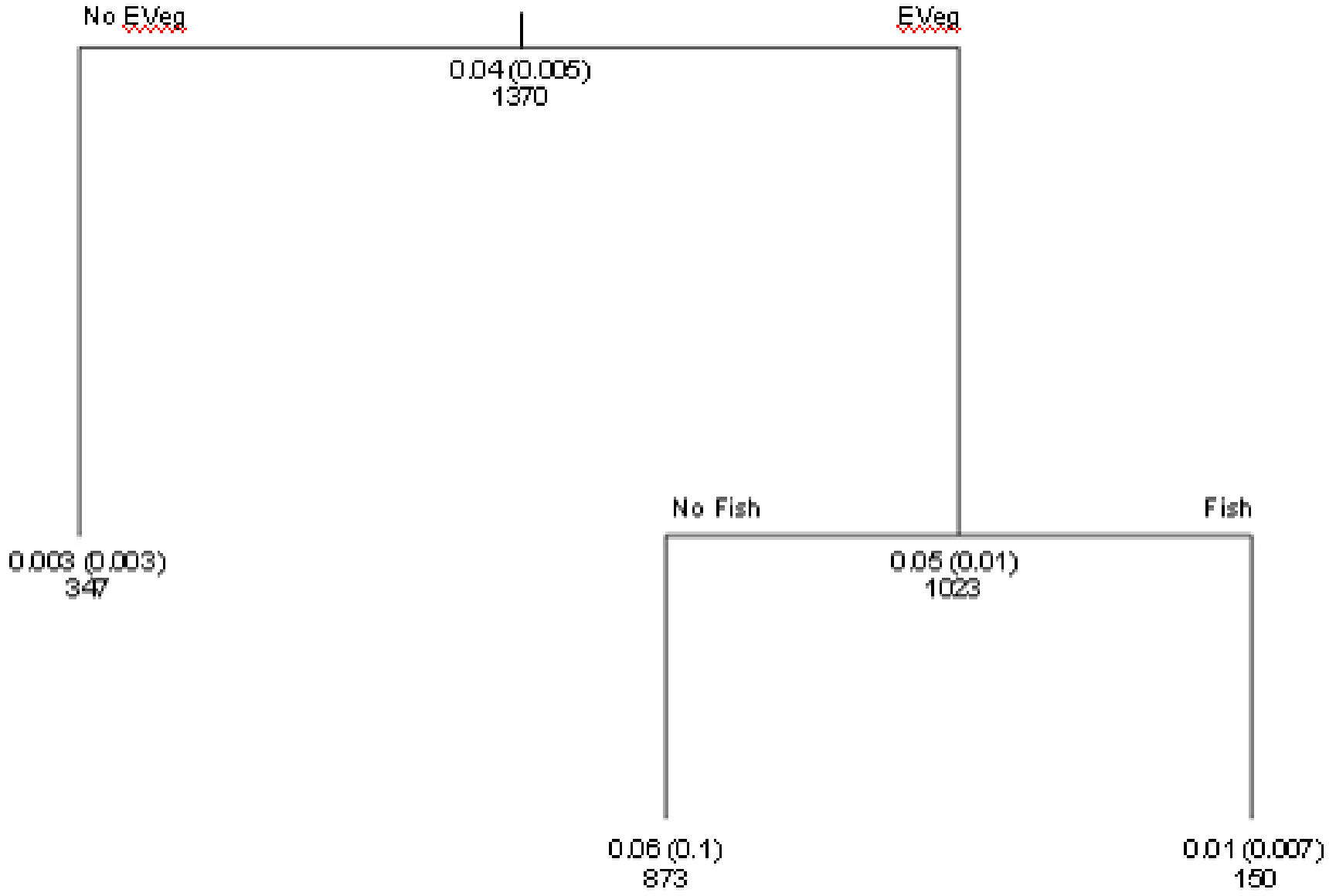


Pacific Treefrog (*Pseudacris regilla*)

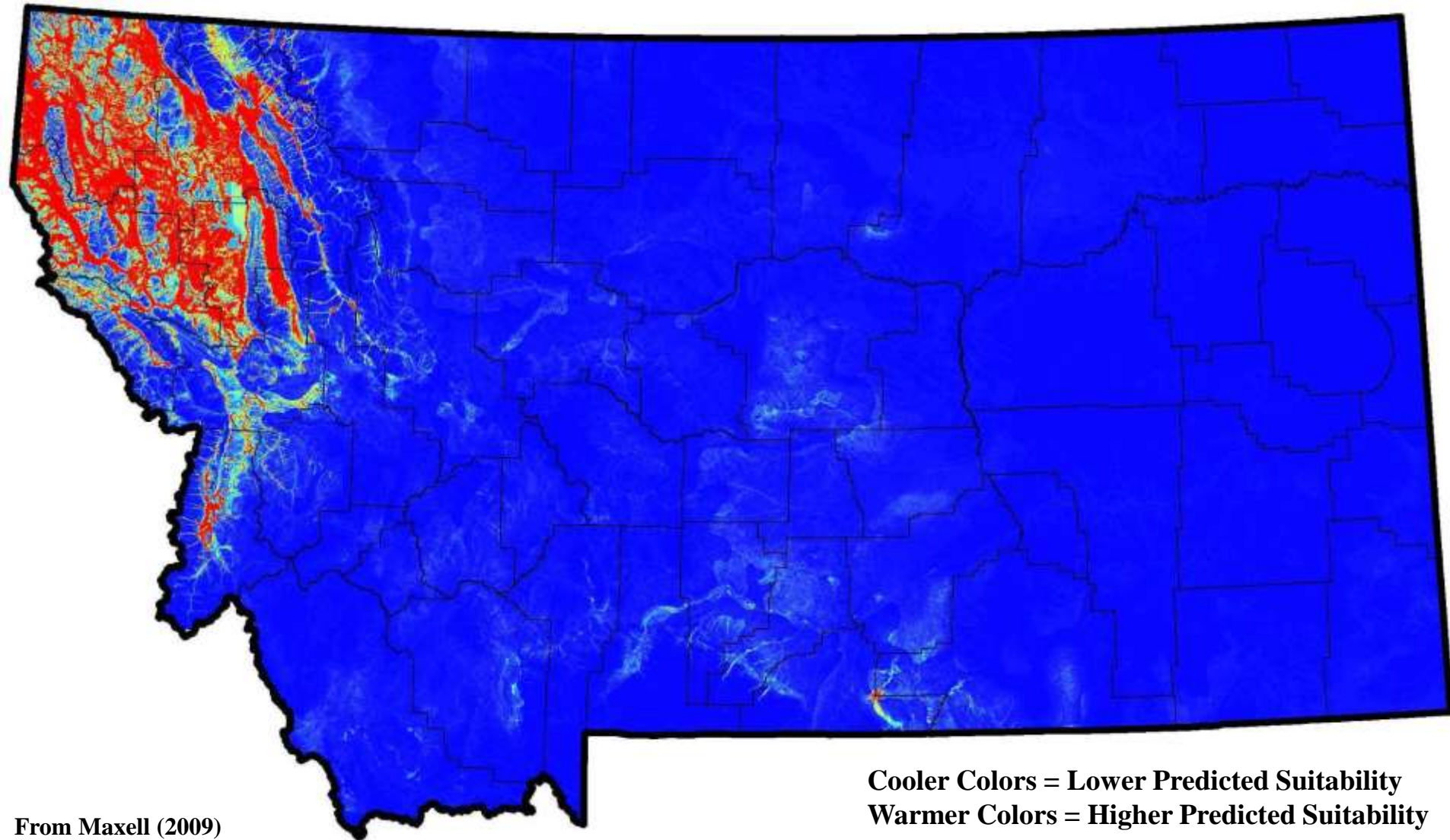
Occupancy Rates

Strata	Total Number Watersheds / Sites	Percent Watershed Occupancy (95% CI ^a)	Percent Site Occupancy (95% CI ^b)
1	53 / 282	43 (32–55)	18 (14–23)
2	24 / 539	4 (0–12)	0.2 (0–1)
4	55 / 2191	4 (0–8)	5 (4–6)
Overall	132 / 1370	20 (14–25)	4 (3–5)

Pacific Treefrog (*Pseudacris regilla*) CART Model



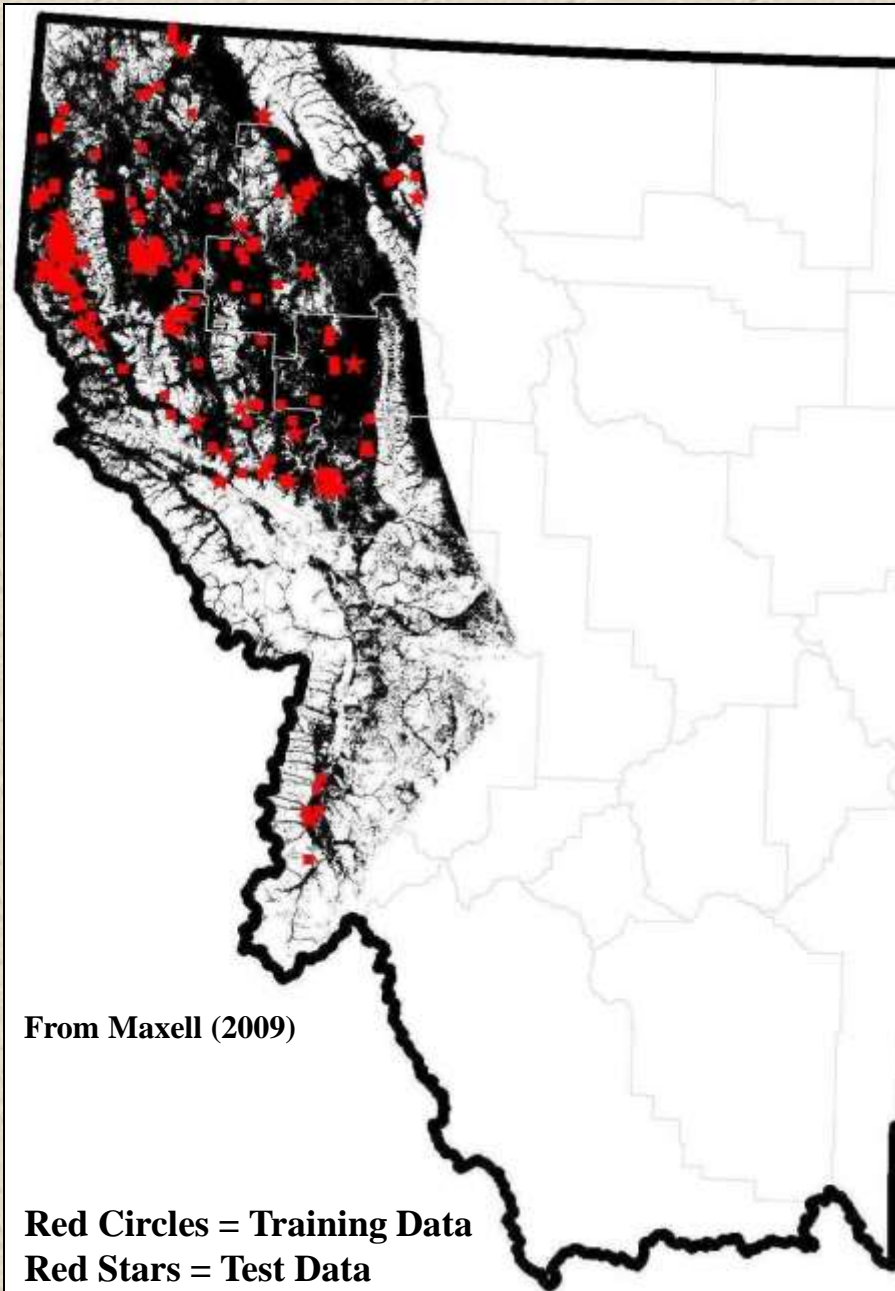
Pacific Treefrog (*Pseudacris regilla*) Statewide Predicted Habitat Suitability Model



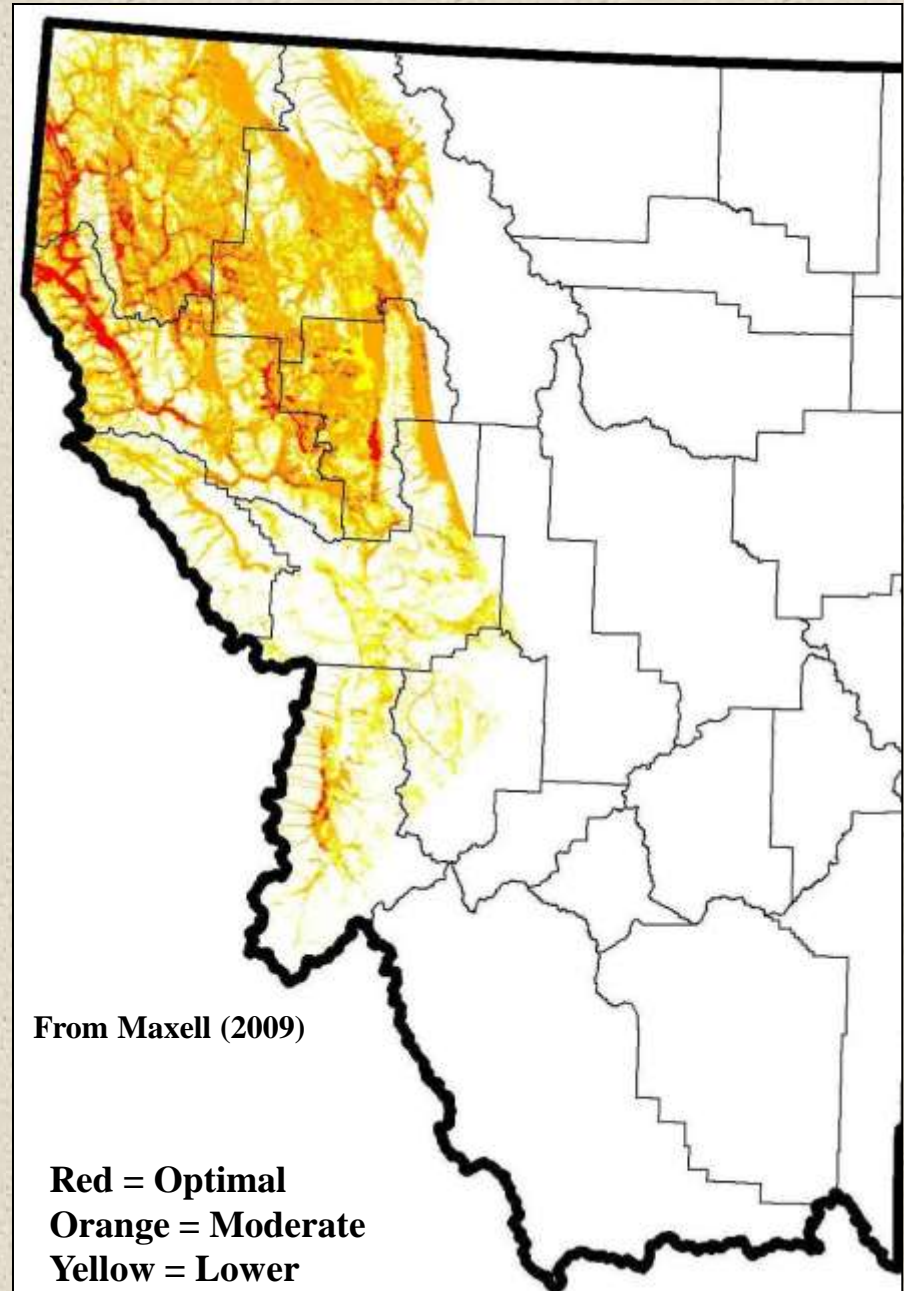
From Maxell (2009)

Pacific Treefrog (*Pseudacris regilla*)

Binary Model with Point Observations



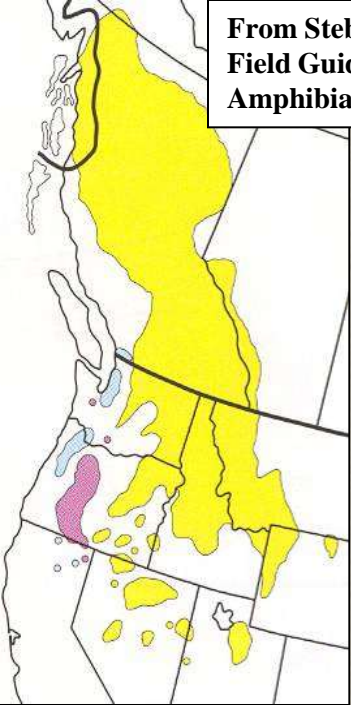
Habitat Suitability Classes



From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles

Columbia Spotted Frog

(*Rana luteiventris*)



Identification

Eggs:

- Ova black above and \approx 2-3mm dia.
- Ova surrounded by 2 jelly layers
- Total egg diameter \approx 10-12mm
- Laid in grapefruit sized masses

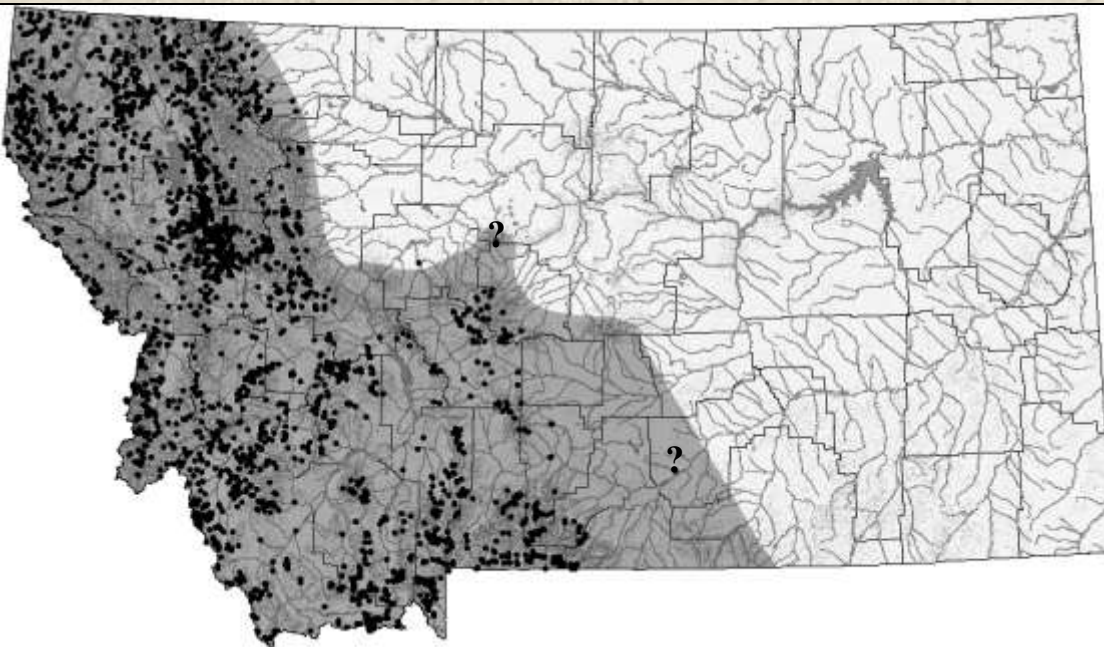
Larvae:

- Eyes located dorsally
- Flecks of metallic gold and black on a brownish dorsal background
- Pale yellow and often with a copper sheen ventrally
- Tail is about twice length of body
- Tail fin clear to yellowish with black and gold flecks

Adults:

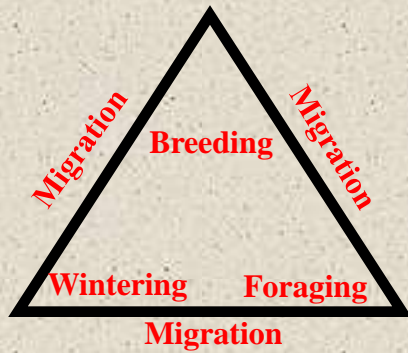
- Dorsal base color varies from light tan to reddish brown or dark green
- Irregular shaped dorsal black spots with lighter centers
- Ventral color white to cream with salmon color often on thighs and sometimes across entire venter

Vocalization: Tongue clicking roof of mouth



Columbia Spotted Frog

(*Rana luteiventris*)



Issues of Concern

- Fish introduction
- Piscicides
- Bullfrogs
- Water impoundments
- Pest/Herbicides and Fertilizers
- Heavy metals / mining
- Loss of beaver

Habitat Use

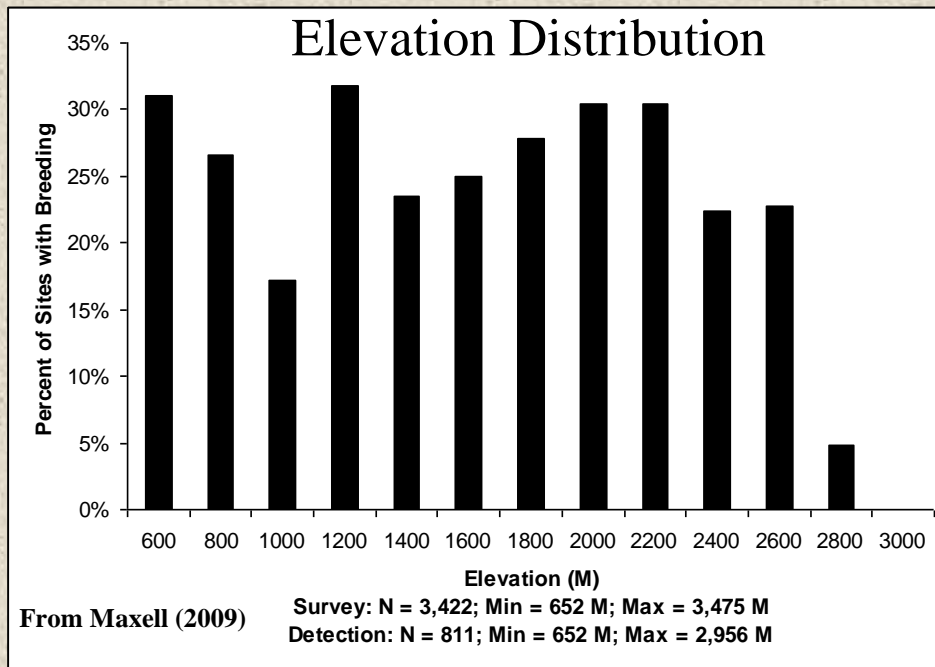
Breeding: -Temporary or permanent waters with emergent vegetation

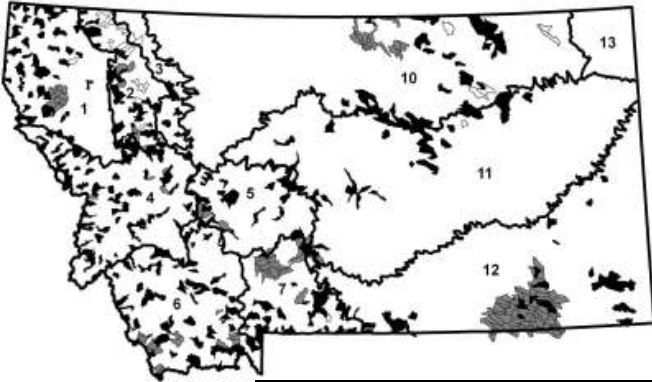
Foraging: -Aquatic margins and nearby terrestrial habitats

Overwintering: -Deeper permanent water bodies and streams

Migration: -Individuals are known to migrate up to 1.5 kilometers between foraging and breeding areas and disperse more than 7 kilometers

Elevation: -Approximately tree line





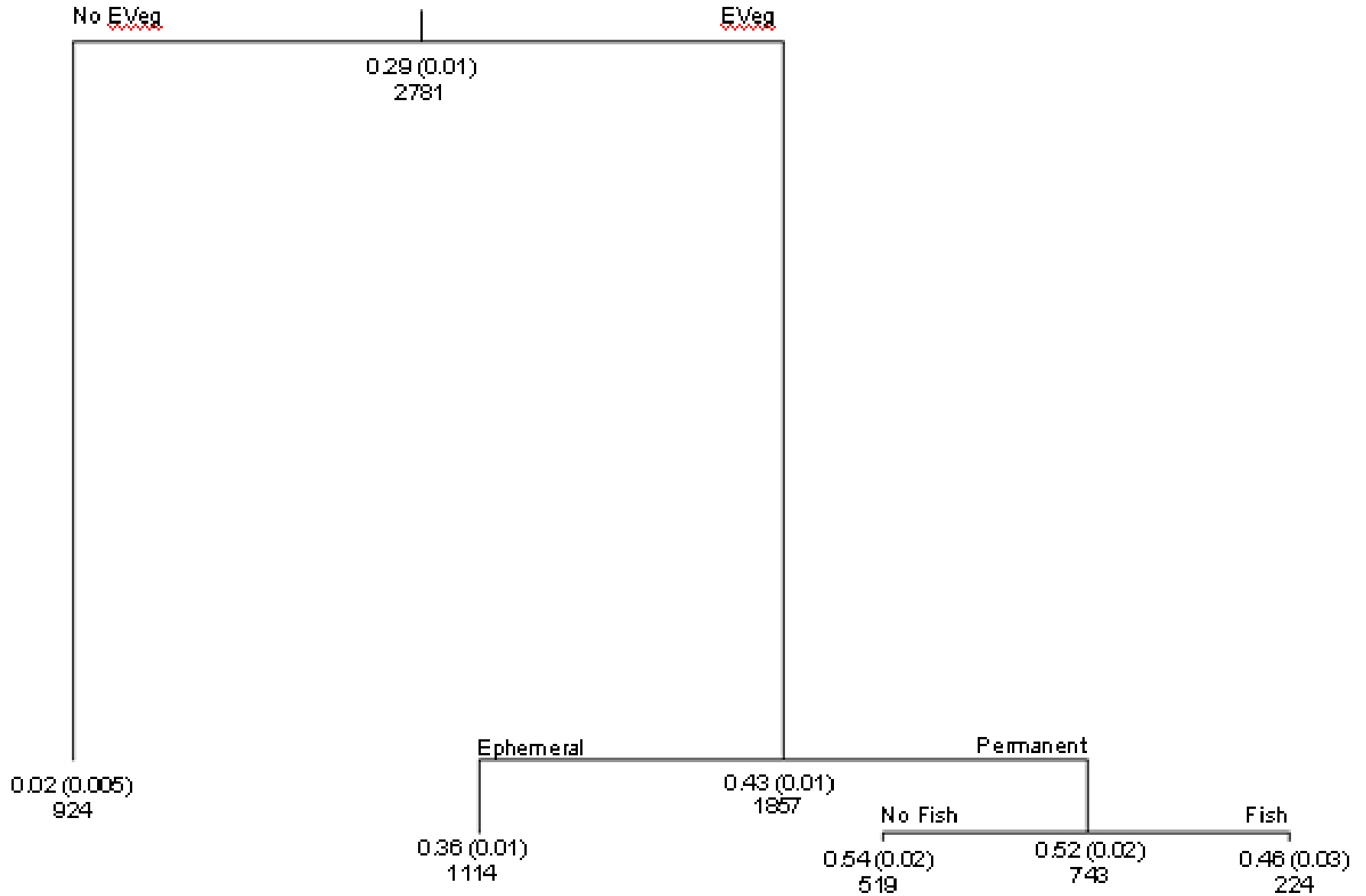
Columbia Spotted Frog

(*Rana luteiventris*)

Occupancy Rates

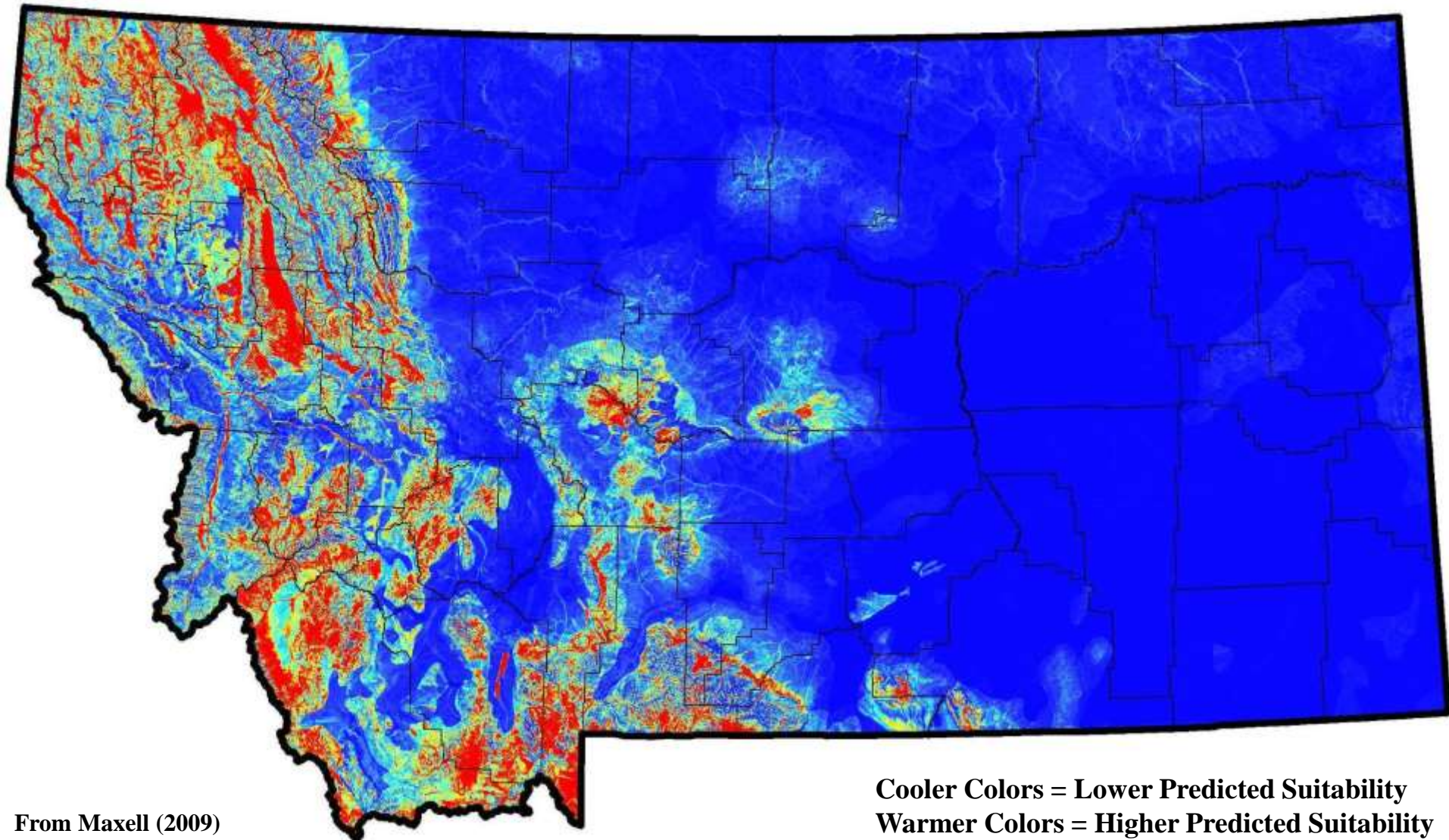
Strata	Total Number Watersheds / Sites	Percent Watershed Occupancy (95% CI ^a)	Percent Site Occupancy (95% CI ^b)
1	49 / 233	61 (49–73)	30 (24–36)
2	34 / 521	67 (54–82)	22 (18–26)
3	4 / 29	50 (2–98)	7 (0–16)
4	61 / 611	77 (68–87)	45 (41–49)
5	18 / 69	56 (34–77)	32 (21–43)
6	51 / 571	73 (61–84)	40 (36–44)
7	28 / 708	57 (41–73)	13 (11–16)
11	7 / 28	0 (-)	0 (-)
12	3 / 10	33 (0–87)	50 (18–82)
Overall	256 / 2781	65 (59–70)	29 (27–31)

Columbia Spotted Frog (*Rana luteiventris*) CART Model



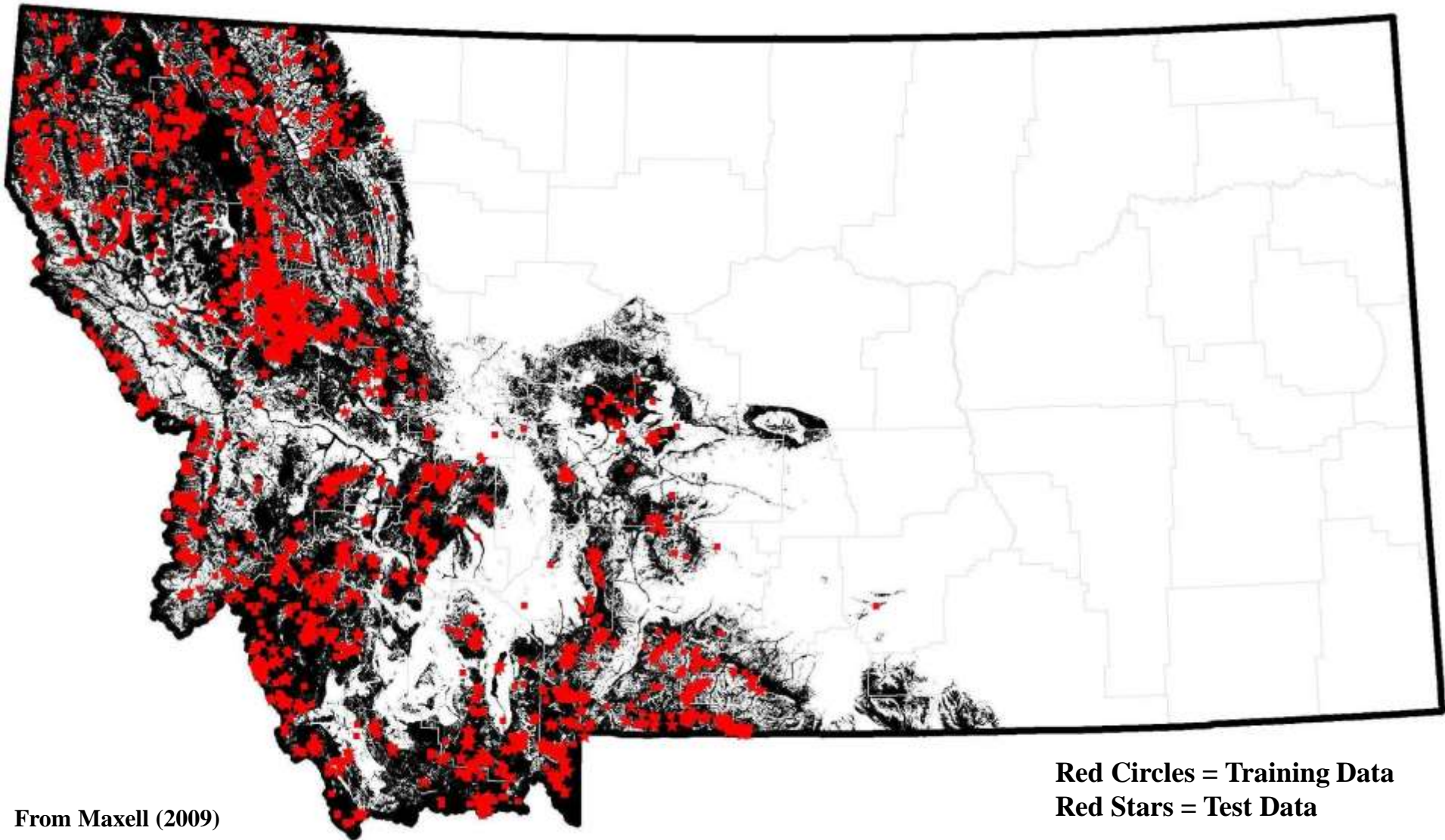
From Maxell (2009)

Columbia Spotted Frog (*Rana luteiventris*) Statewide Predicted Habitat Suitability Model



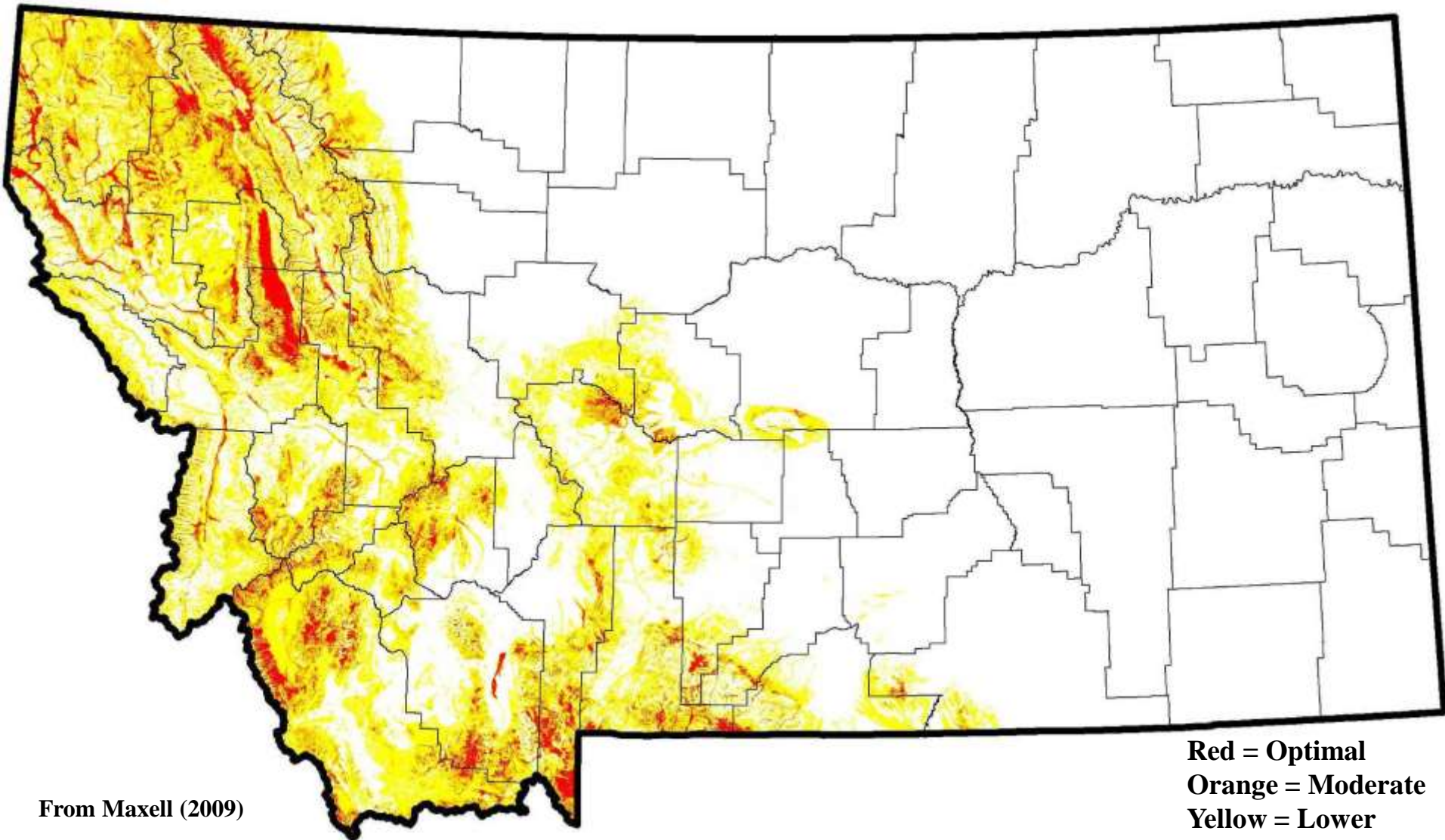
From Maxell (2009)

Columbia Spotted Frog (*Rana luteiventris*) Binary Model with Point Observations



From Maxell (2009)

Columbia Spotted Frog (*Rana luteiventris*) Habitat Suitability Classes



From Maxell (2009)

Northern Leopard Frog (*Rana pipiens*)



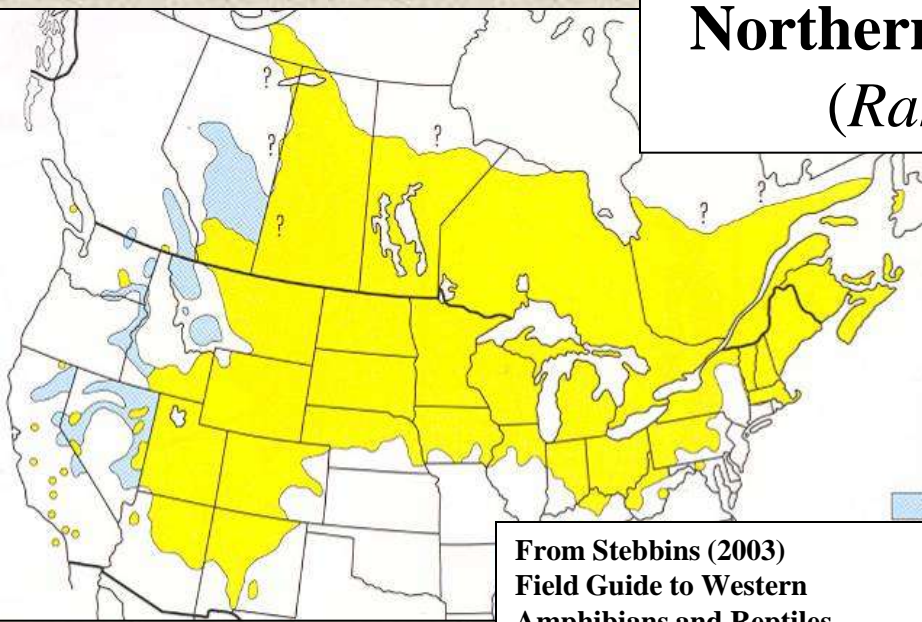
Identification

- Eggs:**
- Ova black above and ≈ 1.7 mm dia.
 - Ova surrounded by 2 jelly layers
 - Total egg diameter ≈ 5 mm
 - Laid in orange to grapefruit sized masses attached to veg underwater

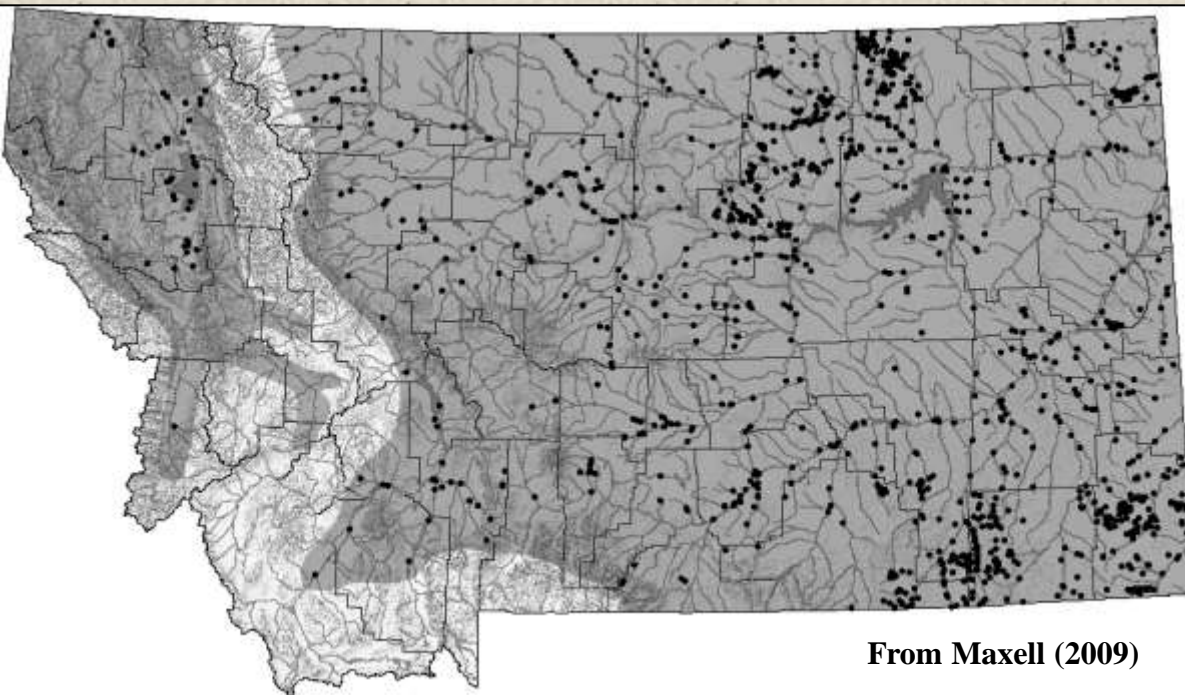
- Larvae:**
- Eyes located dorsally
 - Flecks of light gold or silver on a dark brown to olive background
 - Whitish to transparent ventrally
 - Tail fin clear to yellowish with black and light gold / silver flecks

- Adults:**
- Dorsal base color green or brown
 - Regularly shaped oval or round black dorsal spots are surrounded by light halos
 - Light stripes extend from tip of snout underneath eye to front limb and from behind eye to hind limb
 - Ventral color white to cream with some pinkish patches

Vocalization: Grating chortles and clucks

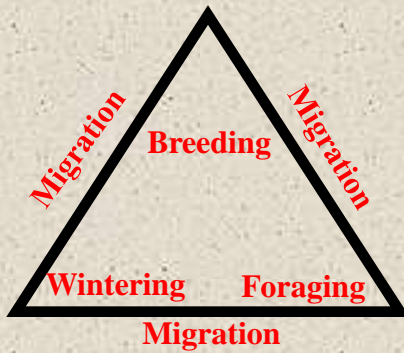


From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles



From Maxell (2009)





Northern Leopard Frog

(*Rana pipiens*)



Issues of Concern

- Regional Declines
- Pathogens
- Local population viability?
- Roads
- Exotic species
- Grazing
- Pest/Herbicides and Fertilizers

Habitat Use

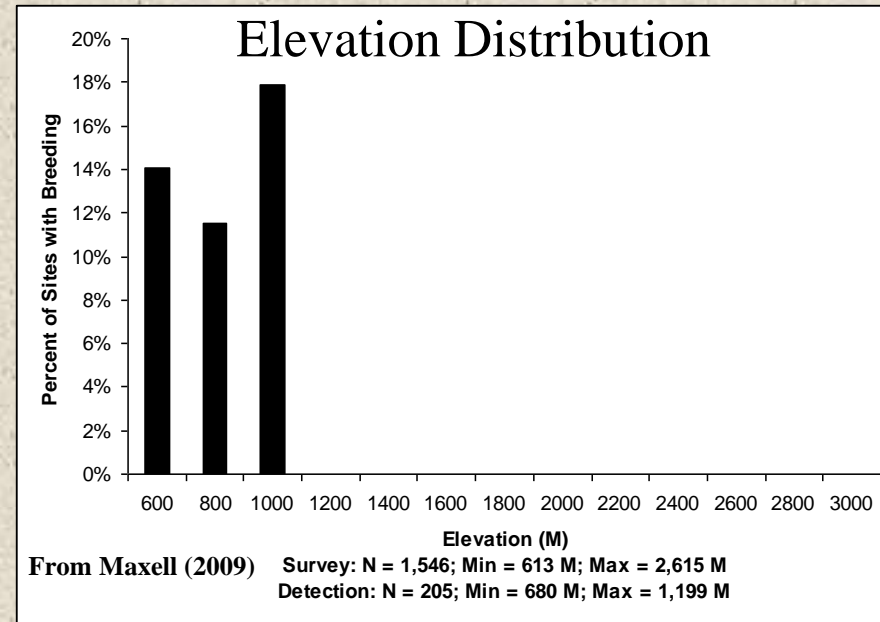
Breeding: -Usually more permanent waters with emergent vegetation, but some ephemeral sites may be used

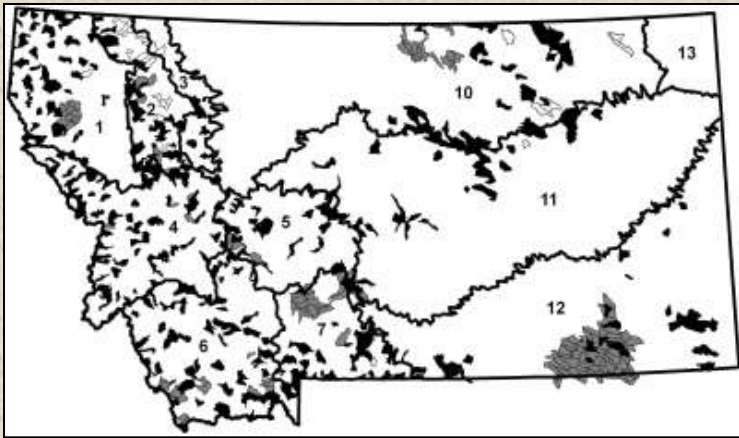
Foraging: -Aquatic margins and nearby terrestrial habitats

Overwintering: -Deeper permanent water bodies and streams

Migration: -Individuals are known to migrate at least 1 kilometer between foraging and breeding areas and disperse up to 8 kilometers

Elevation: -Up to 6,700 ft



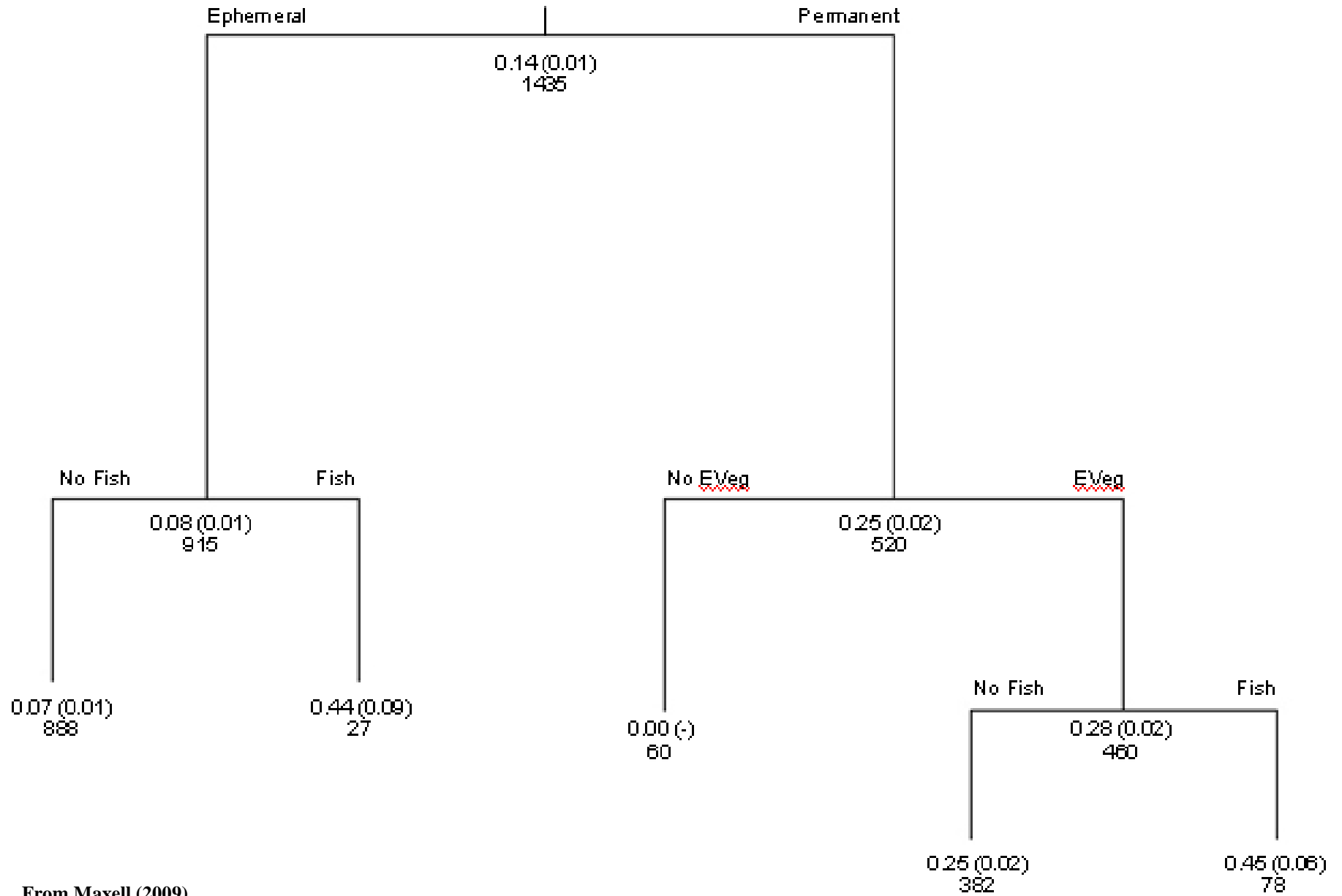


Northern Leopard Frog (*Rana pipiens*)

Occupancy Rates

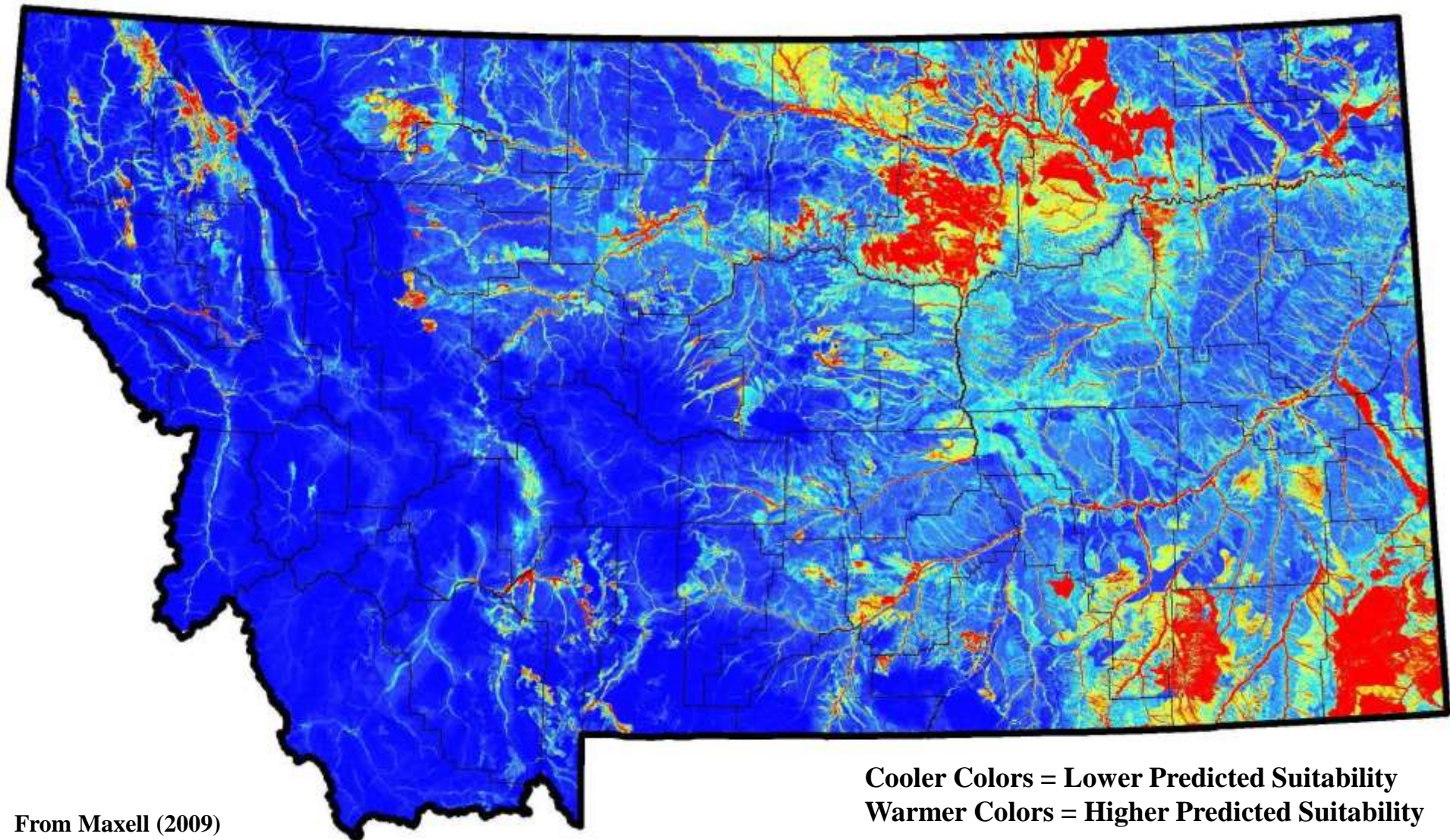
Strata	Total Number Watersheds / Sites	Percent Watershed Occupancy (95% CI ^a)	Percent Site Occupancy (95% CI ^b)
10	37 / 853	62 (48–76)	14 (11–16)
11	24 / 126	25 (9–41)	6 (2–11)
12	33 / 434	82 (70–94)	18 (14–22)
Overall	94 / 1435	60 (50–69)	14 (12–16)

Northern Leopard Frog (*Rana pipiens*) CART Model



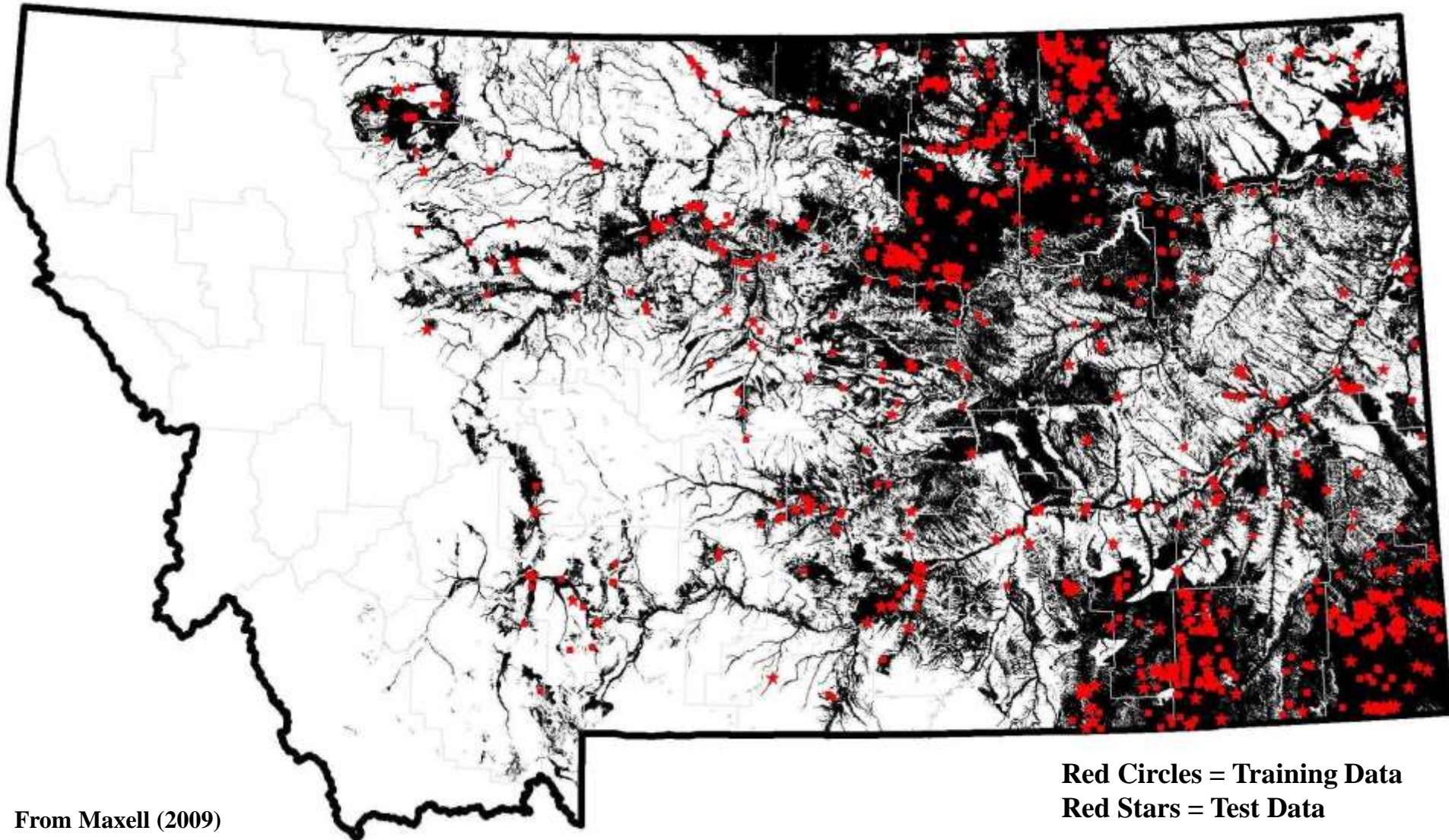
From Maxell (2009)

Northern Leopard Frog (*Rana pipiens*) Statewide Predicted Habitat Suitability Model



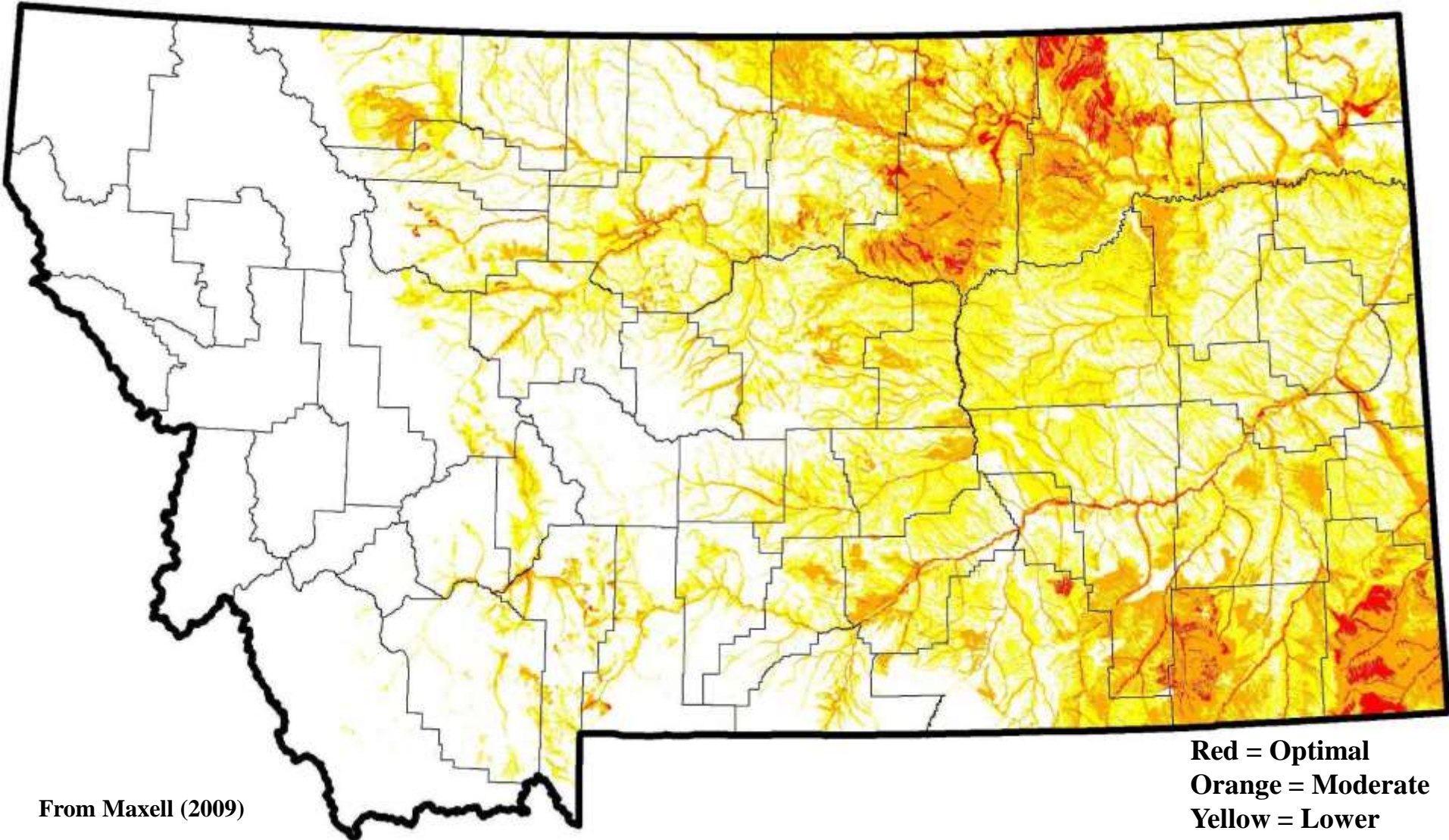
From Maxell (2009)

Northern Leopard Frog (*Rana pipiens*) Binary Model with Point Observations



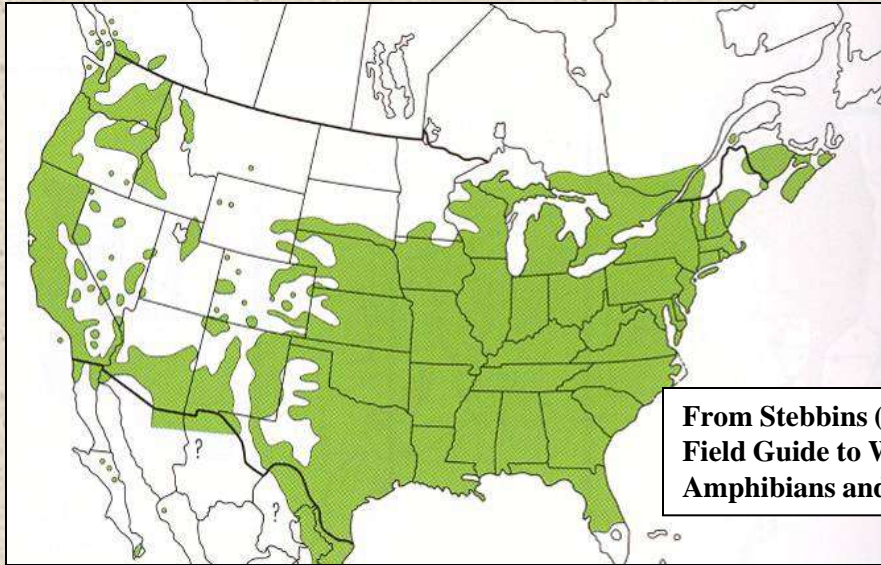
From Maxell (2009)

Northern Leopard Frog (*Rana pipiens*) Habitat Suitability Classes



From Maxell (2009)

American Bullfrog (*Rana catesbeiana*)



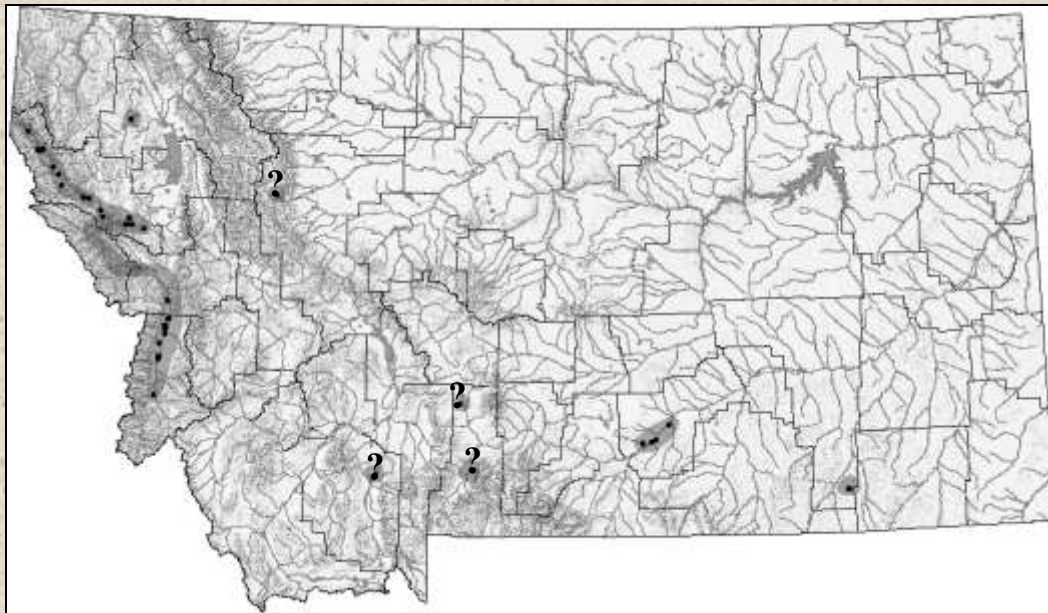
Identification

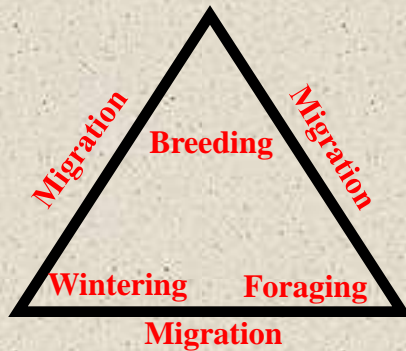
- Eggs:**
- Ova black above and \approx 1-3mm dia.
 - Ova surrounded by 1 jelly layer
 - Total egg diameter \approx 6-10mm
 - Laid in thin film on water surface

- Larvae:**
- Eyes located dorsally
 - Round black dots and flecks of yellow on an olive green to yellow dorsal background
 - Creamy white to bright yellow ventrally

- Adults:**
- Tympanum as large or larger than eye in diameter
 - Skin fold extends from eye over tympanum to front limb
 - Dorsal base color varies from pale green to dark green with small dark spots or dark mottling
 - Ventral color is cream to bright yellow with gray to green mottling

Vocalization: “Bruuuuum”





American Bullfrog

(*Rana catesbeiana*)



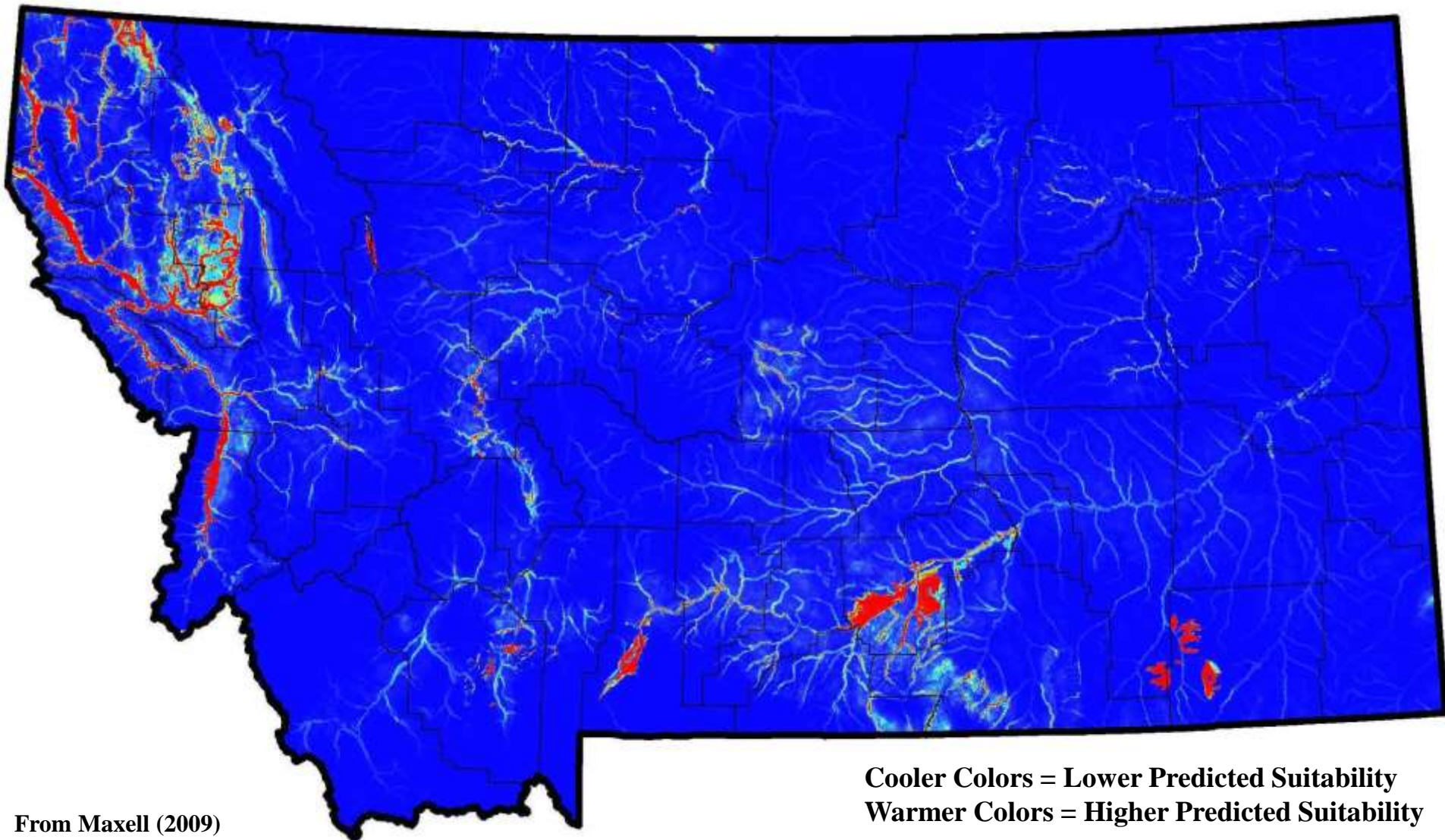
Habitat Use

- Breeding:** -Warmer permanent water bodies with emergent and/or aquatic vegetation
- Foraging:** -Aquatic margins and immediately adjacent terrestrial habitats
- Overwintering:** -Deep permanent water bodies and larger slower portions of rivers
- Migration:** -Seasonal migrations are thought to be limited to no more than a few hundred meters, but dispersal distances of 2.8 kilometers are known
- Elevation:** -In valley bottoms up to approximately 4000 ft

Issues of Concern

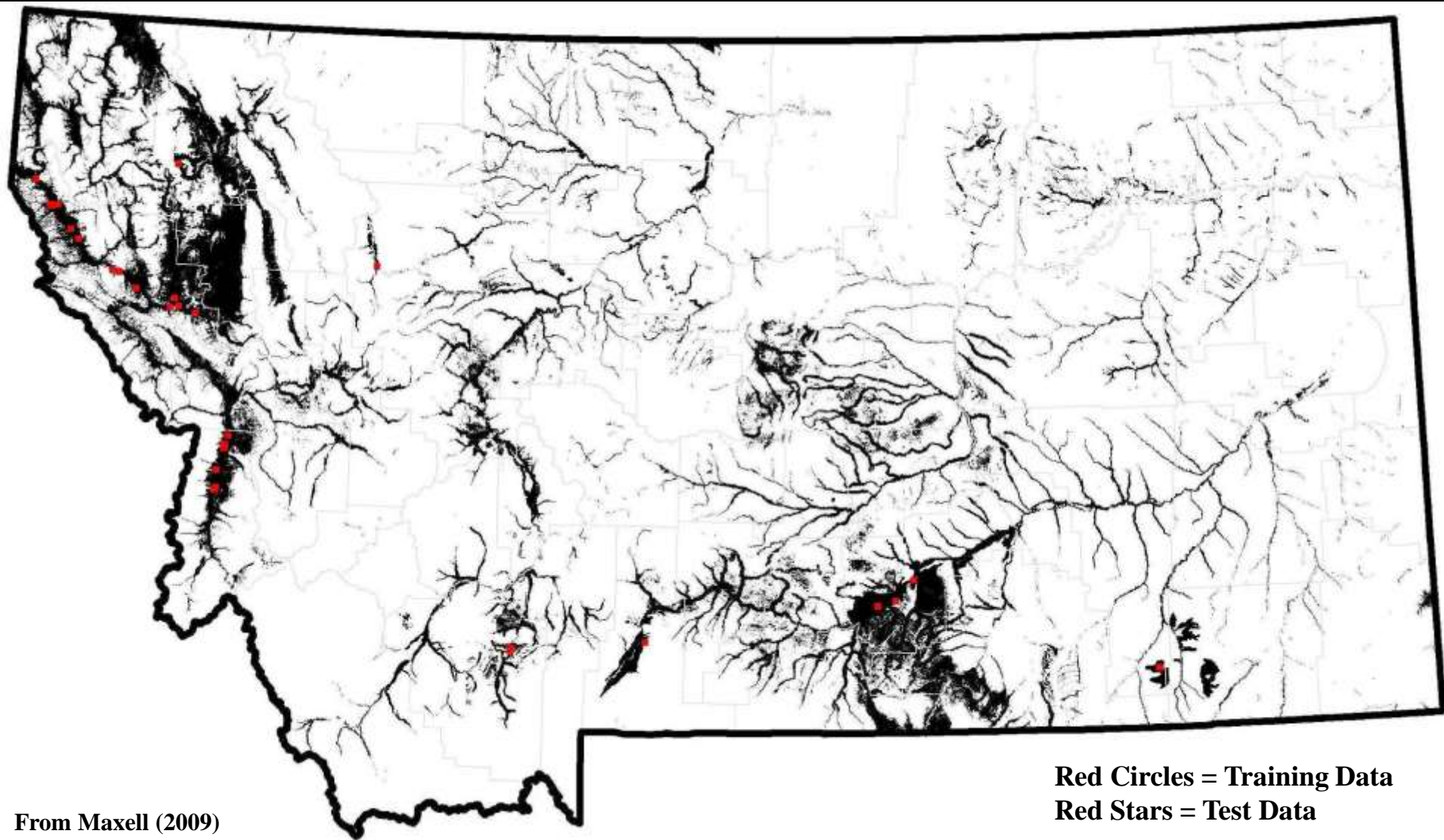
- American Bullfrogs are an exotic species that should be removed whenever feasible

American Bullfrog (*Rana catesbeiana*) Statewide Predicted Habitat Suitability Model



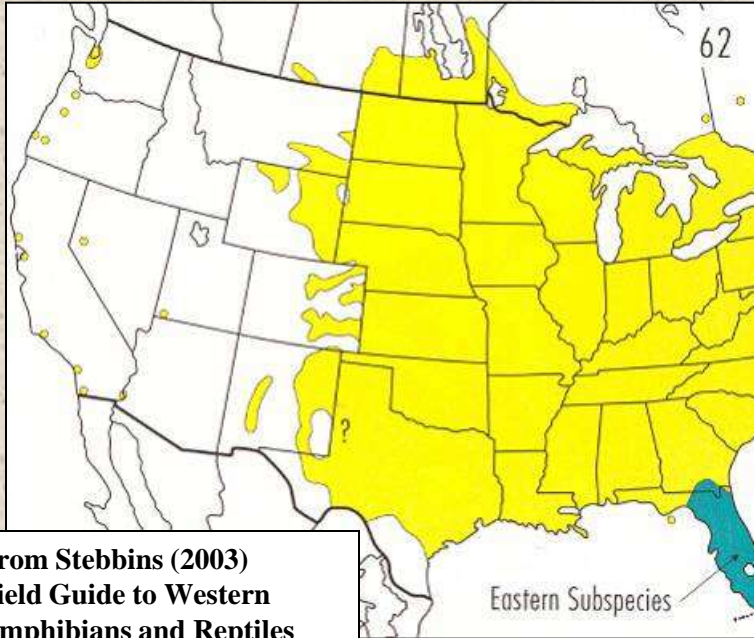
From Maxell (2009)

American Bullfrog (*Rana catesbeiana*) Binary Model with Point Observations



From Maxell (2009)

Snapping Turtle (*Chelydra serpentina*)

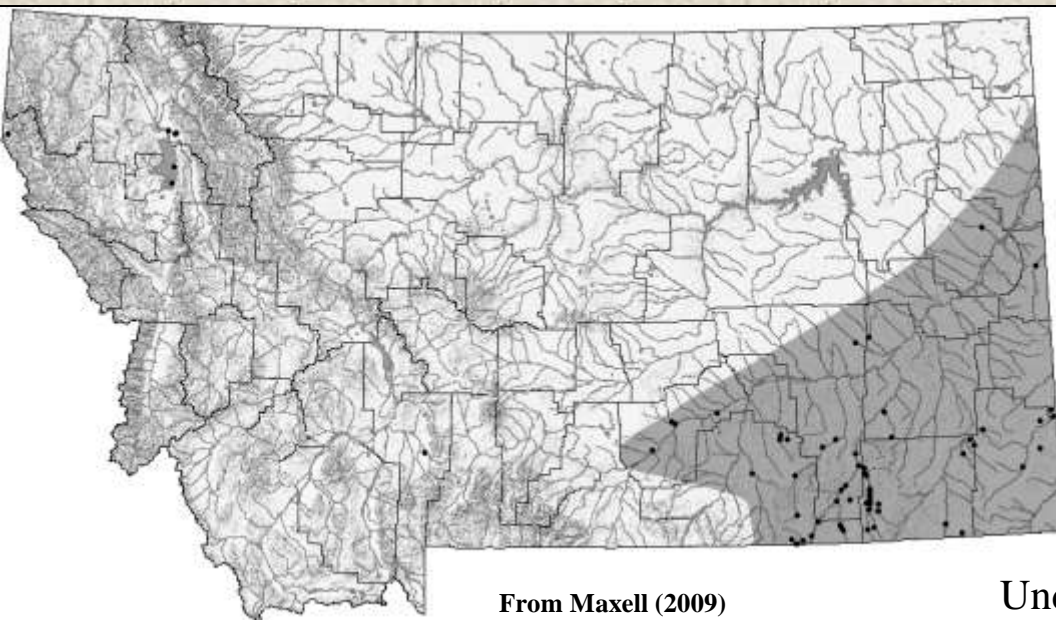


From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles

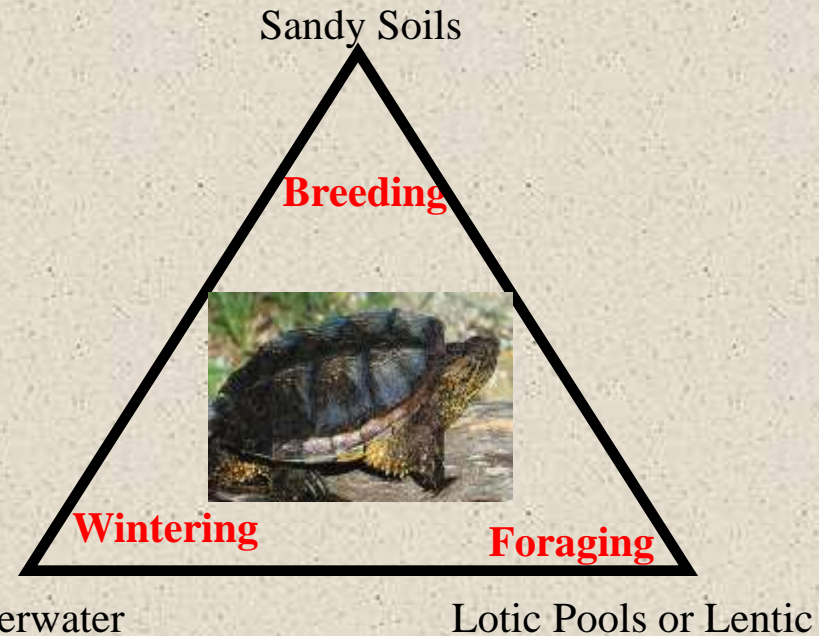


Issues of Concern

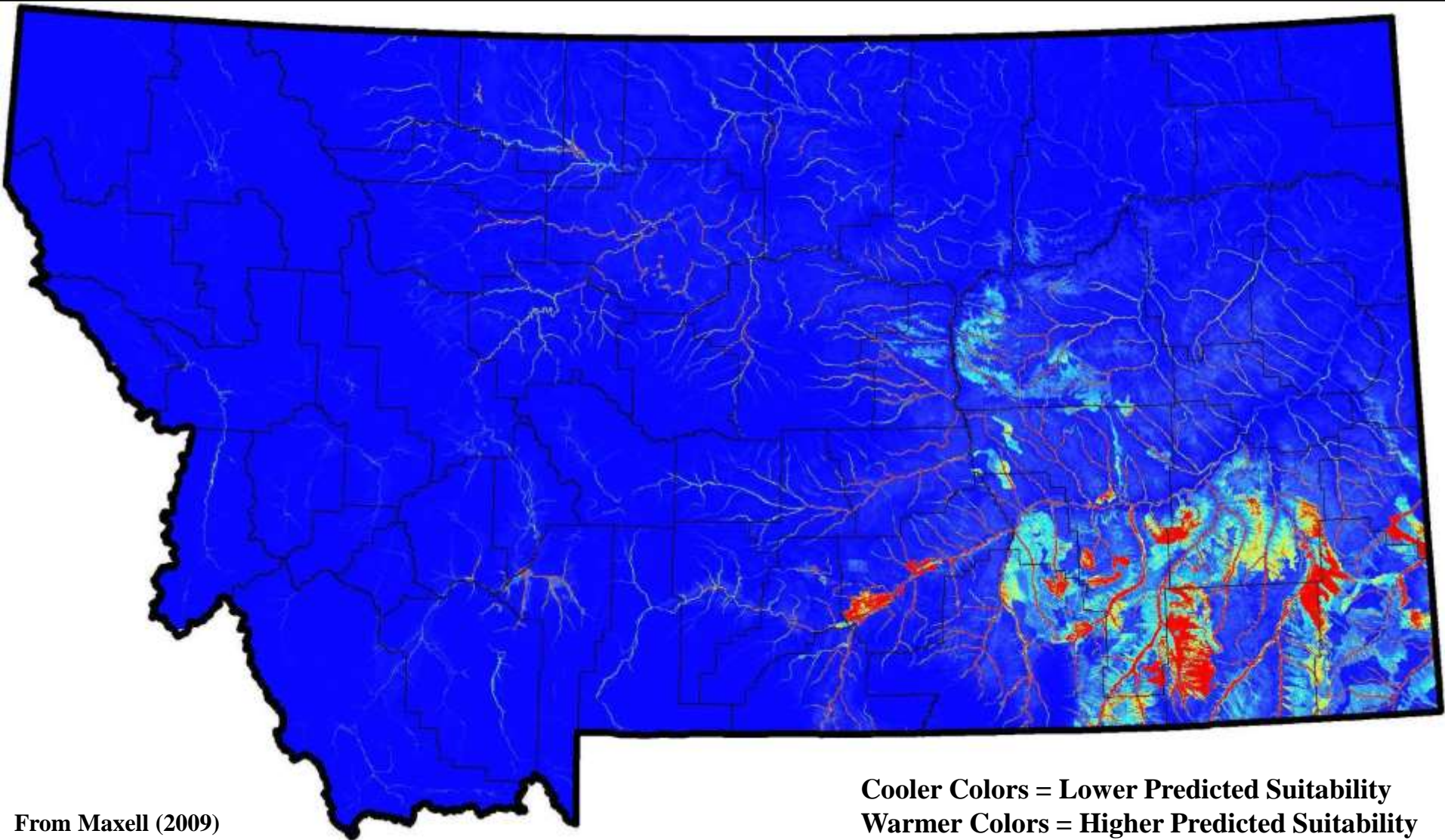
- Lack of information
- Status unknown
- Fossil fuel development
- Human harvest



From Maxell (2009)

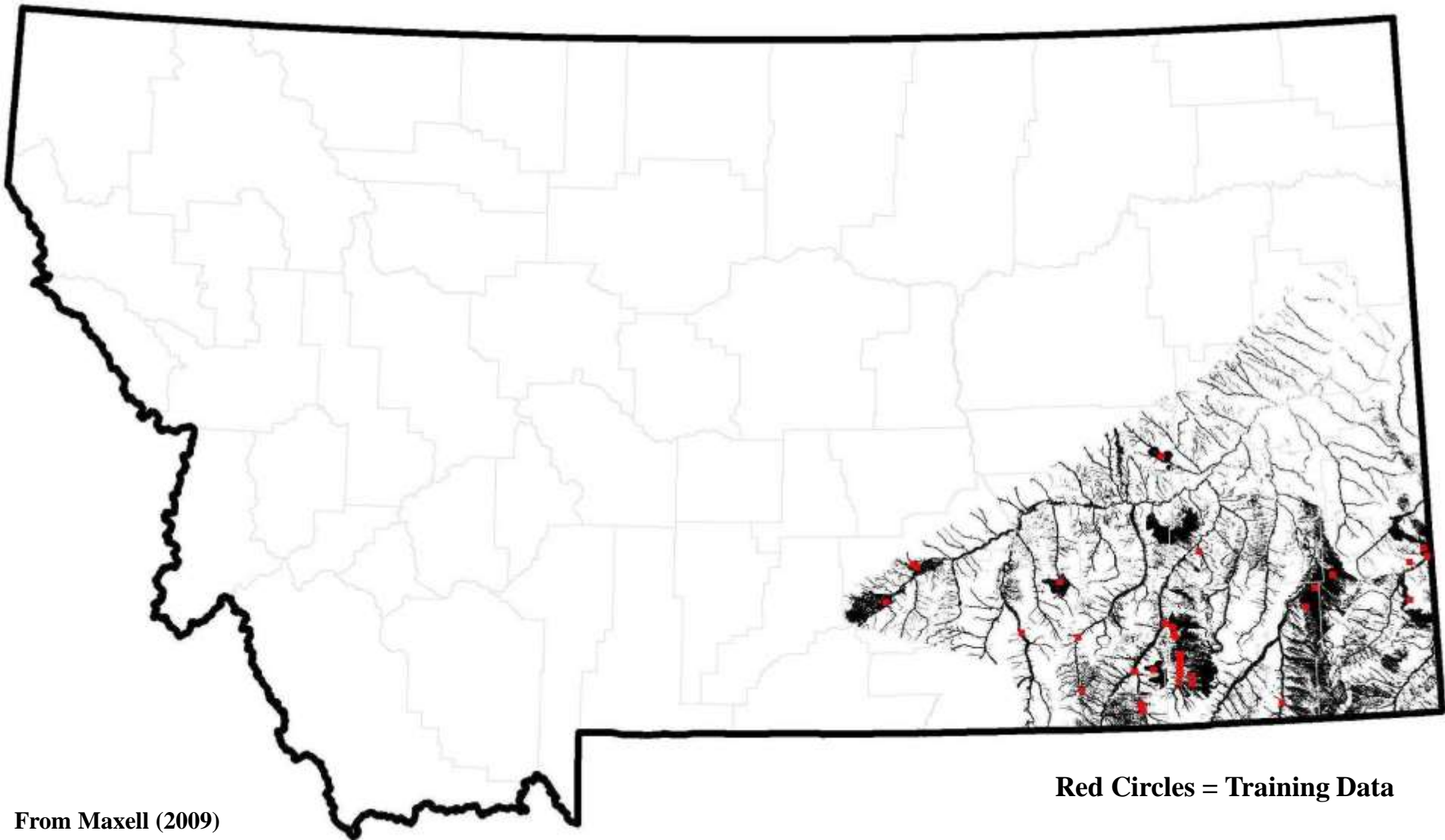


**Snapping Turtle (*Chelydra serpentina*)
Statewide Predicted Habitat Suitability Model**



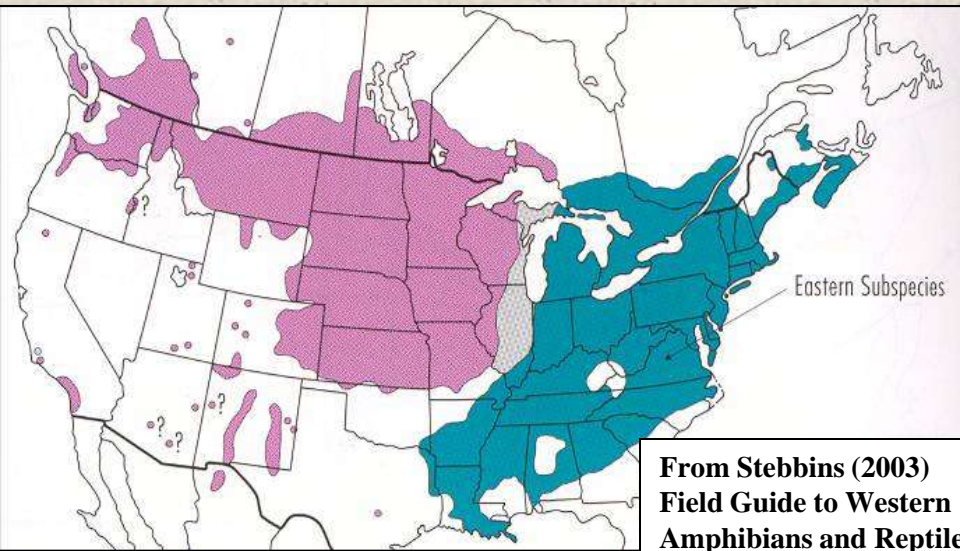
From Maxell (2009)

Snapping Turtle (*Chelydra serpentina*) Binary Model with Point Observations

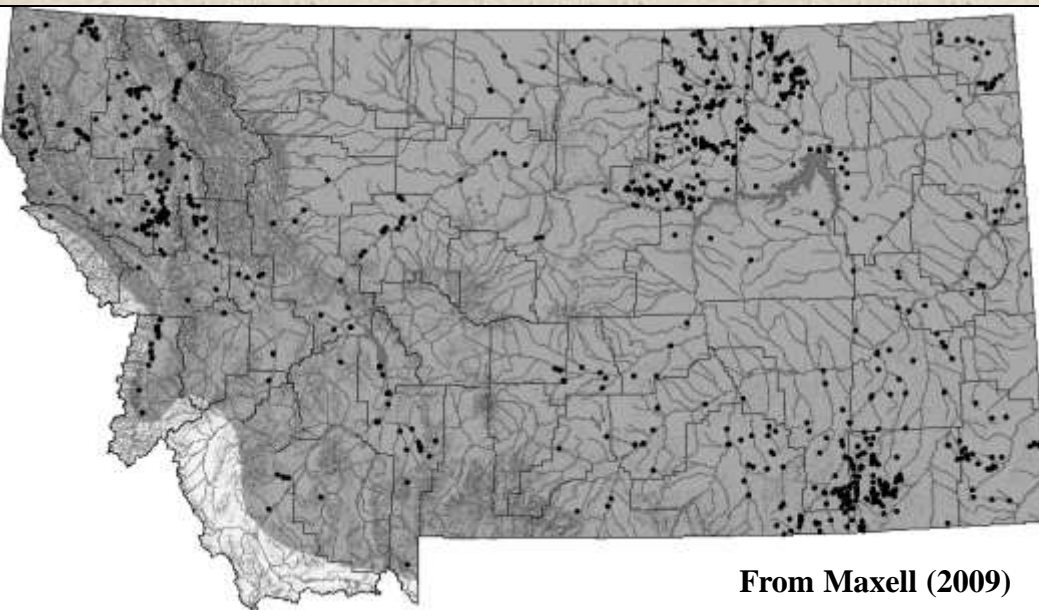


From Maxell (2009)

Painted Turtle (*Chrysemys picta*)



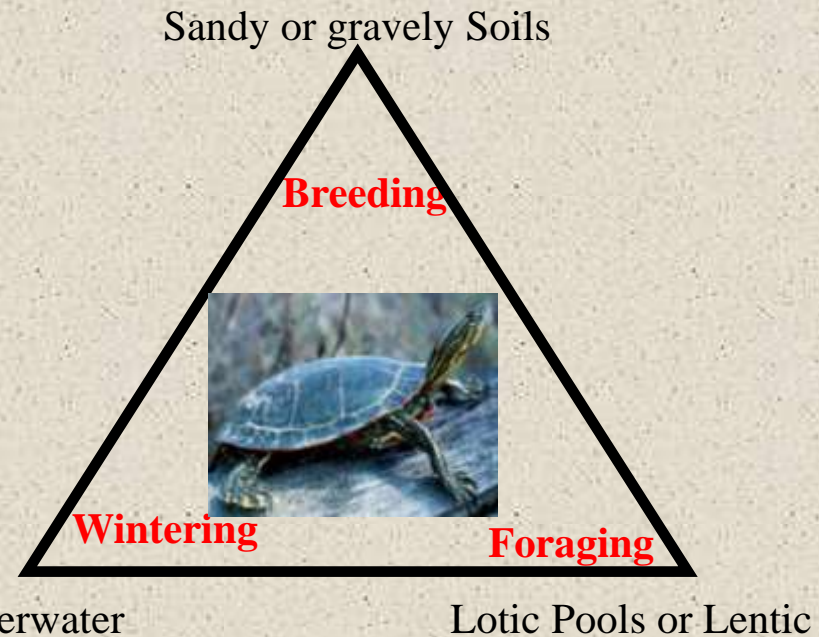
From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles



From Maxell (2009)

Issues of Concern

- Common
- Mesopredators
- Local road issues



Sandy or gravelly Soils

Breeding

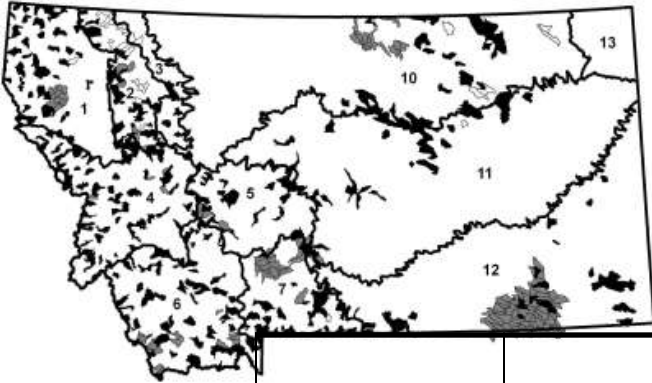


Wintering

Foraging

Underwater

Lotic Pools or Lentic

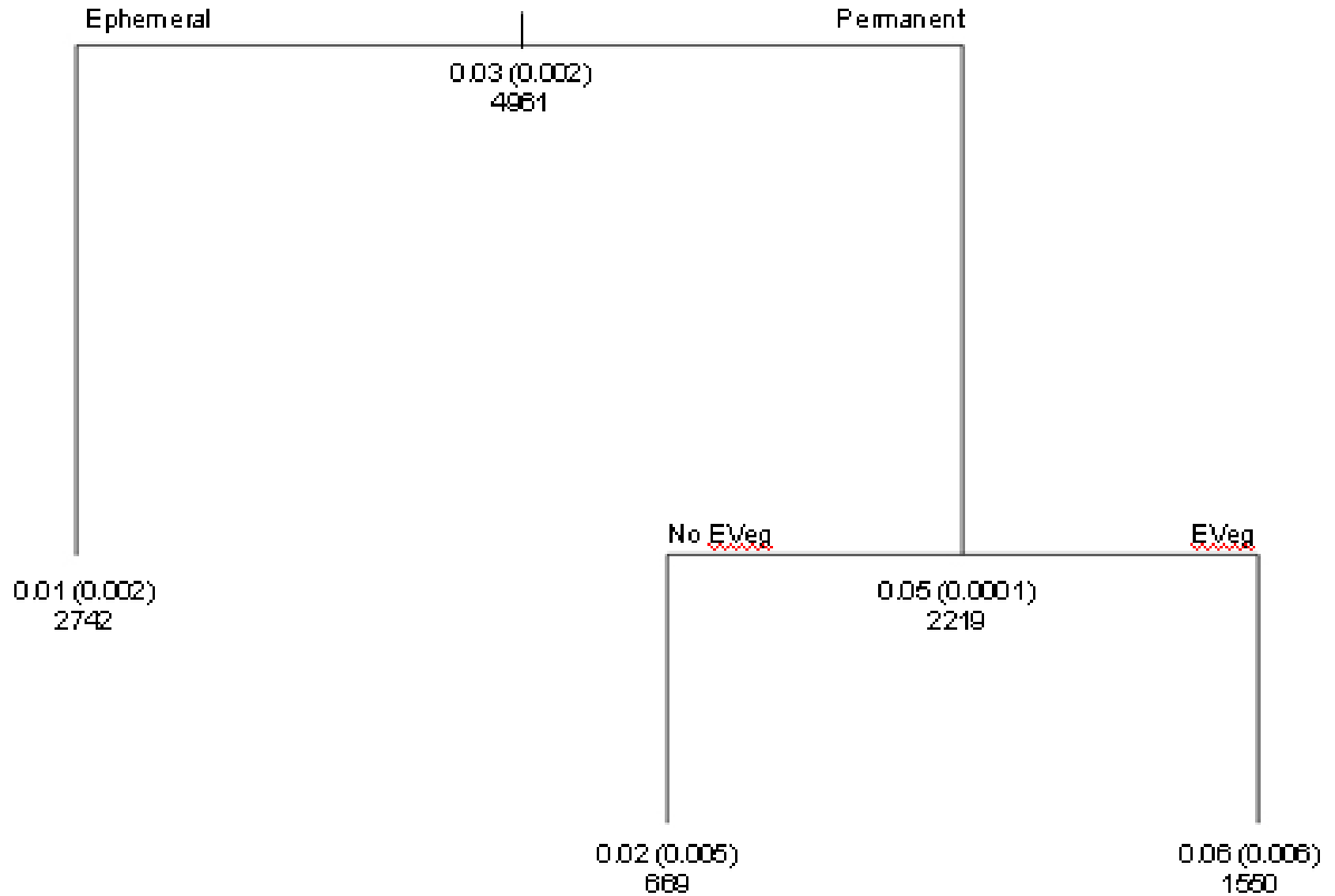


Painted Turtle (*Chrysemys picta*)

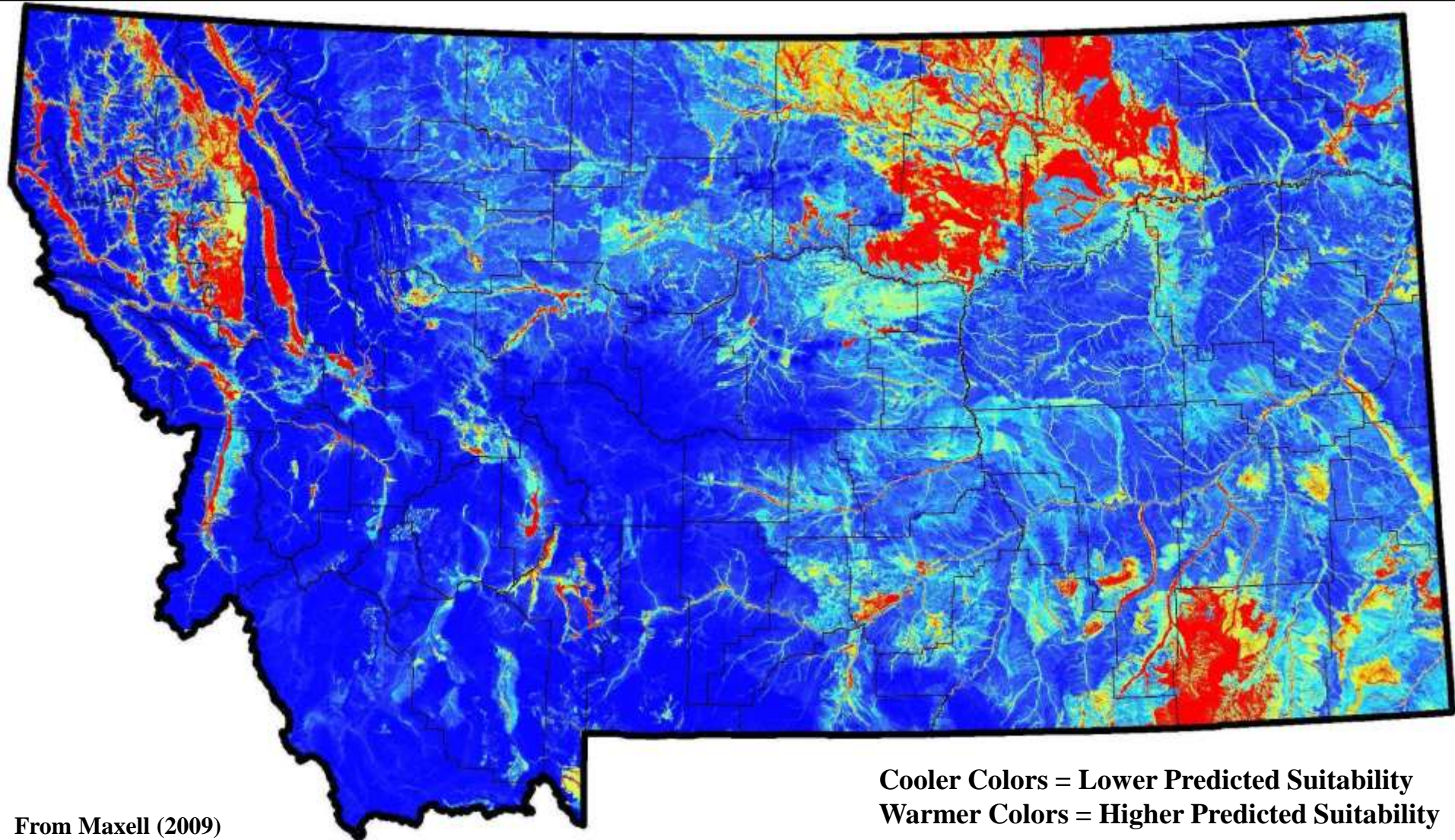
Occupancy Rates

Strata	Total Number Watersheds / Sites	Percent Watershed Occupancy (95% CI ^a)	Percent Site Occupancy (95% CI ^b)
1	53 / 287	6 (0–11)	1 (0–3)
2	36 / 639	11 (2–20)	1 (0–1)
3	4 / 43	25 (0–67)	2 (0–7)
4	65 / 803	2 (0–4)	0.1 (0–0.3)
5	19 / 86	0 (-)	0 (-)
6	53 / 752	0 (-)	0 (-)
7	29 / 769	0 (-)	0 (-)
10	38 / 930	55 (41–70)	9 (8–11)
11	23 / 161	13 (0–26)	2 (0–5)
12	34 / 491	53 (38–68)	9 (6–11)
Overall	354 / 4961	14 (11–17)	3 (2–3)

Painted Turtle (*Chrysemys picta*) CART Model

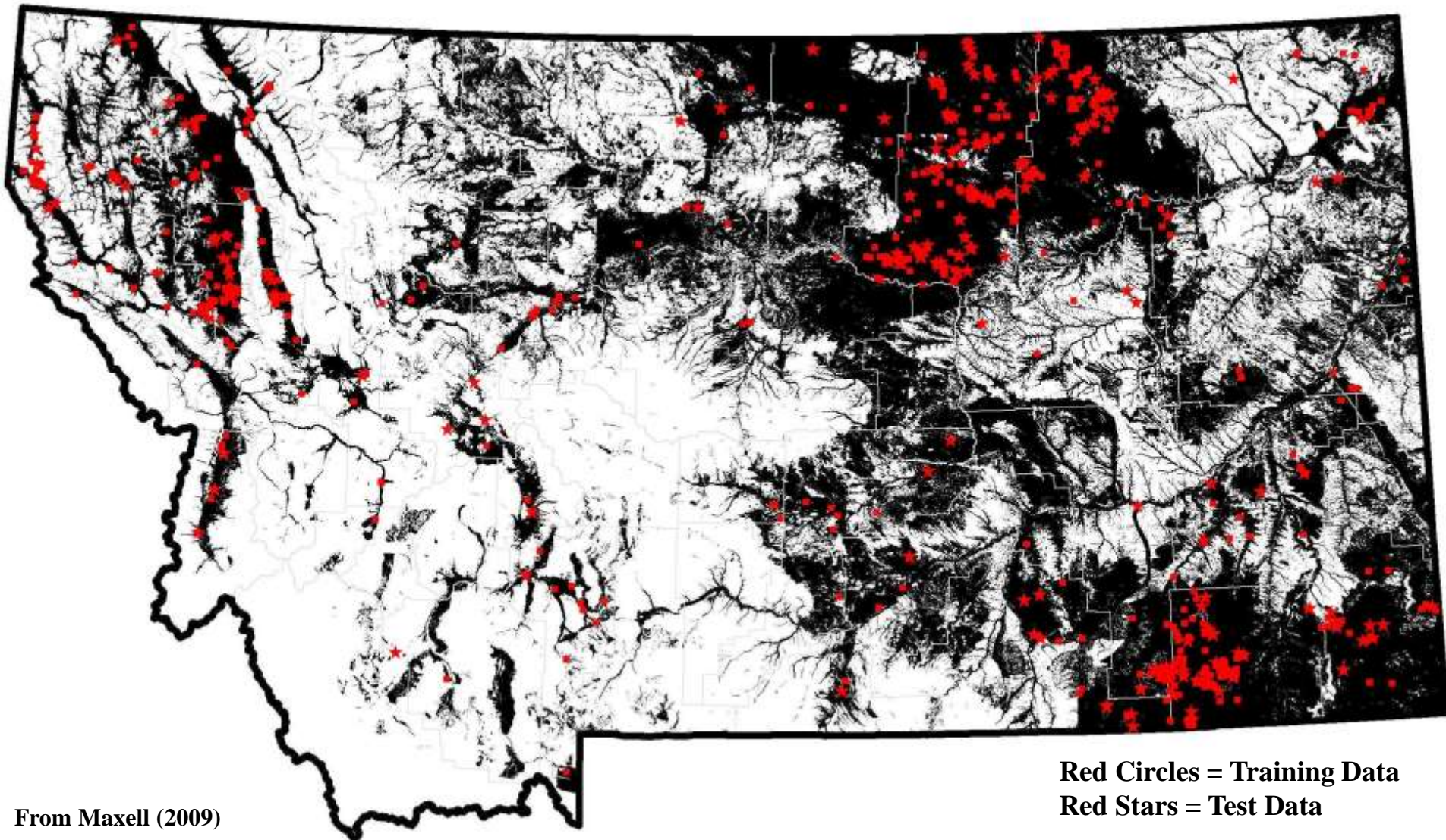


Painted Turtle (*Chrysemys picta*) Statewide Predicted Habitat Suitability Model



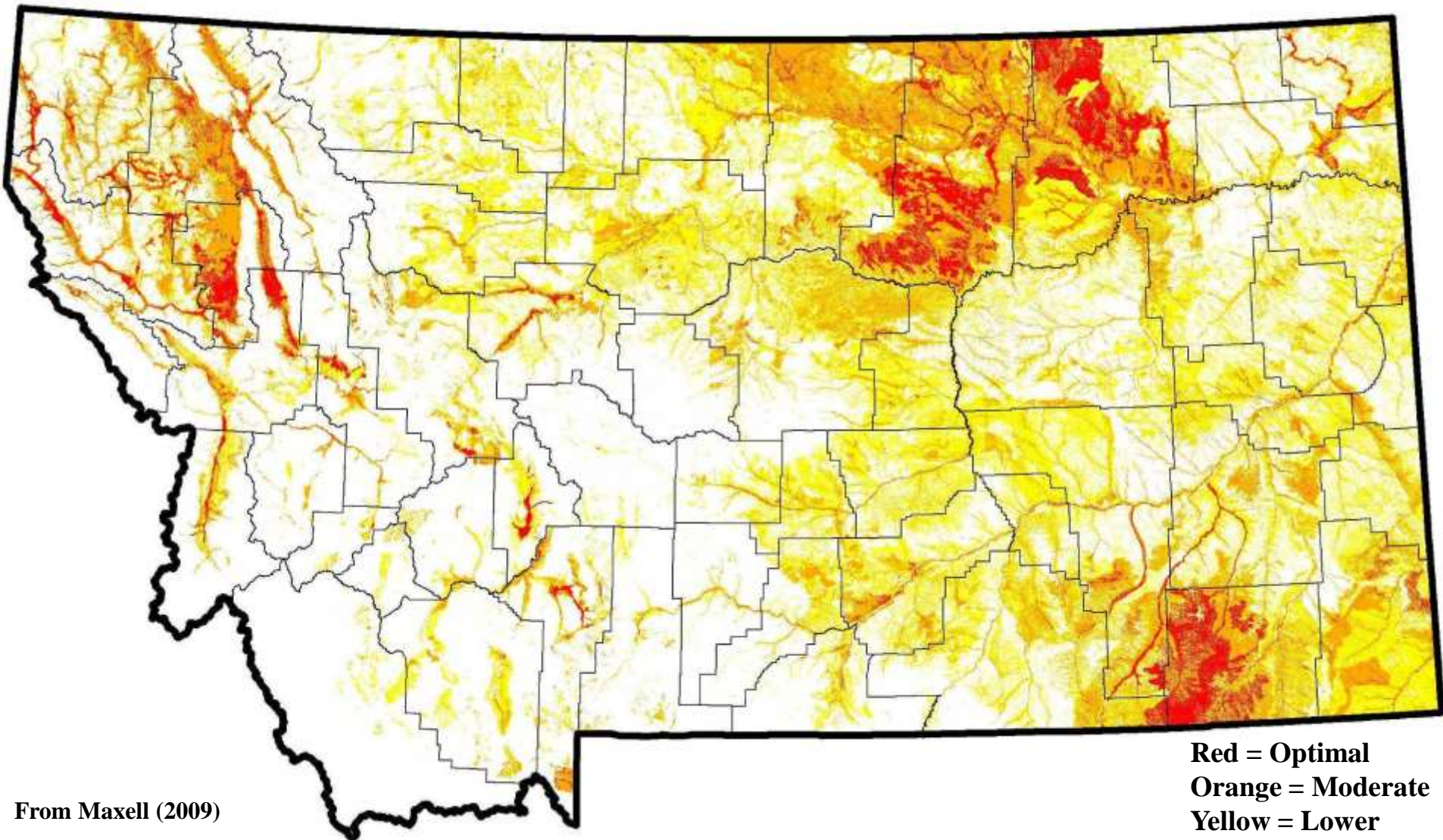
From Maxell (2009)

Painted Turtle (*Chrysemys picta*) Binary Model with Point Observations



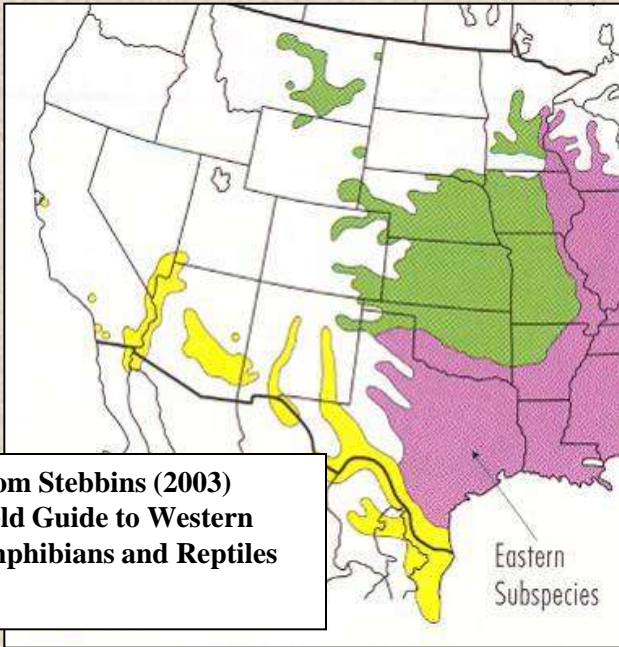
From Maxell (2009)

Painted Turtle (*Chrysemys picta*) Habitat Suitability Classes



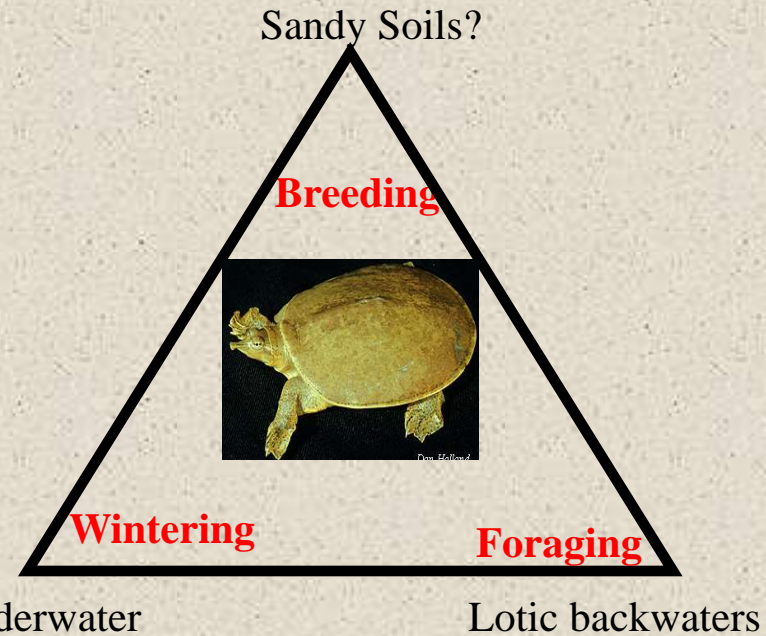
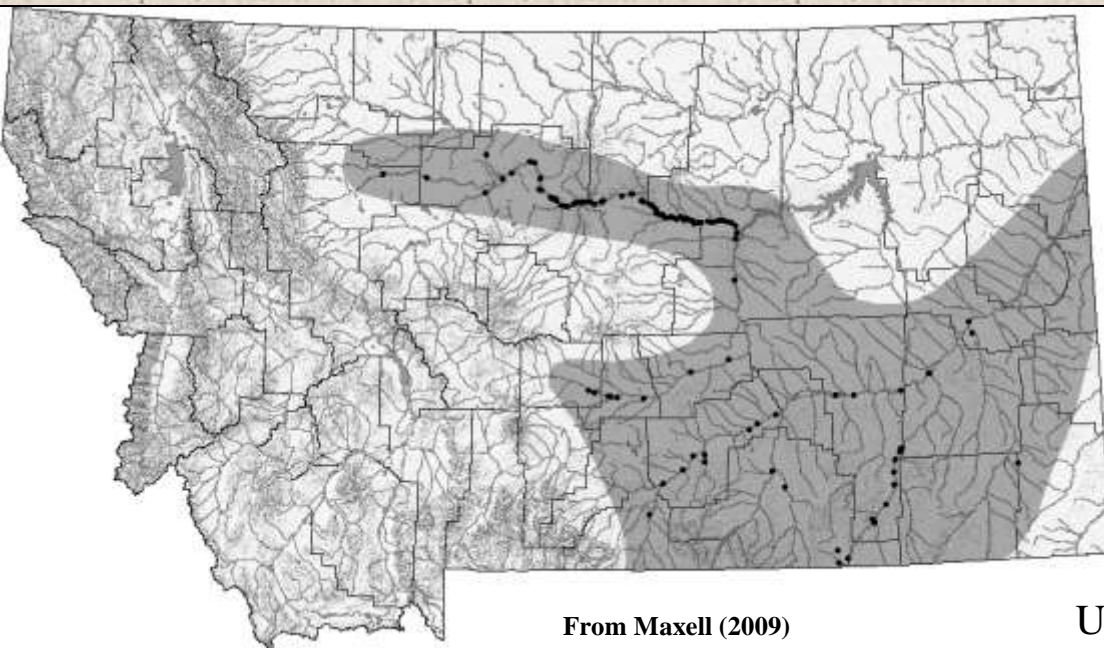
From Maxell (2009)

Spiny Softshell (*Apalone spinifera*)

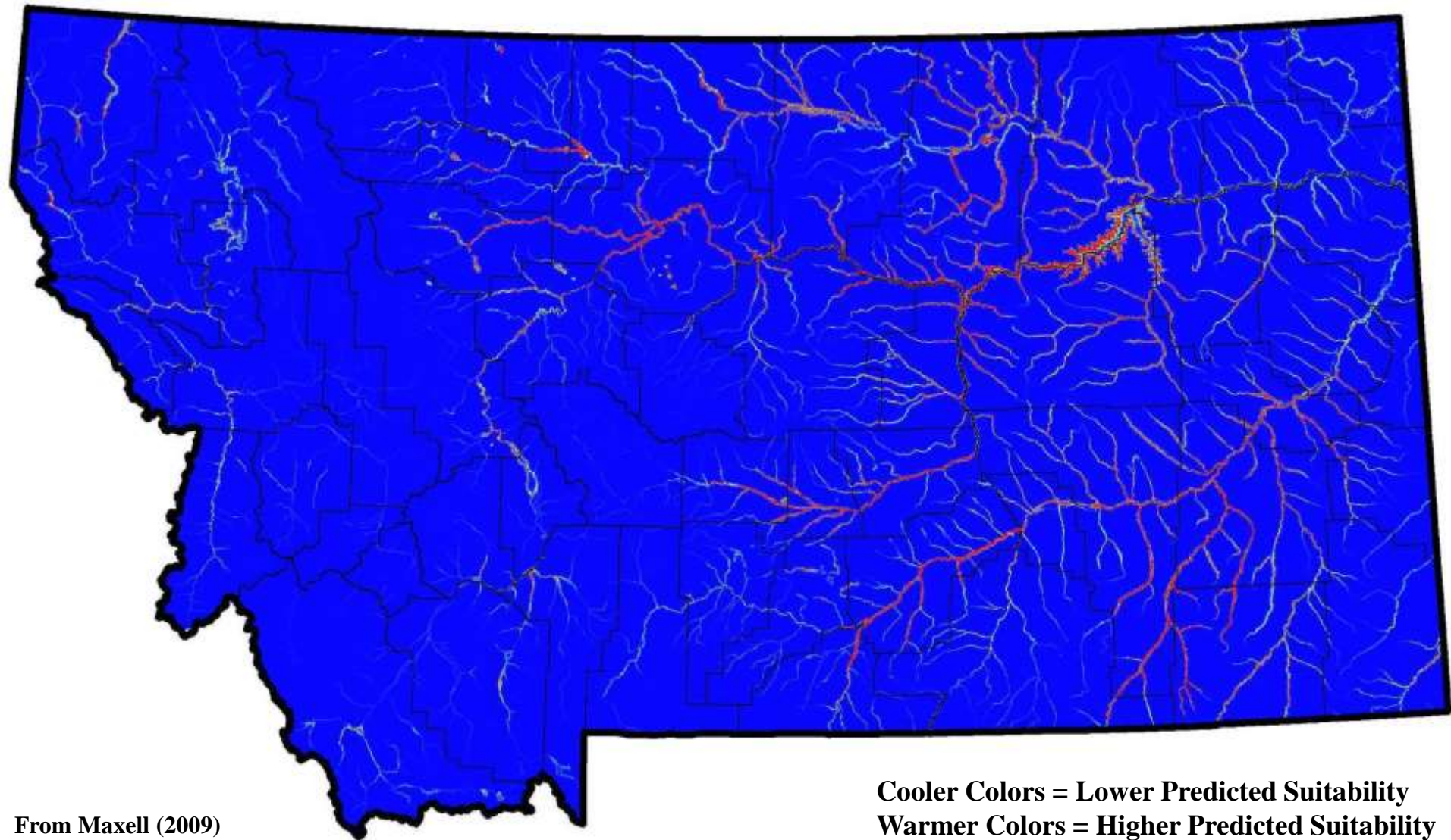


Issues of Concern

- Isolated population
- Altered hydrologic regime
- Breeding habitat?



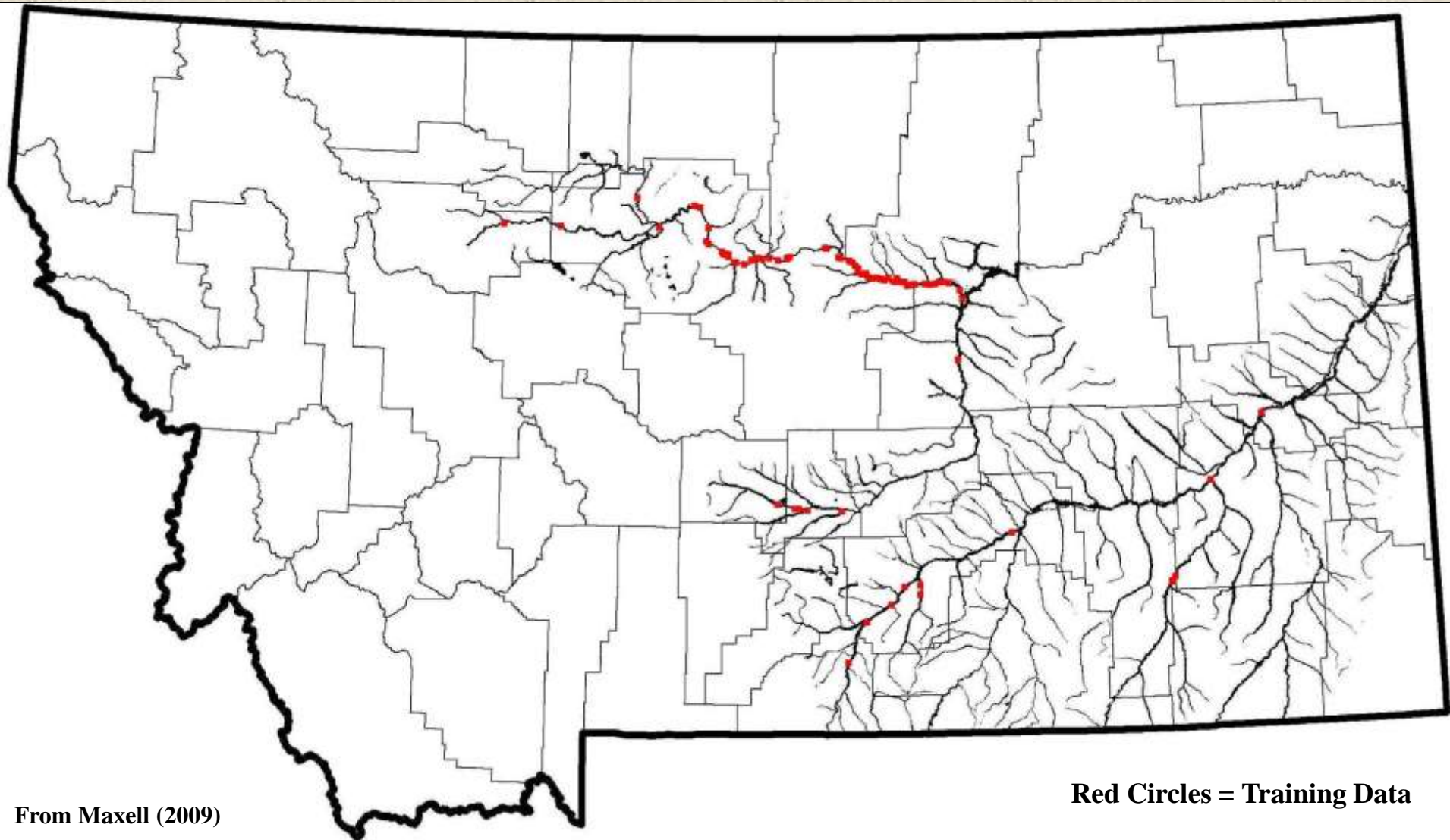
Spiny Softshell (*Apalone spinifera*)
Statewide Predicted Habitat Suitability Model



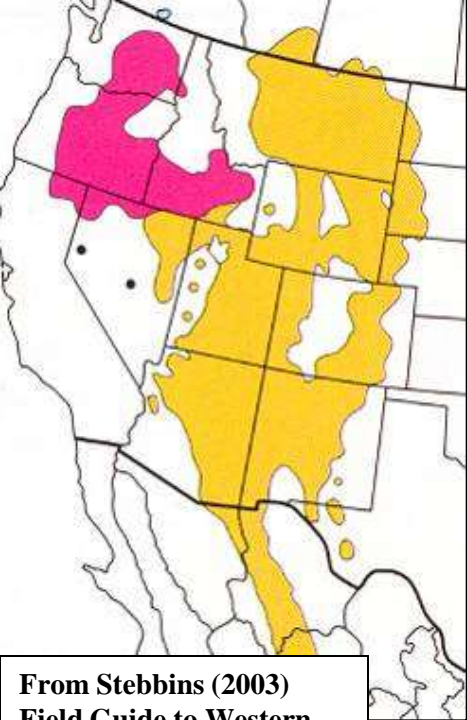
From Maxell (2009)

Cooler Colors = Lower Predicted Suitability
Warmer Colors = Higher Predicted Suitability

Spiny Softshell (*Apalone spinifera*) Binary Model with Point Observations



Greater Short-horned Lizard (*Phrynosoma hernandesi*)



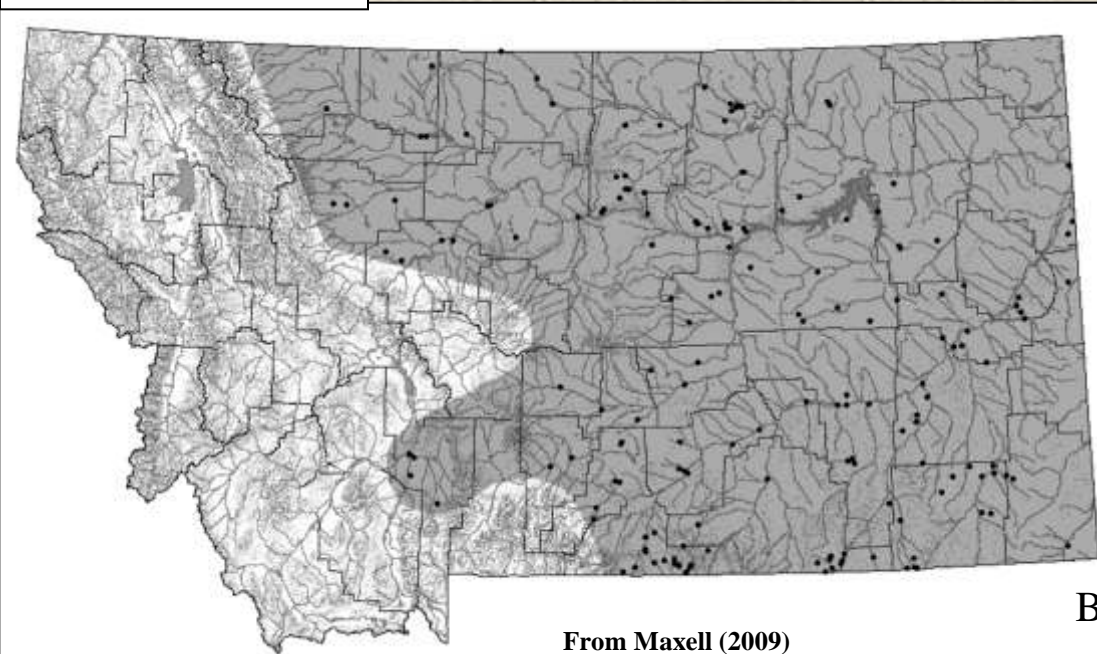
From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles



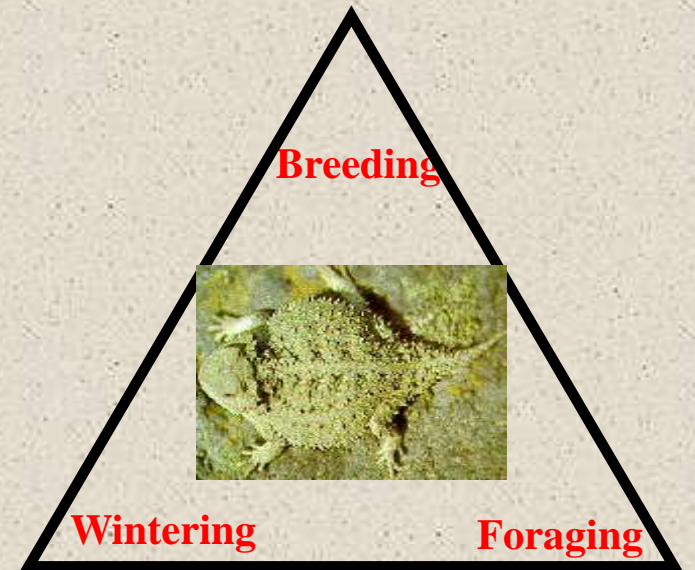
Issues of Concern

- Lack of recent records
- Status unknown
- Fossil fuel development
- Tilled agriculture
- Grazing

South Facing Coulee Rims



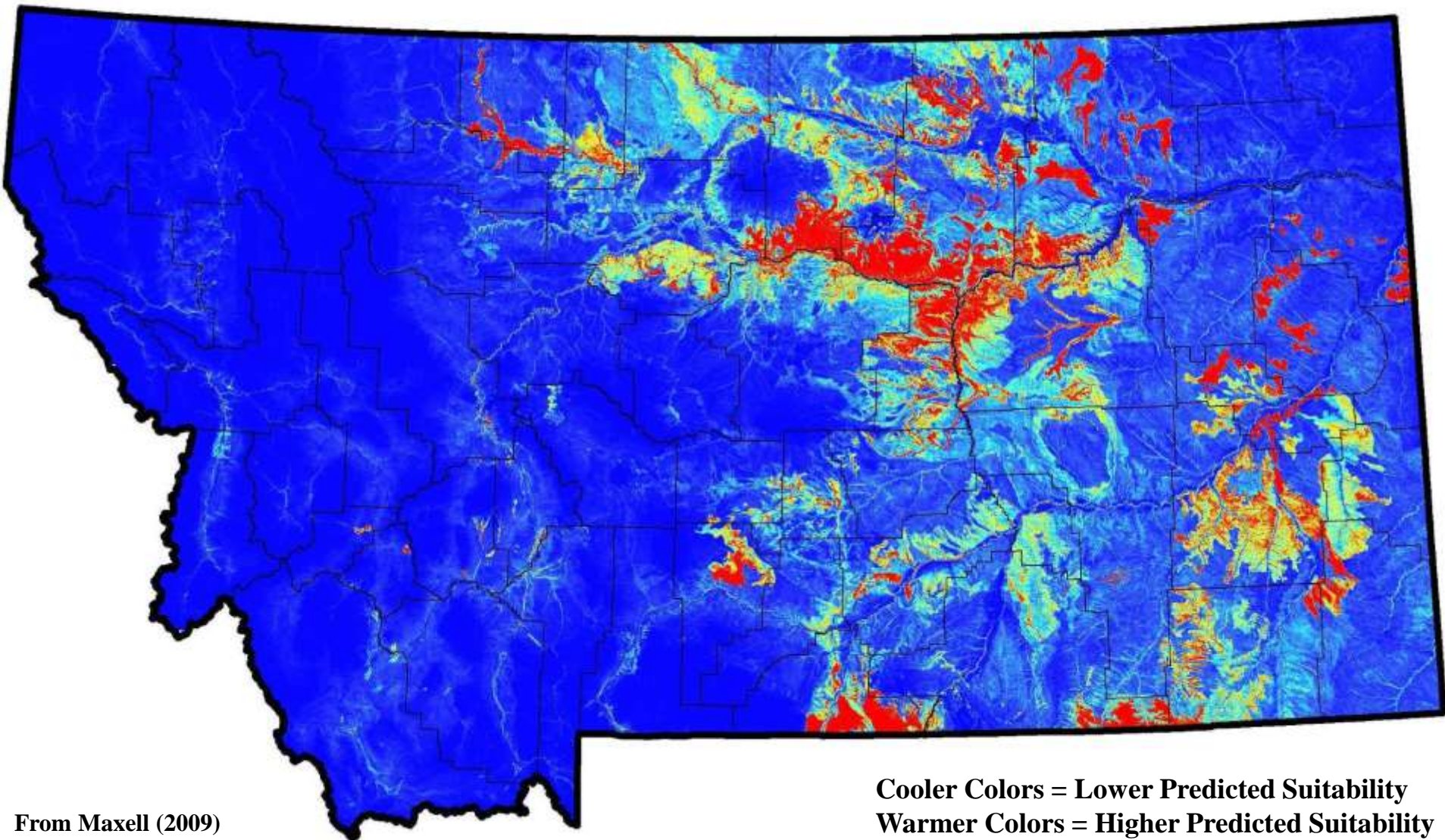
From Maxell (2009)



Below frost line

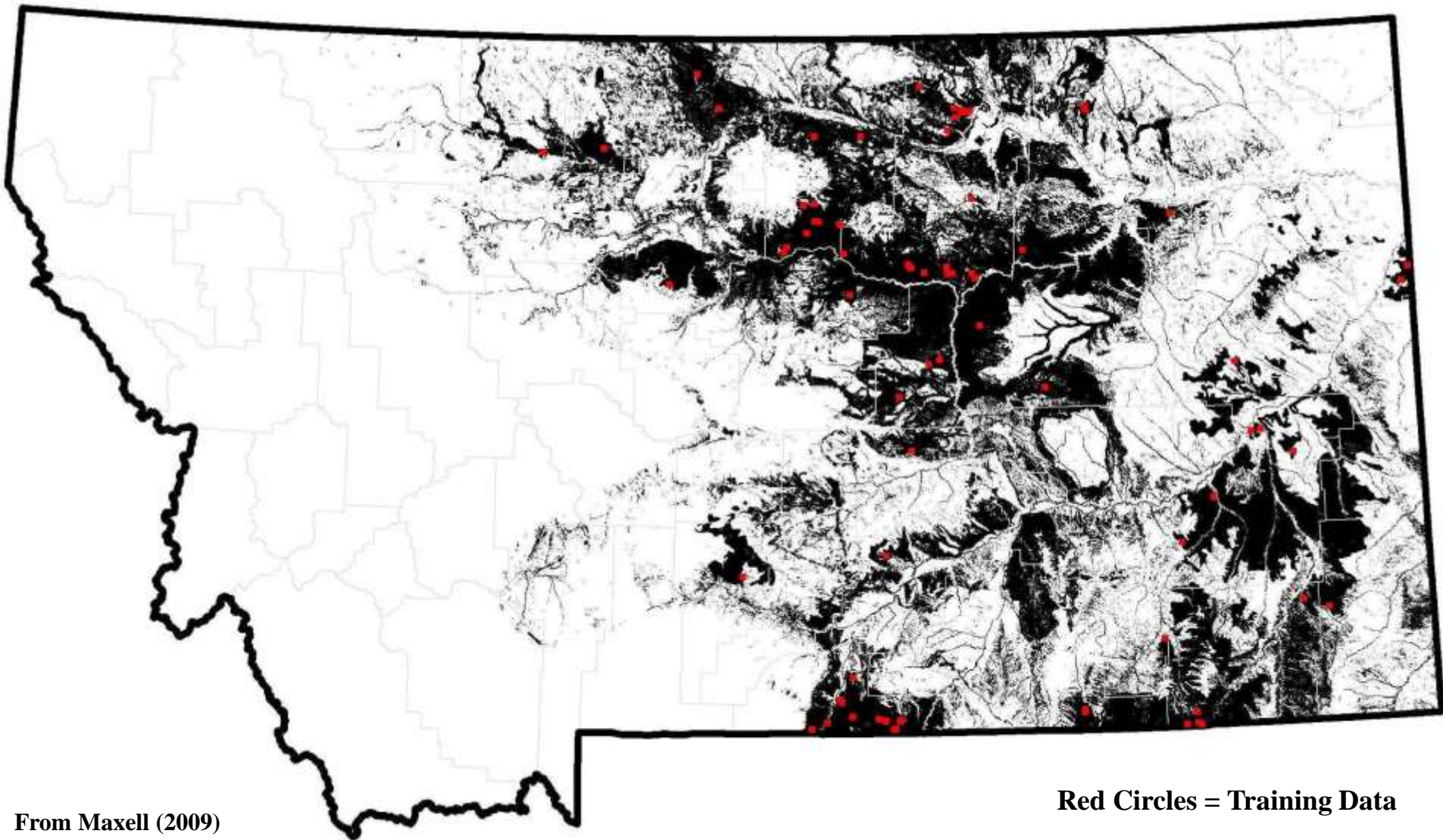
Ant specialist

Greater Short-horned Lizard (*Phrynosoma hernandesi*) Statewide Predicted Habitat Suitability Model



From Maxell (2009)

Greater Short-horned Lizard (*Phrynosoma hernandesi*) Binary Model with Point Observations



Red Circles = Training Data

From Maxell (2009)

Common Sagebrush Lizard (*Sceloporus graciosus*)

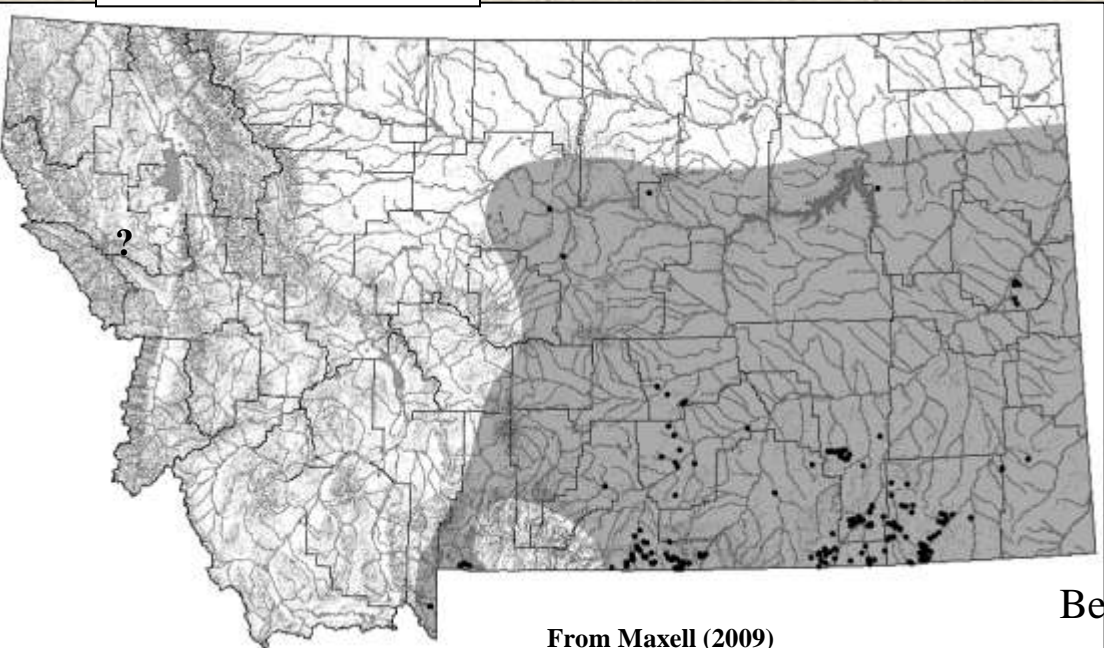


From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles

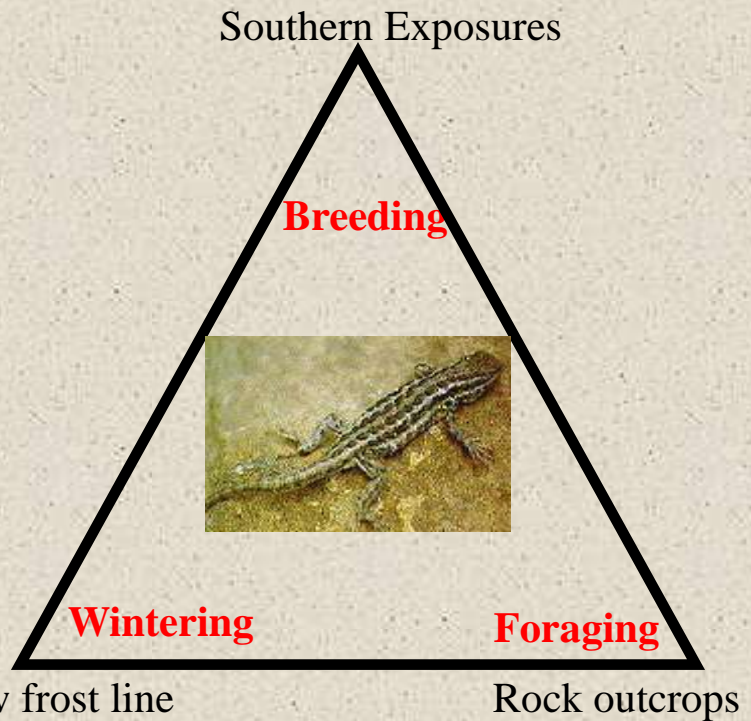


Issues of Concern

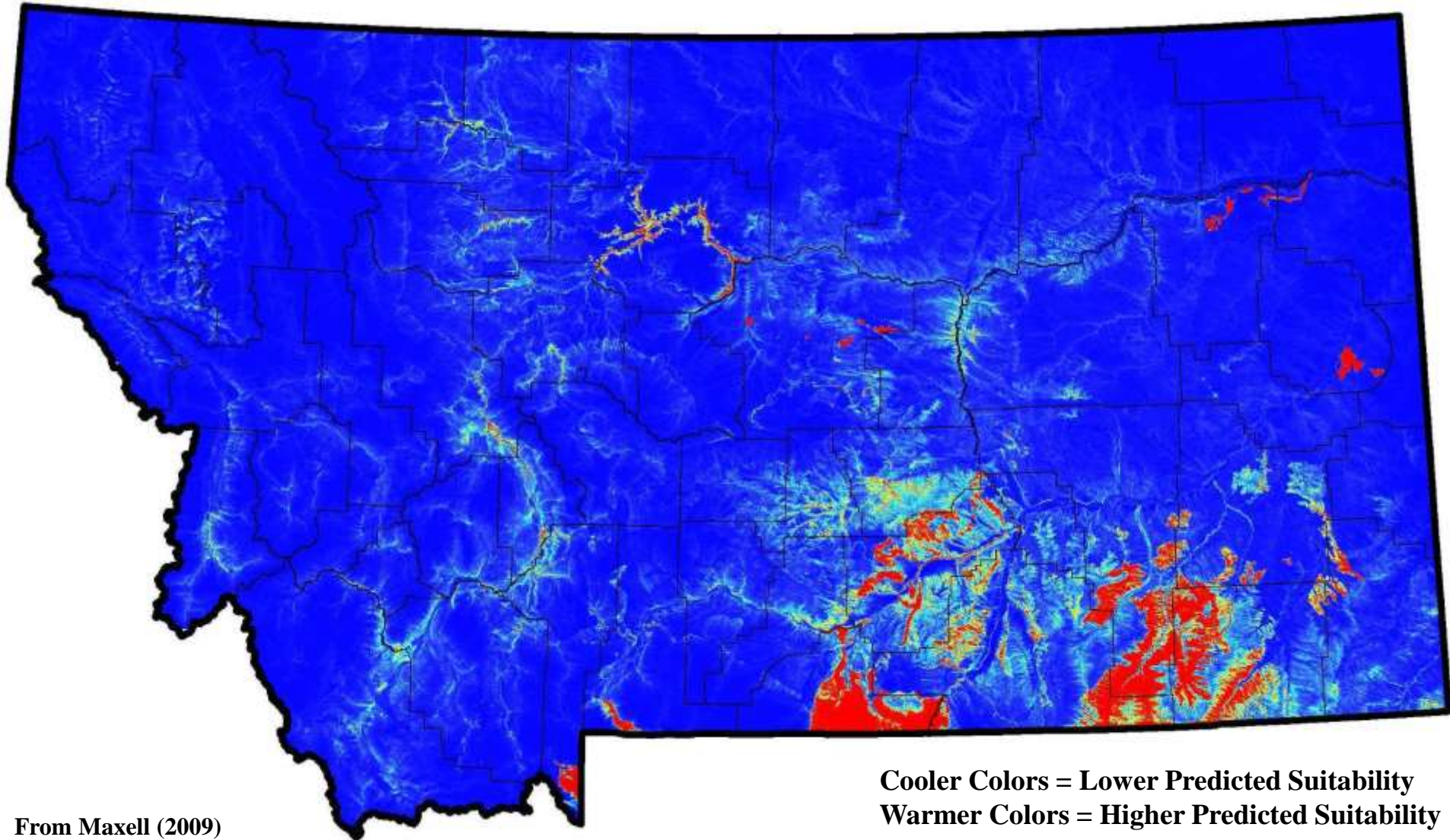
- Lack of knowledge
- Status largely unknown
- Fossil fuel development
- Tilled agriculture



From Maxell (2009)

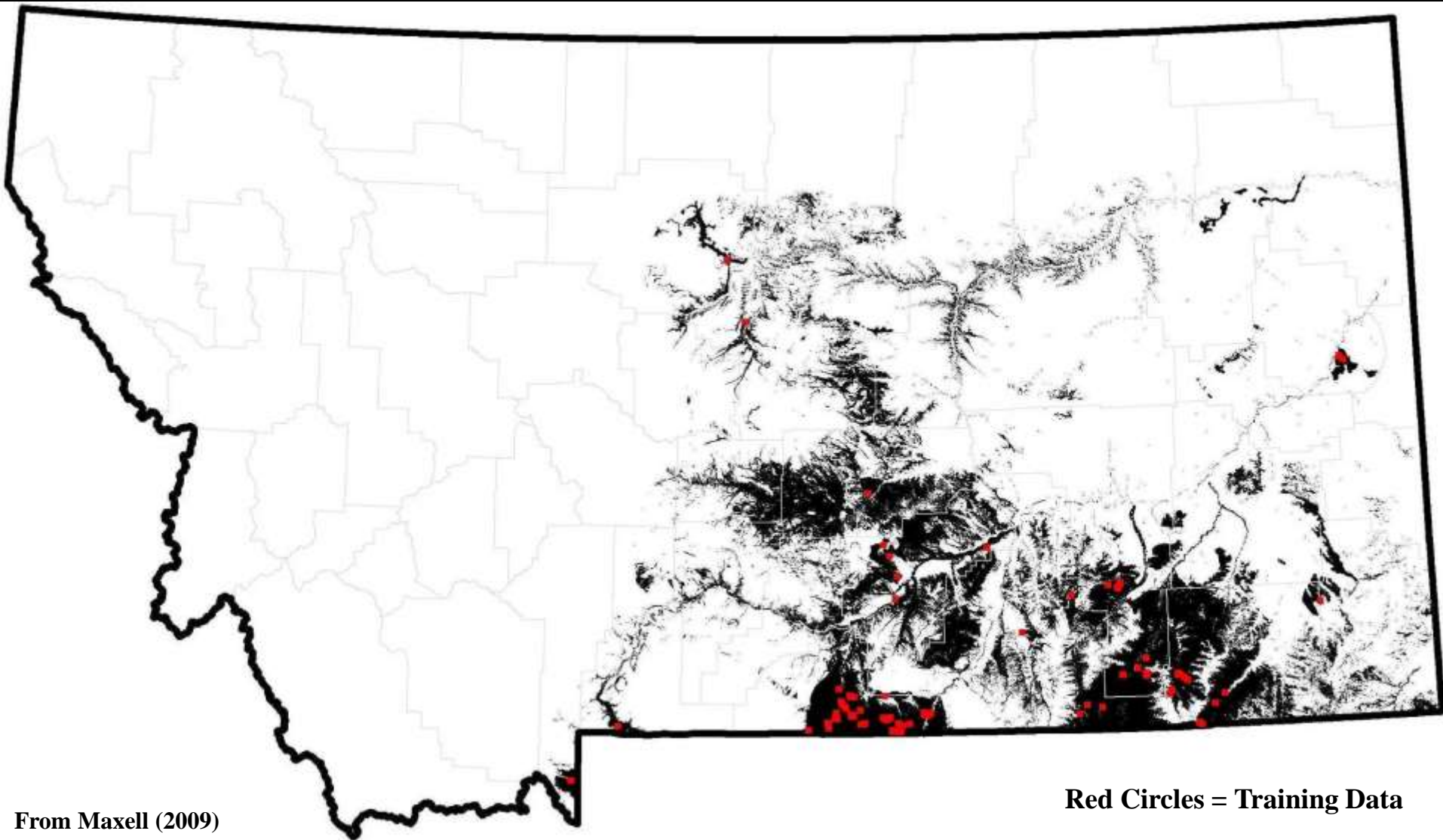


Common Sagebrush Lizard (*Sceloporus graciosus*) Statewide Predicted Habitat Suitability Model



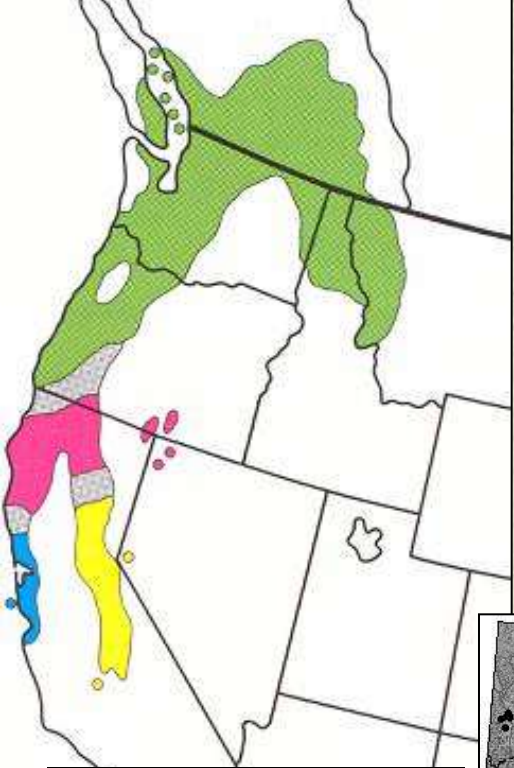
From Maxell (2009)

Common Sagebrush Lizard (*Sceloporus graciosus*) Binary Model with Point Observations

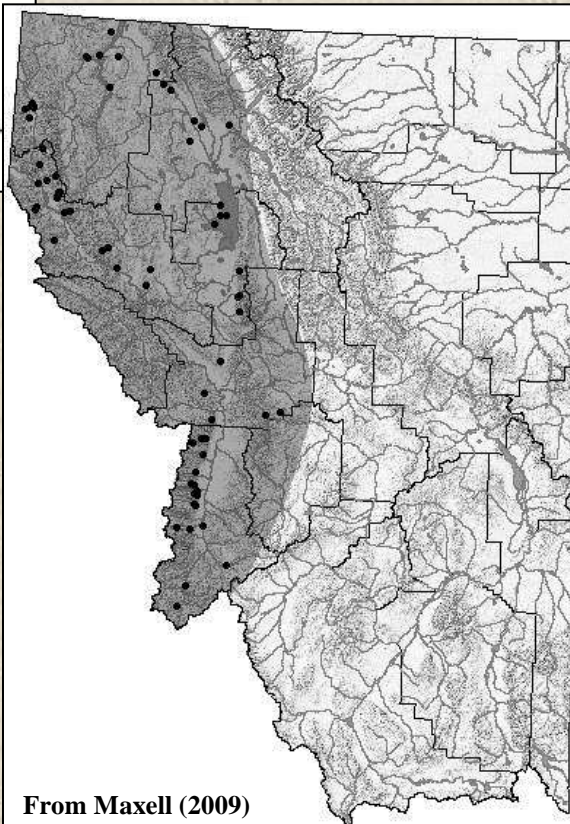


From Maxell (2009)

Northern Alligator Lizard (*Elgaria coerulea*)



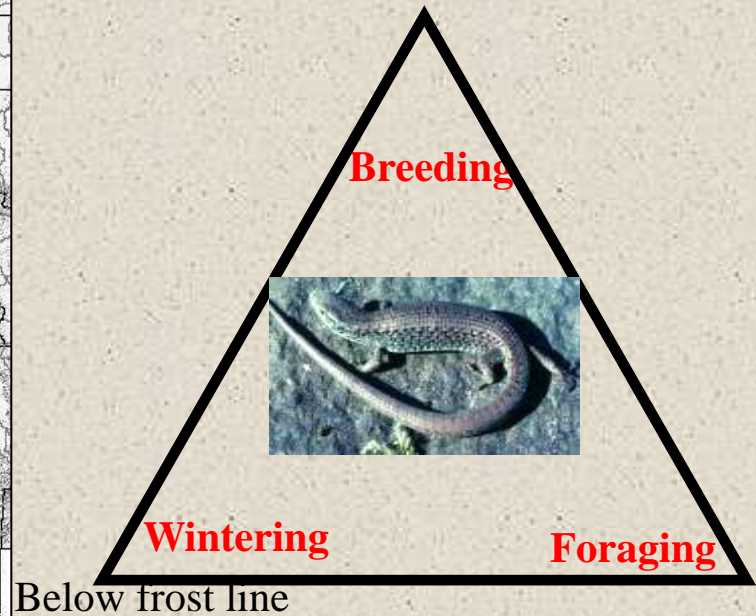
From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles



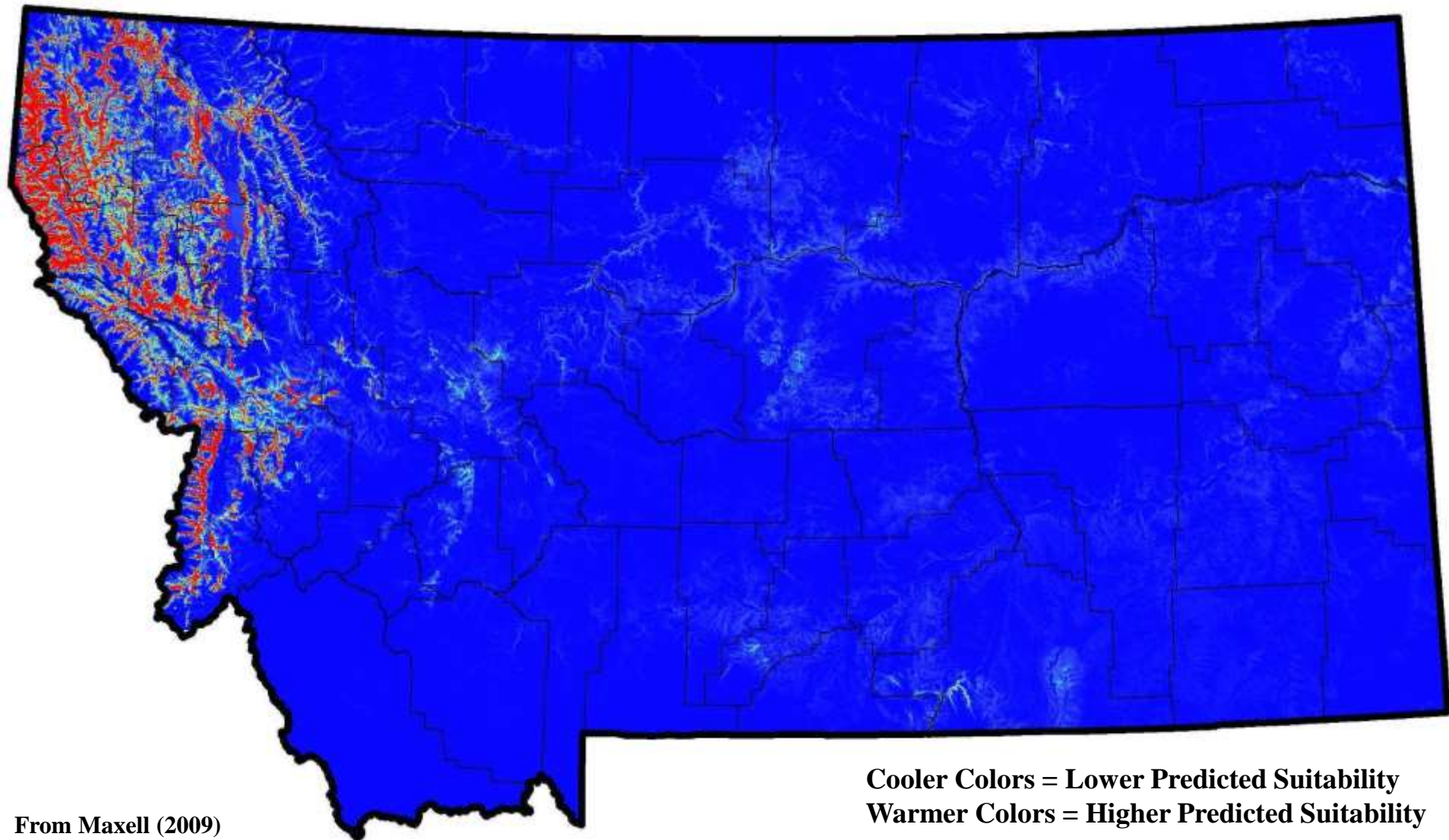
From Maxell (2009)

Issues of Concern

-Relatively few records

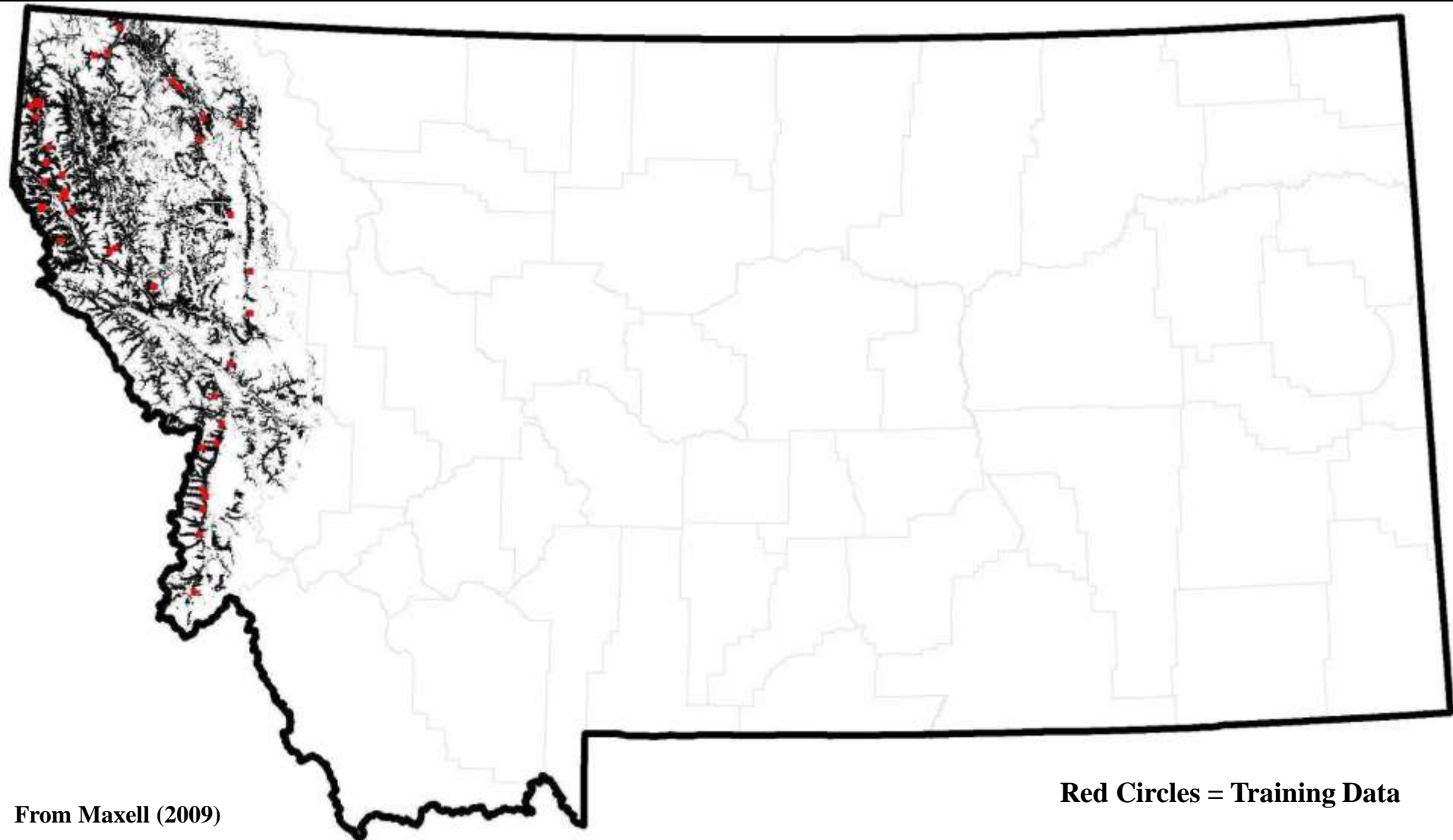


Northern Alligator Lizard (*Elgaria coerulea*) Statewide Predicted Habitat Suitability Model



From Maxell (2009)

Northern Alligator Lizard (*Elgaria coerulea*) Binary Model with Point Observations

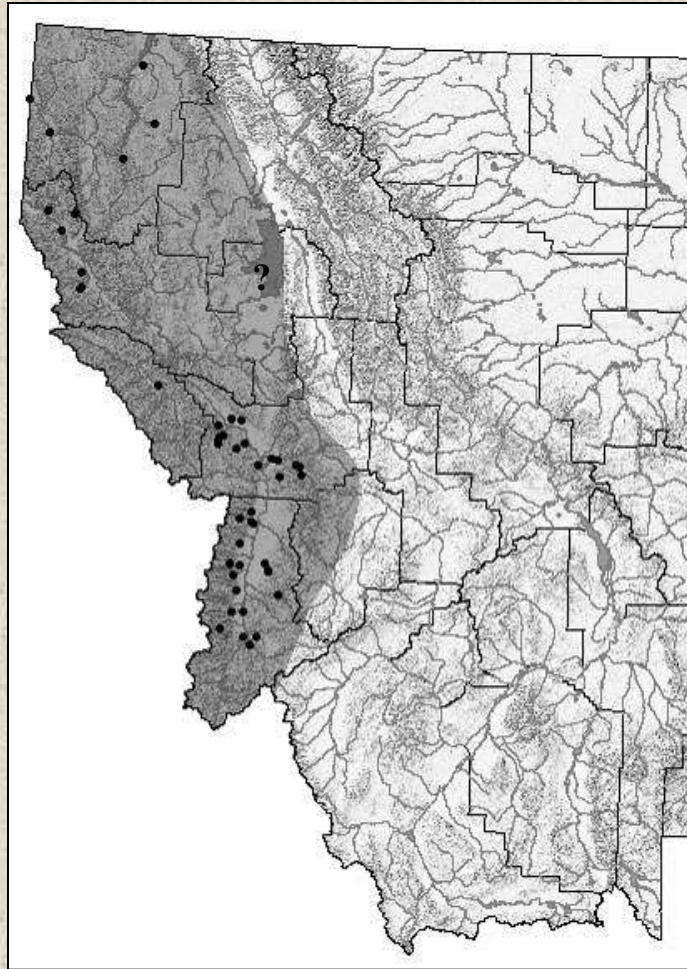


Red Circles = Training Data

Western Skink (*Eumeces skiltonianus*)



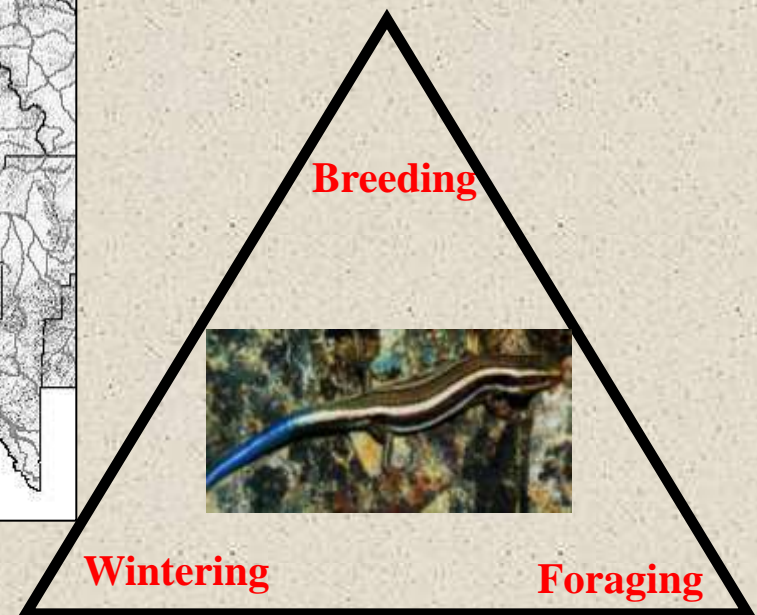
From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles



Issues of Concern

- Relatively few records
- Lack of knowledge

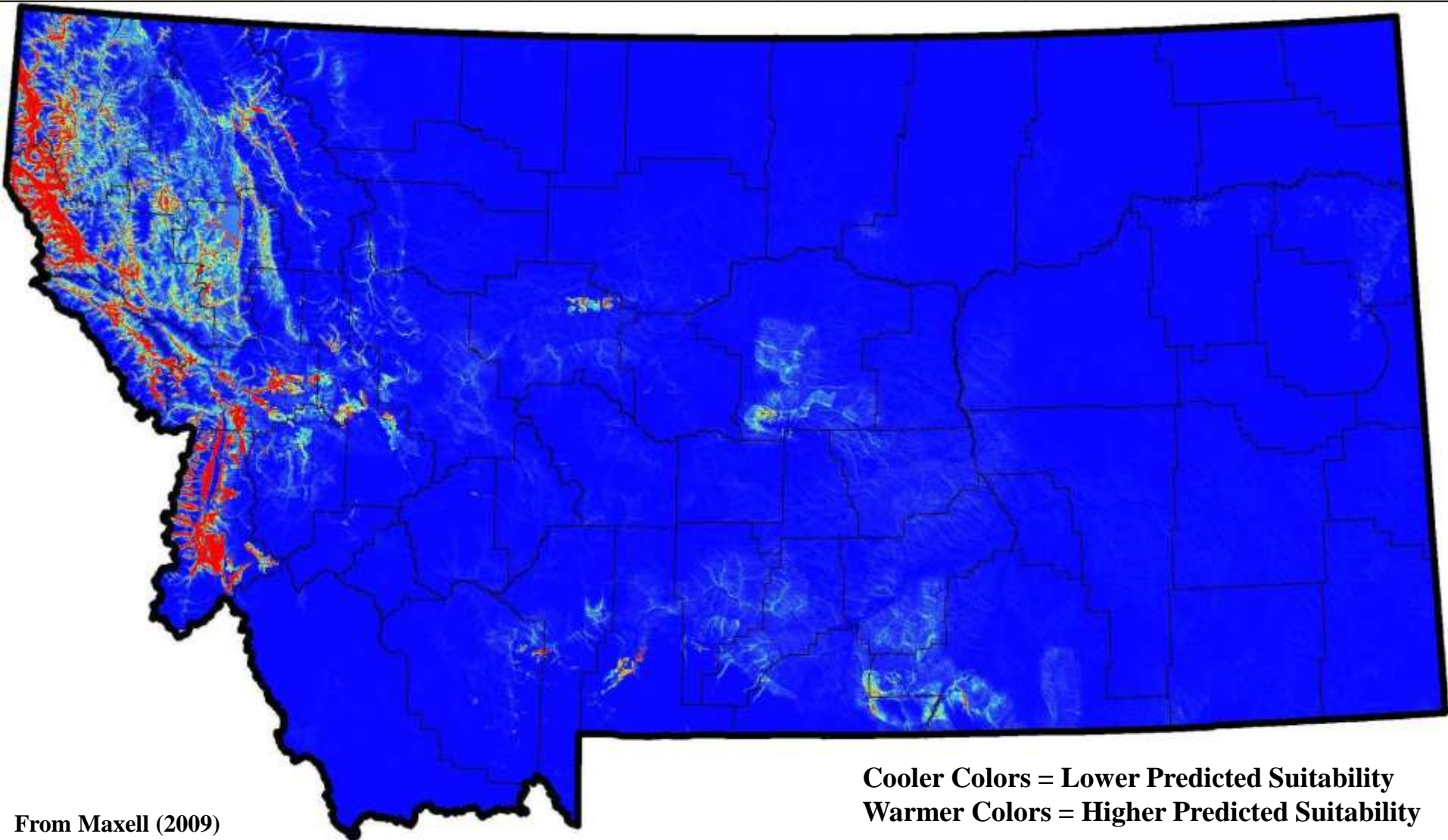
Grassland and Open Conifer Forest



Below frost line

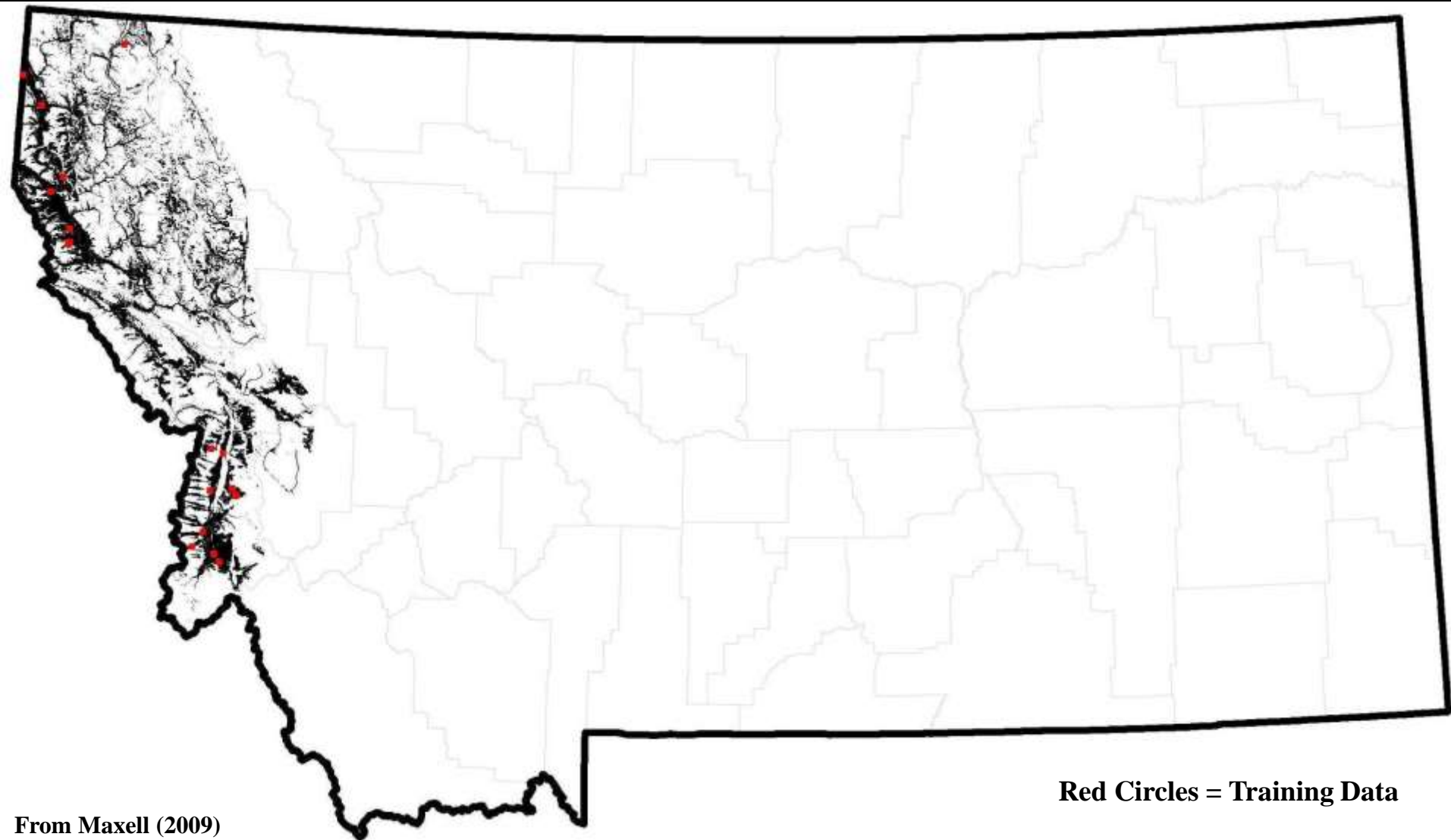
Grassland and Open Conifer Forest

Western Skink (*Eumeces skiltonianus*) Statewide Predicted Habitat Suitability Model



From Maxell (2009)

Western Skink (*Eumeces skiltonianus*) Binary Model with Point Observations



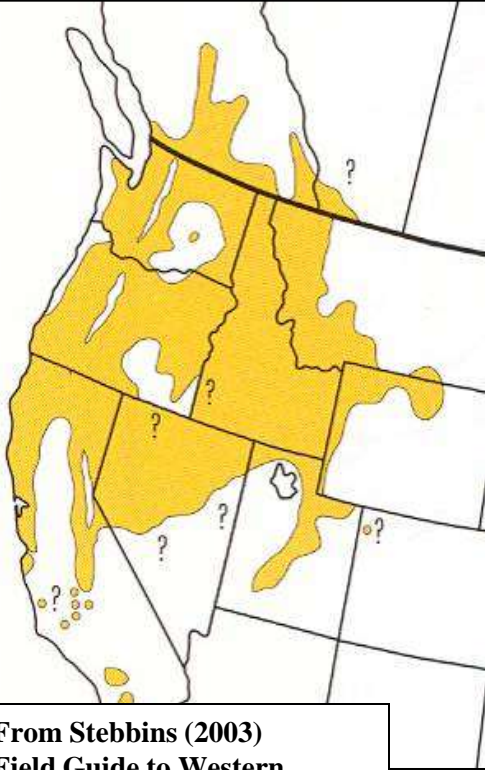
From Maxell (2009)

Rubber Boa (*Charina bottae*)

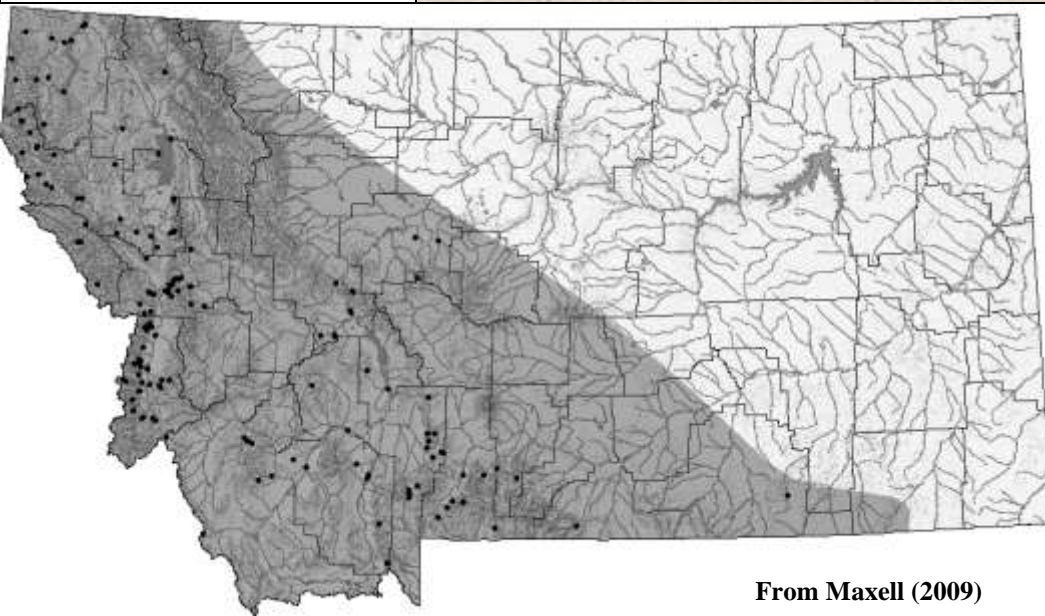


Issues of Concern

- Appears to be common, but relatively few records
- Roads / vehicle traffic particularly on wet nights



From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles



From Maxell (2009)

Near hibernacula

Breeding



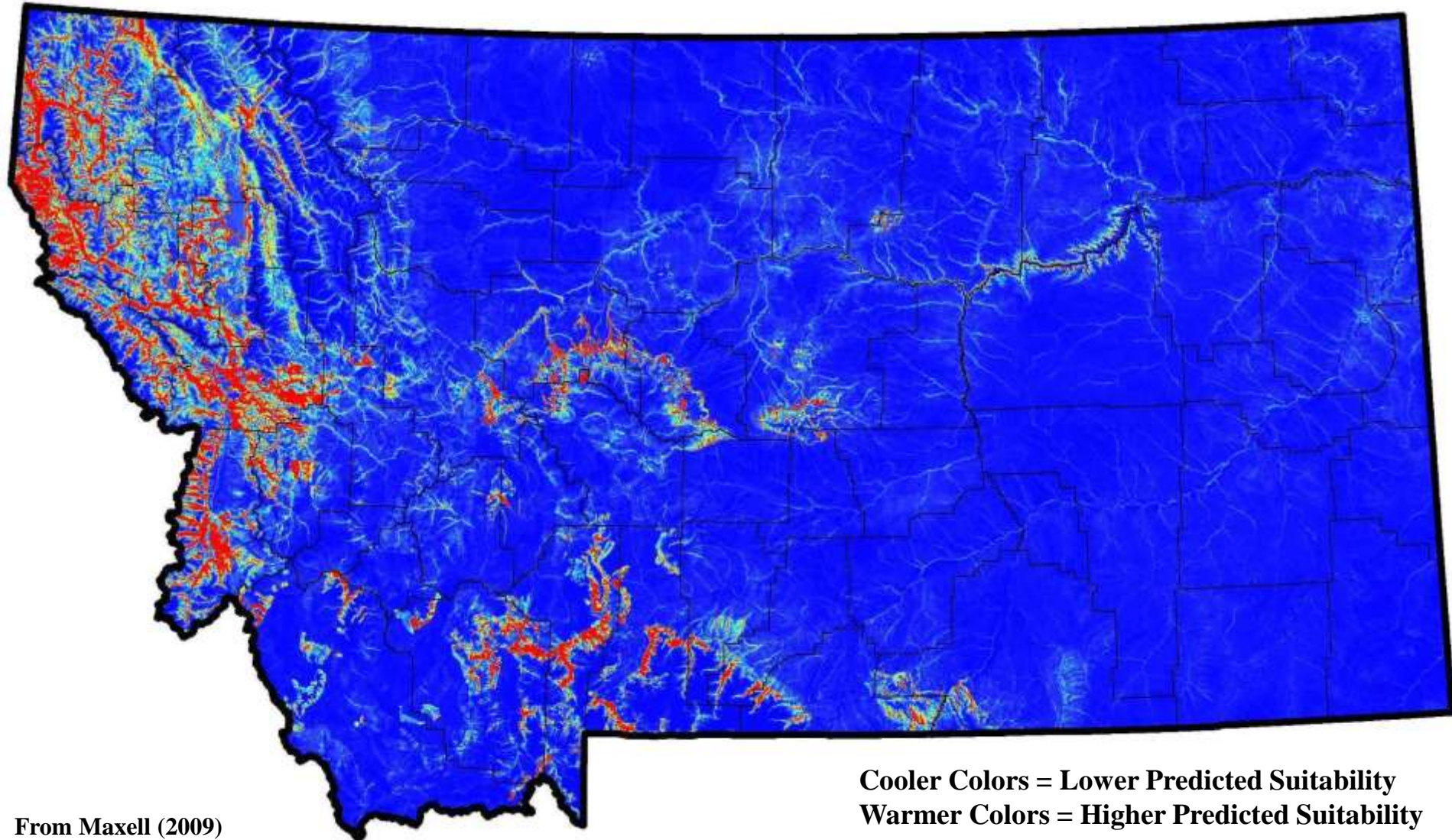
Wintering

Foraging

Below frost line

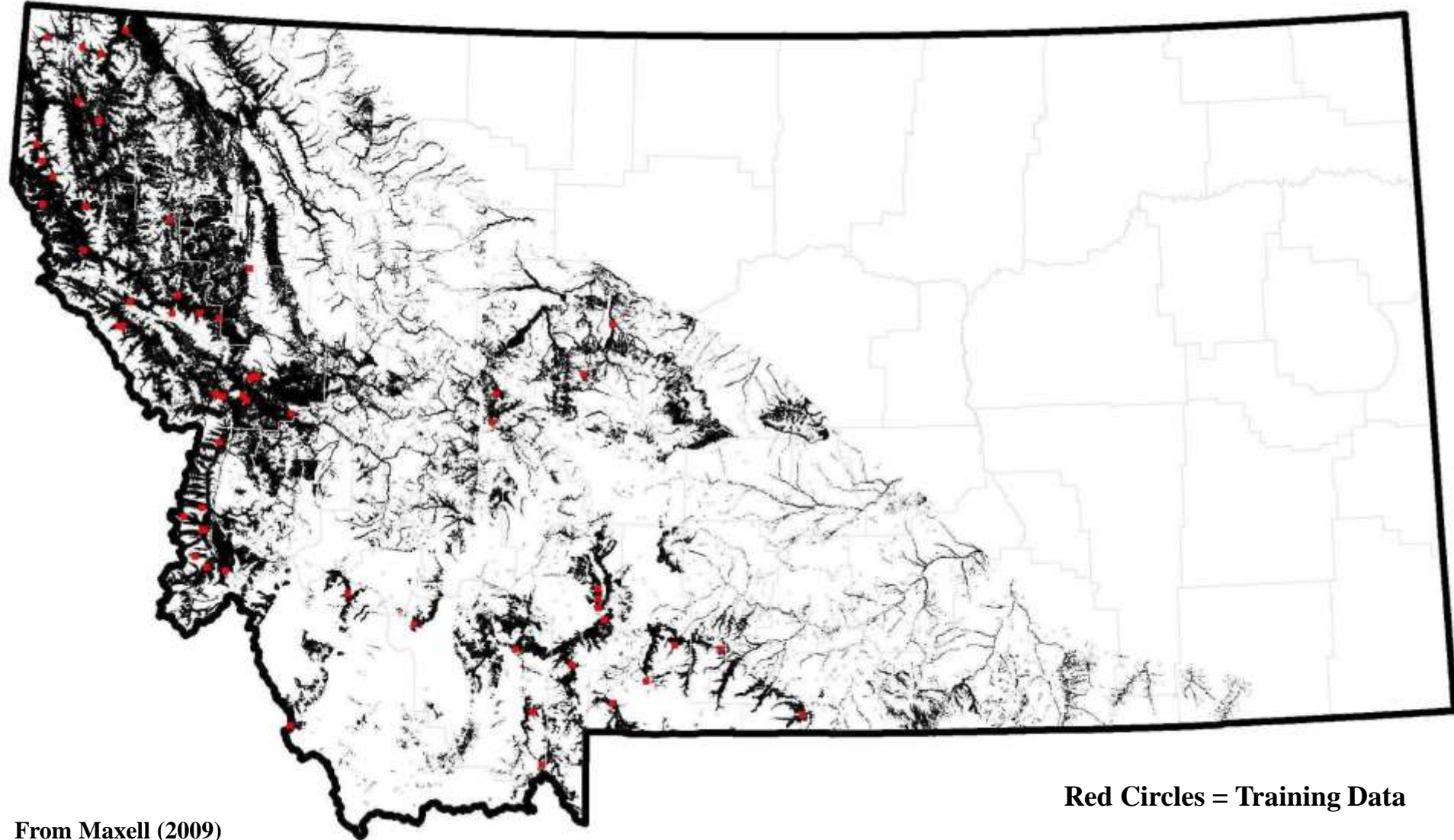
Variety of Habitats
Small mammals

Rubber Boa (*Charina bottae*) Statewide Predicted Habitat Suitability Model



From Maxell (2009)

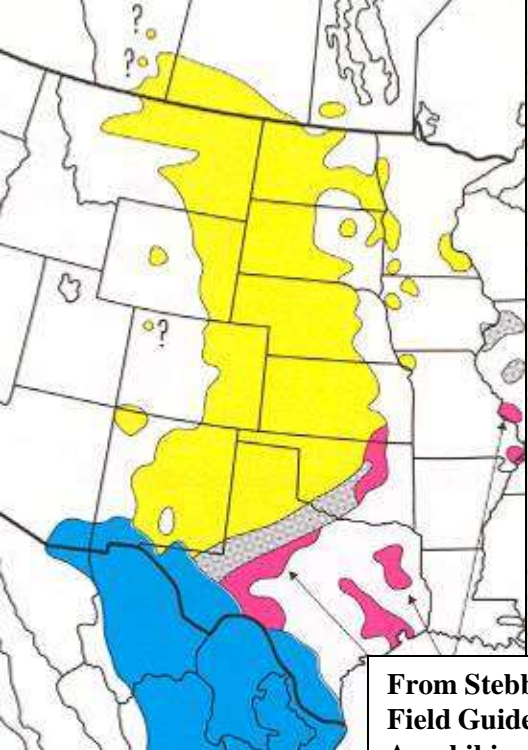
Rubber Boa (*Charina bottae*) Binary Model with Point Observations



Red Circles = Training Data

From Maxell (2009)

Western Hog-nosed Snake (*Heterodon nasicus*)



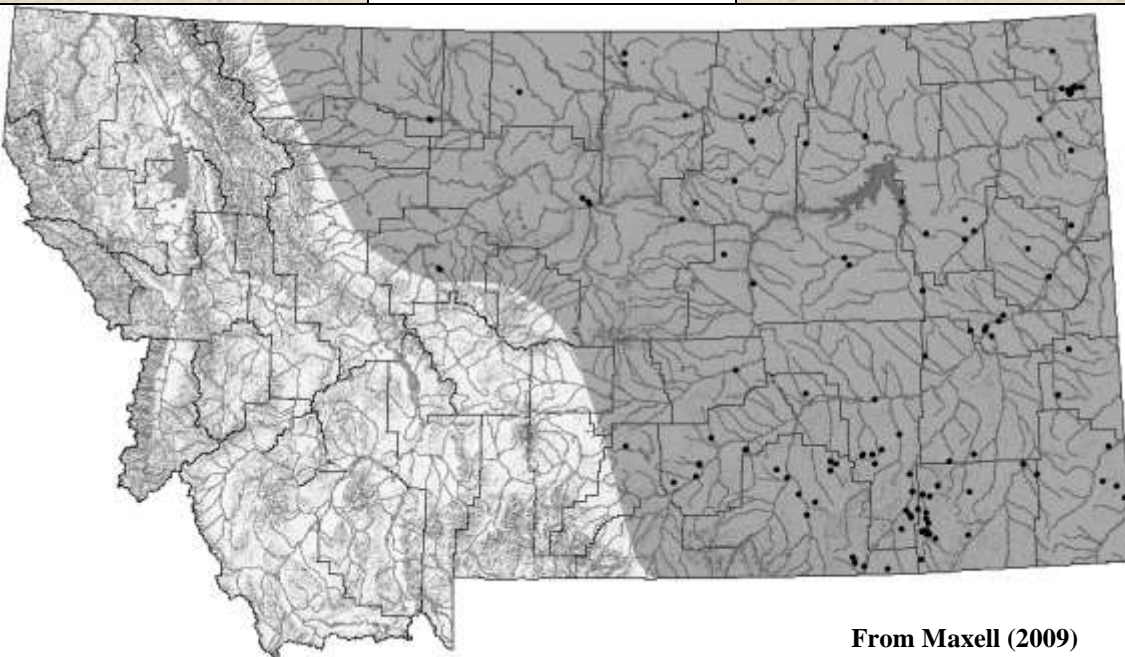
From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles



Issues of Concern

- Lack of knowledge
- Status unknown
- Few recent records
- Flood plain dependent
- Amphibian specialist

Near hibernacula?



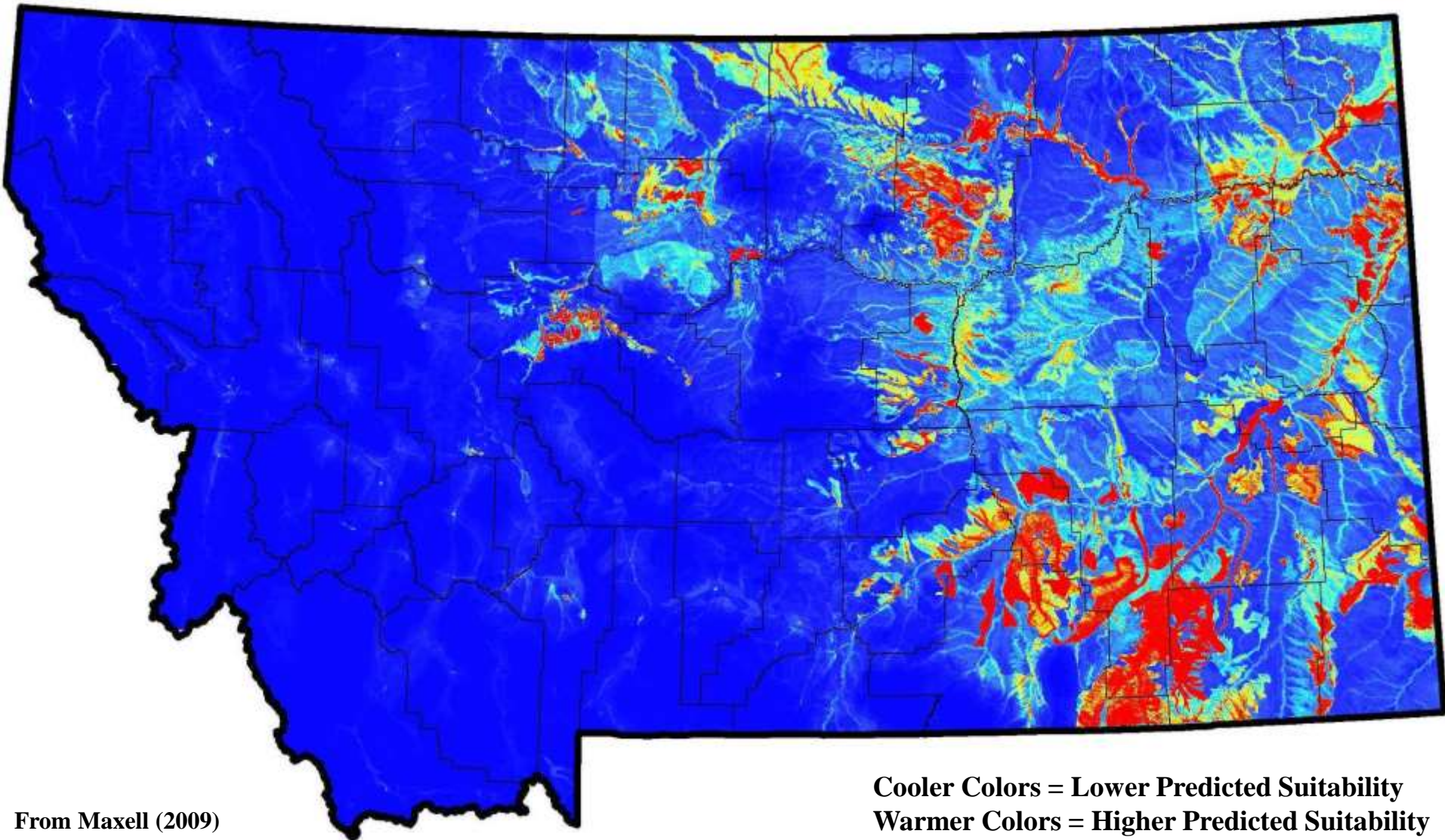
From Maxell (2009)



Below frost line
Friable soils

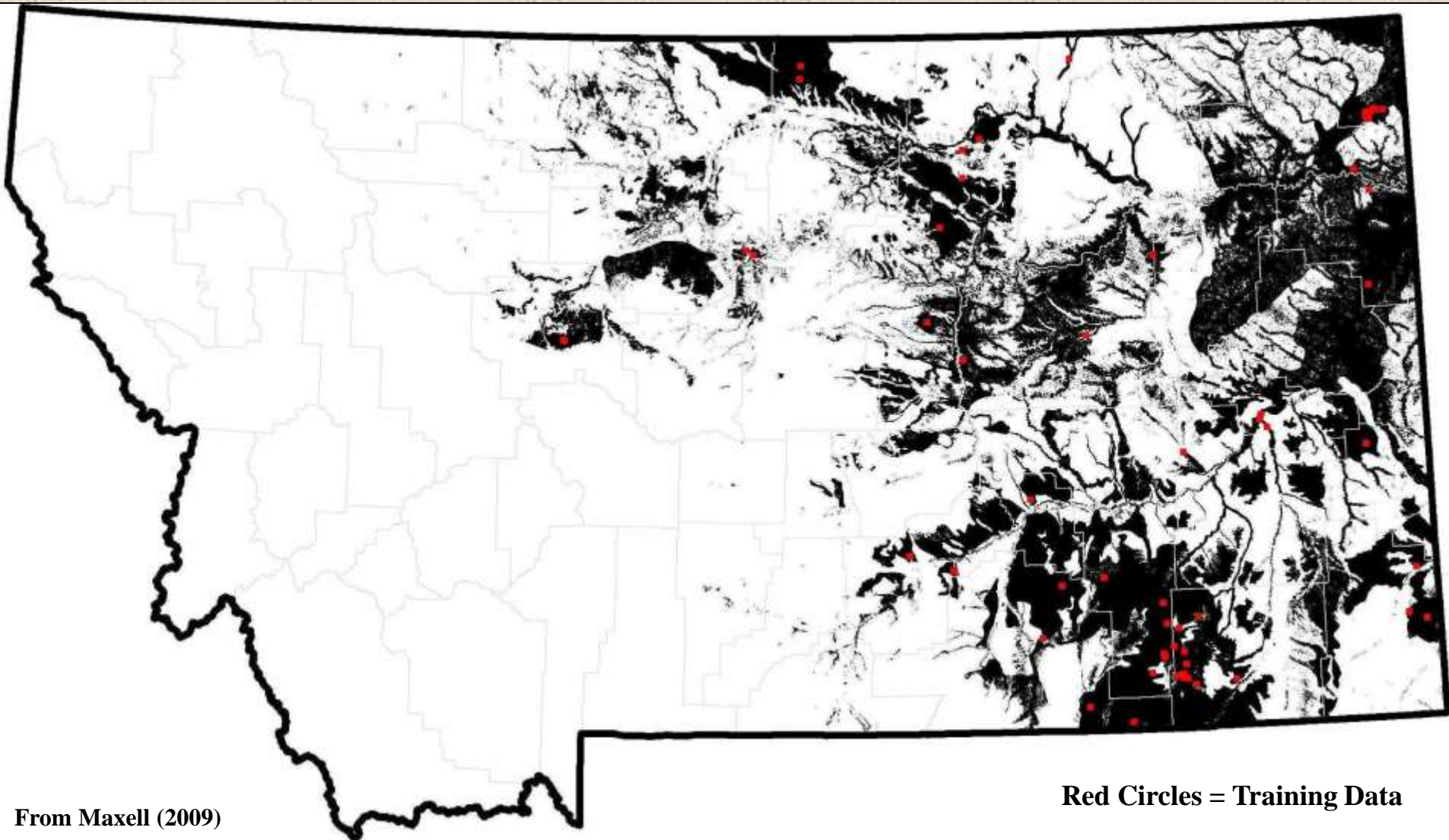
Floodplain
Friable soils
Amphibs

Western Hog-nosed Snake (*Heterodon nasicus*) Statewide Predicted Habitat Suitability Model



From Maxell (2009)

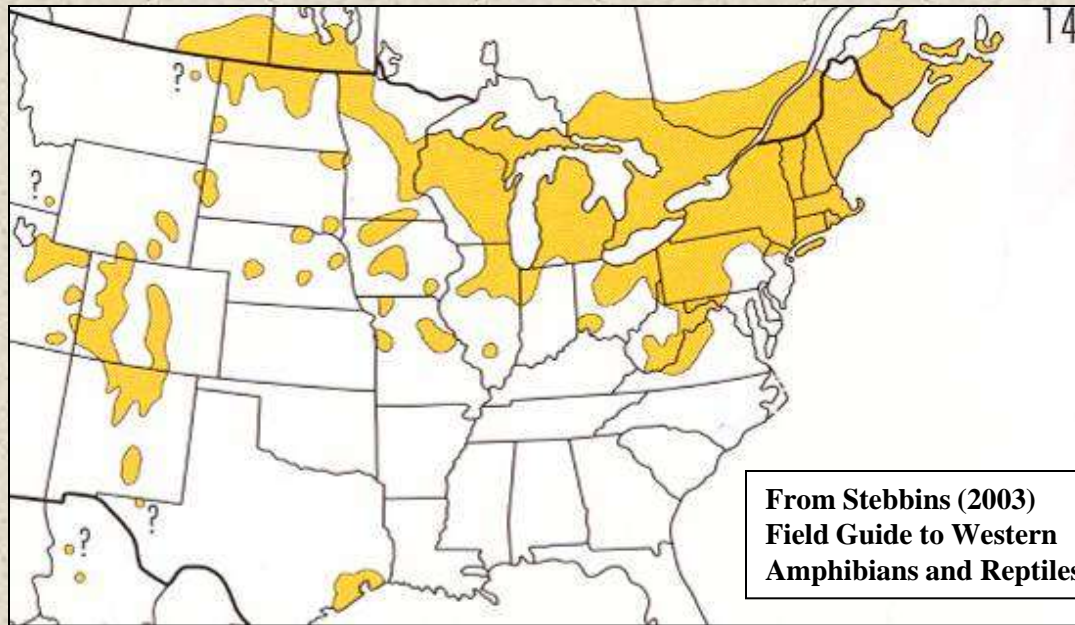
Western Hog-nosed Snake (*Heterodon nasicus*) Binary Model with Point Observations



From Maxell (2009)

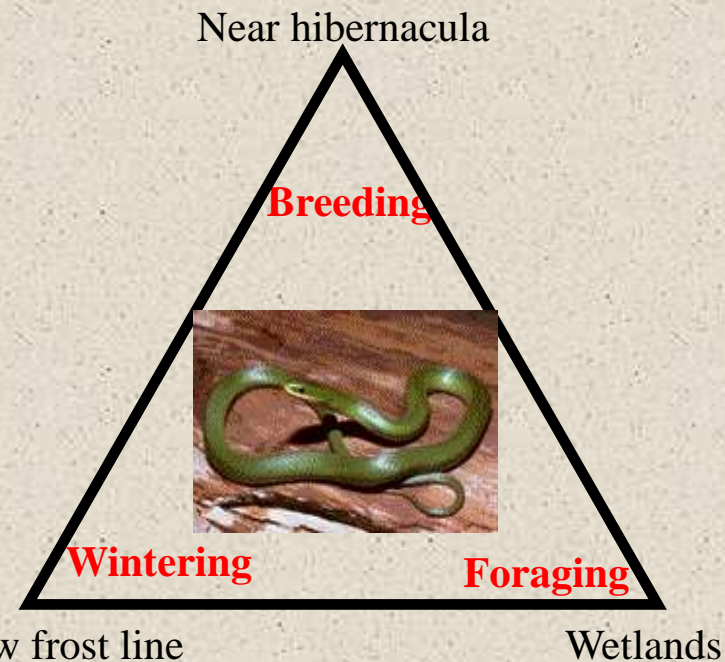
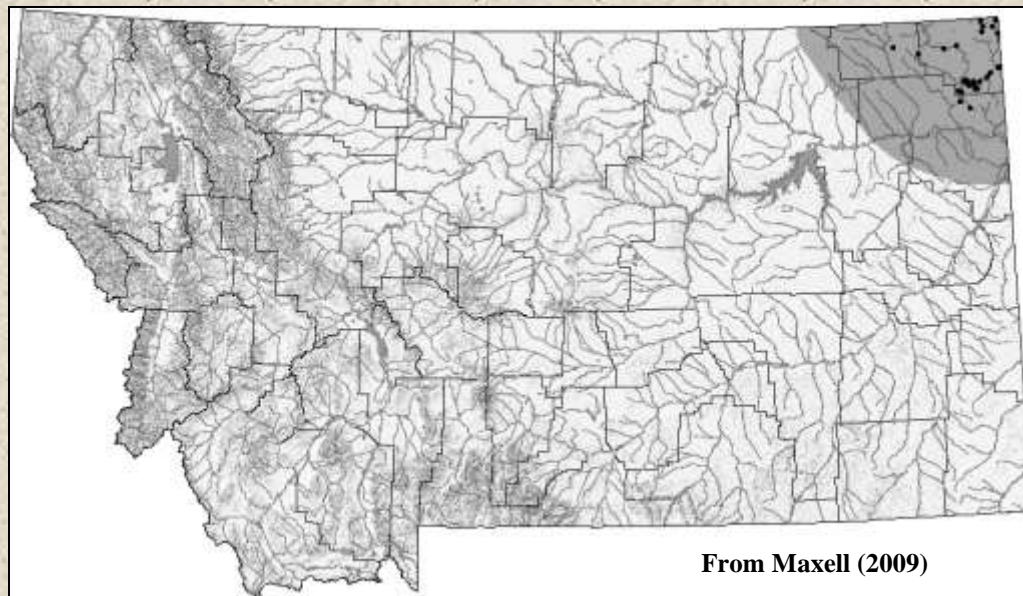
Red Circles = Training Data

Smooth Greensnake (*Opheodrys vernalis*)

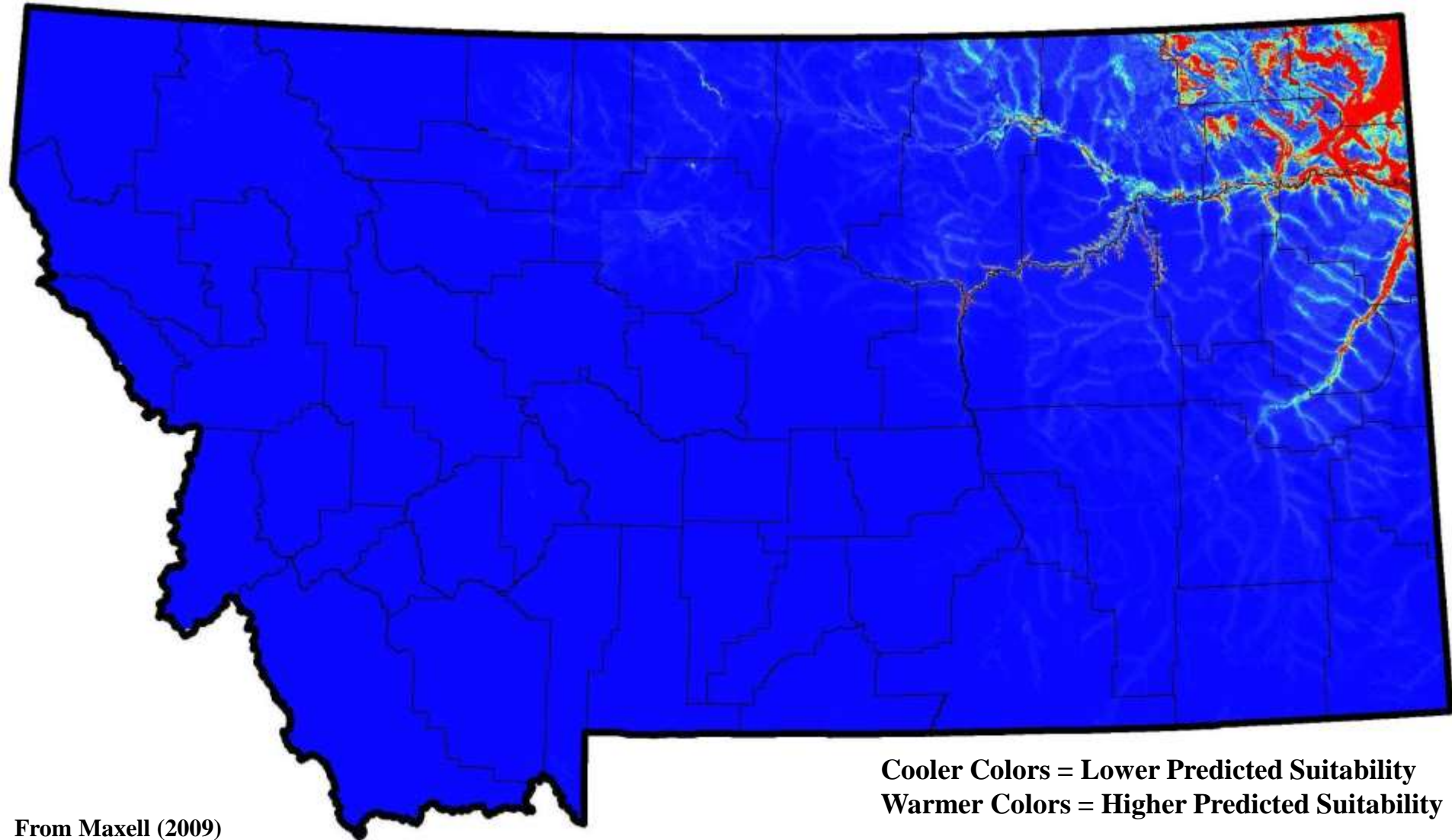


Issues of Concern

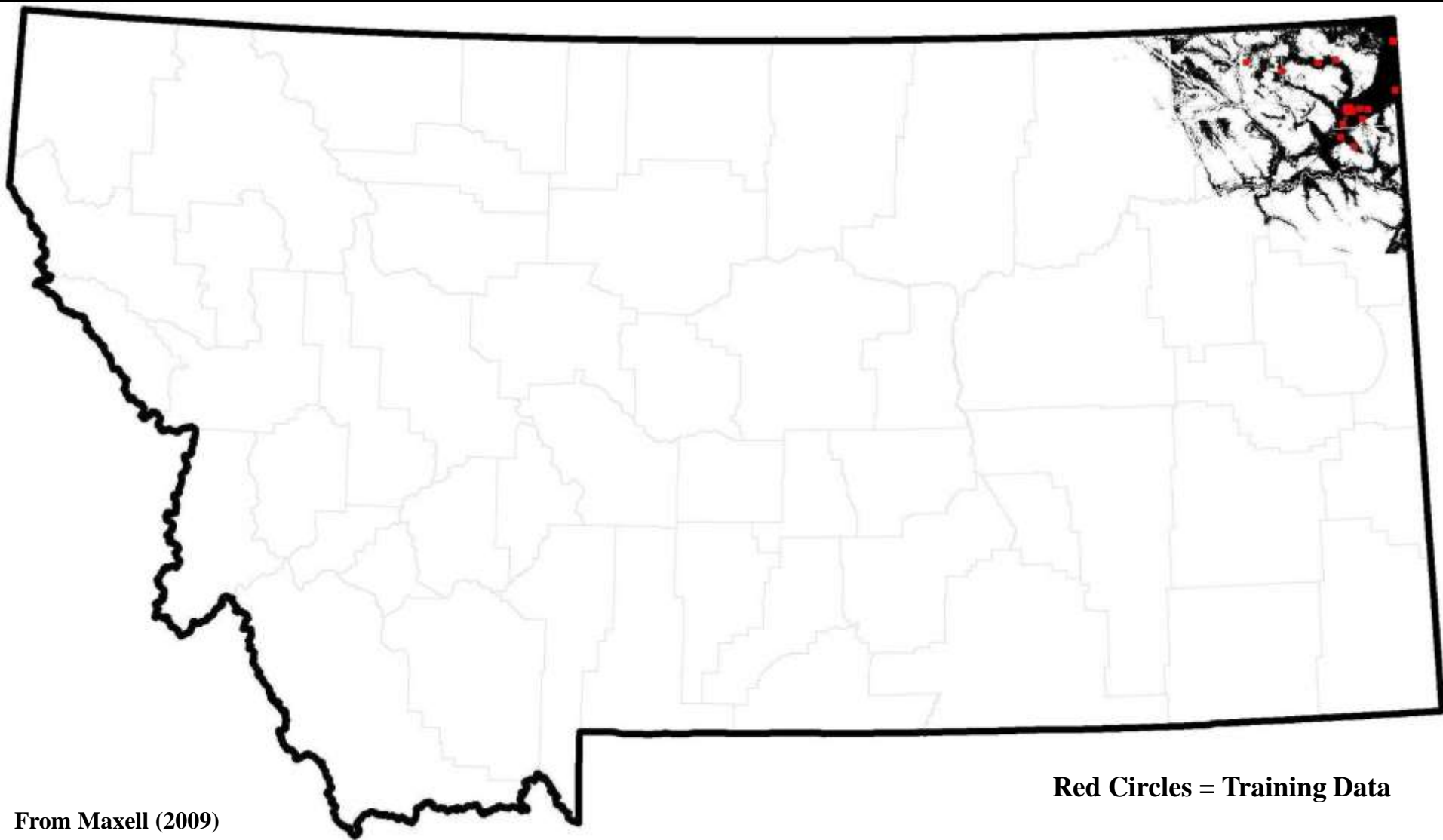
- Lack of knowledge
- Few records
- Range poorly understood
- Appears common in NE



Smooth Greensnake (*Opheodrys vernalis*) Statewide Predicted Habitat Suitability Model



Smooth Greensnake (*Opheodrys vernalis*) Binary Model with Point Observations

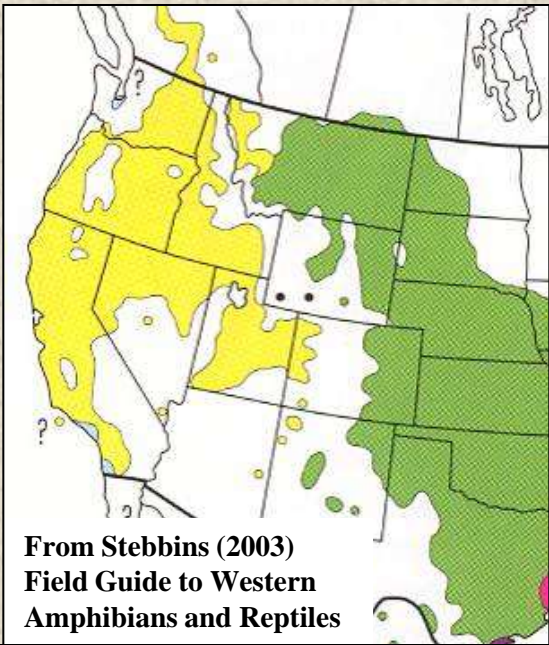


From Maxell (2009)

Red Circles = Training Data

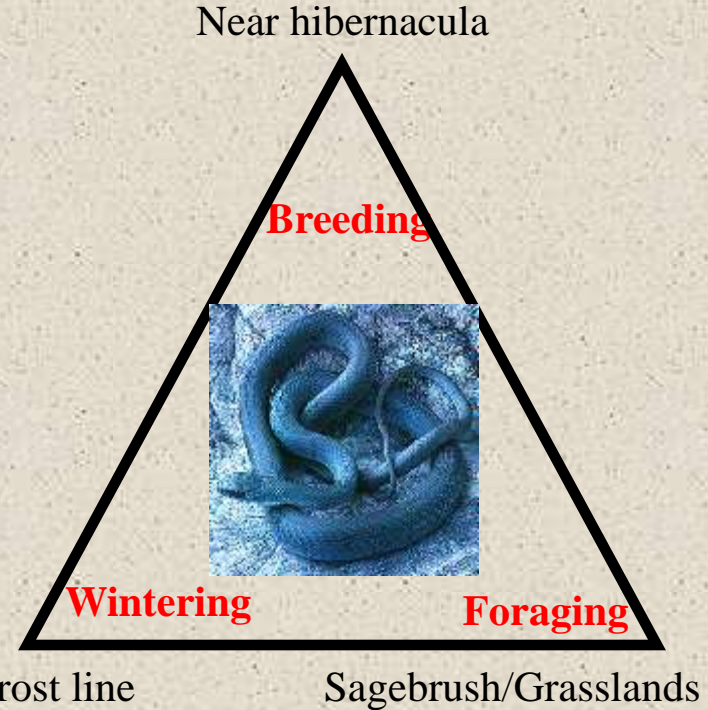
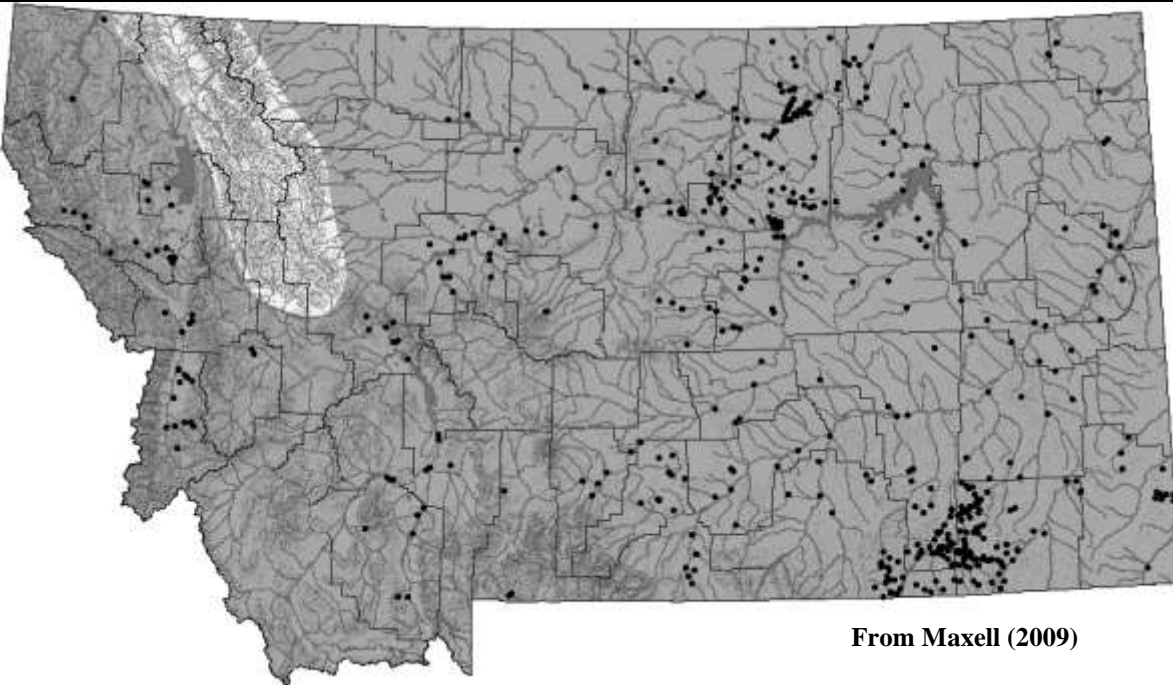
Eastern Racer

(*Coluber constrictor*)

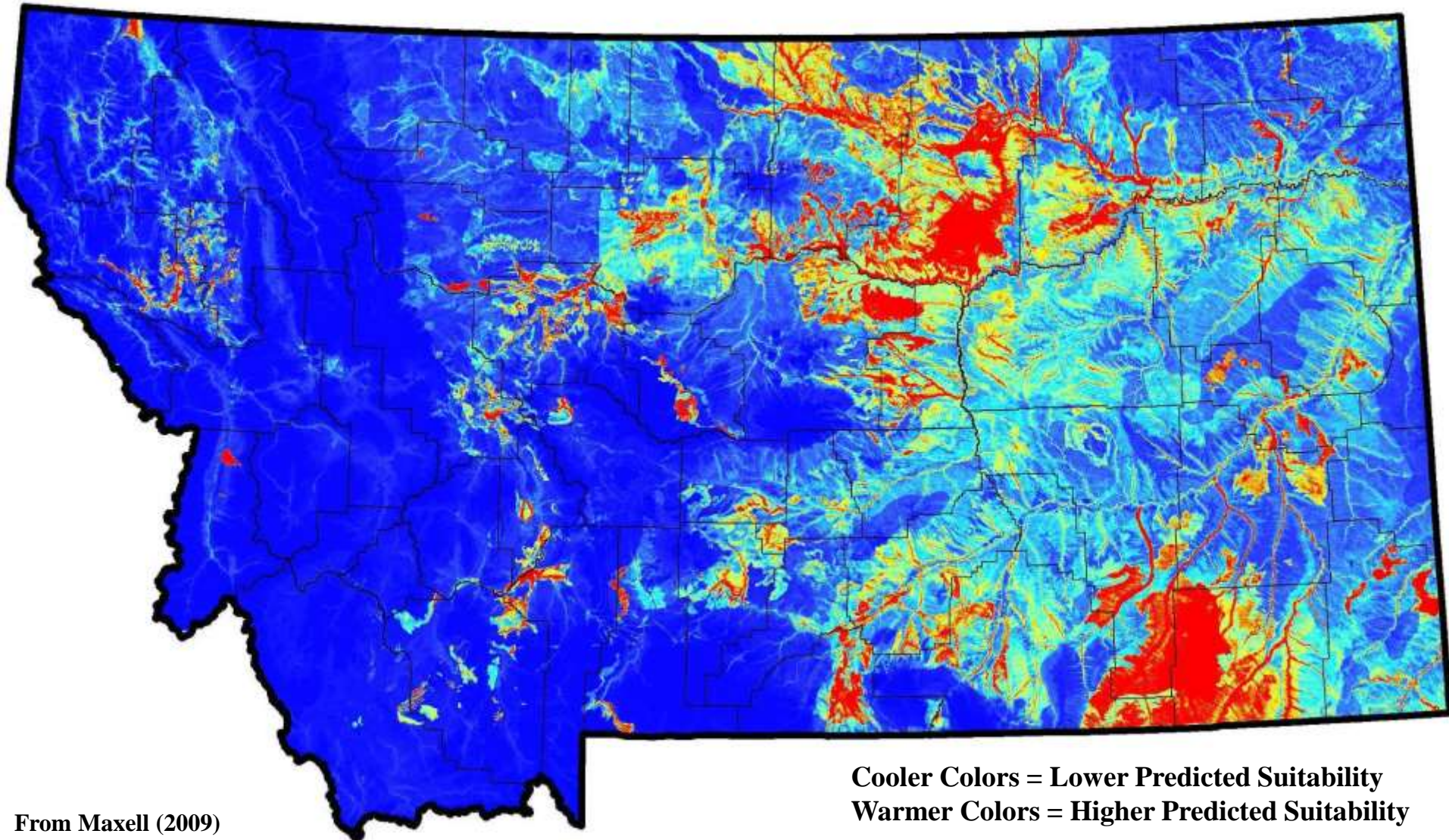


Issues of Concern

- Appears common in E
- Loss of grasslands in W
- Roads / vehicle traffic

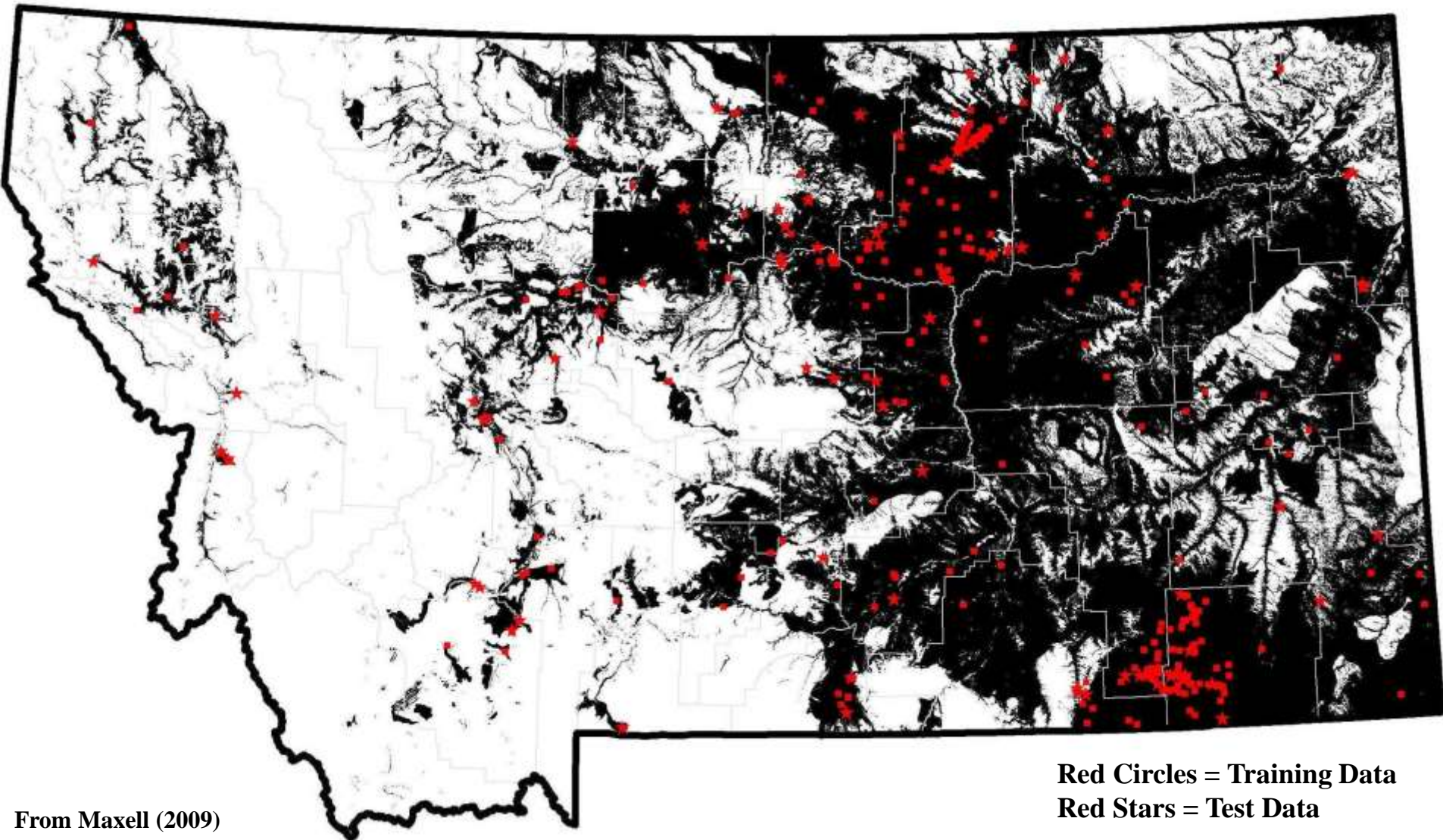


Eastern Racer (*Coluber constrictor*) Statewide Predicted Habitat Suitability Model



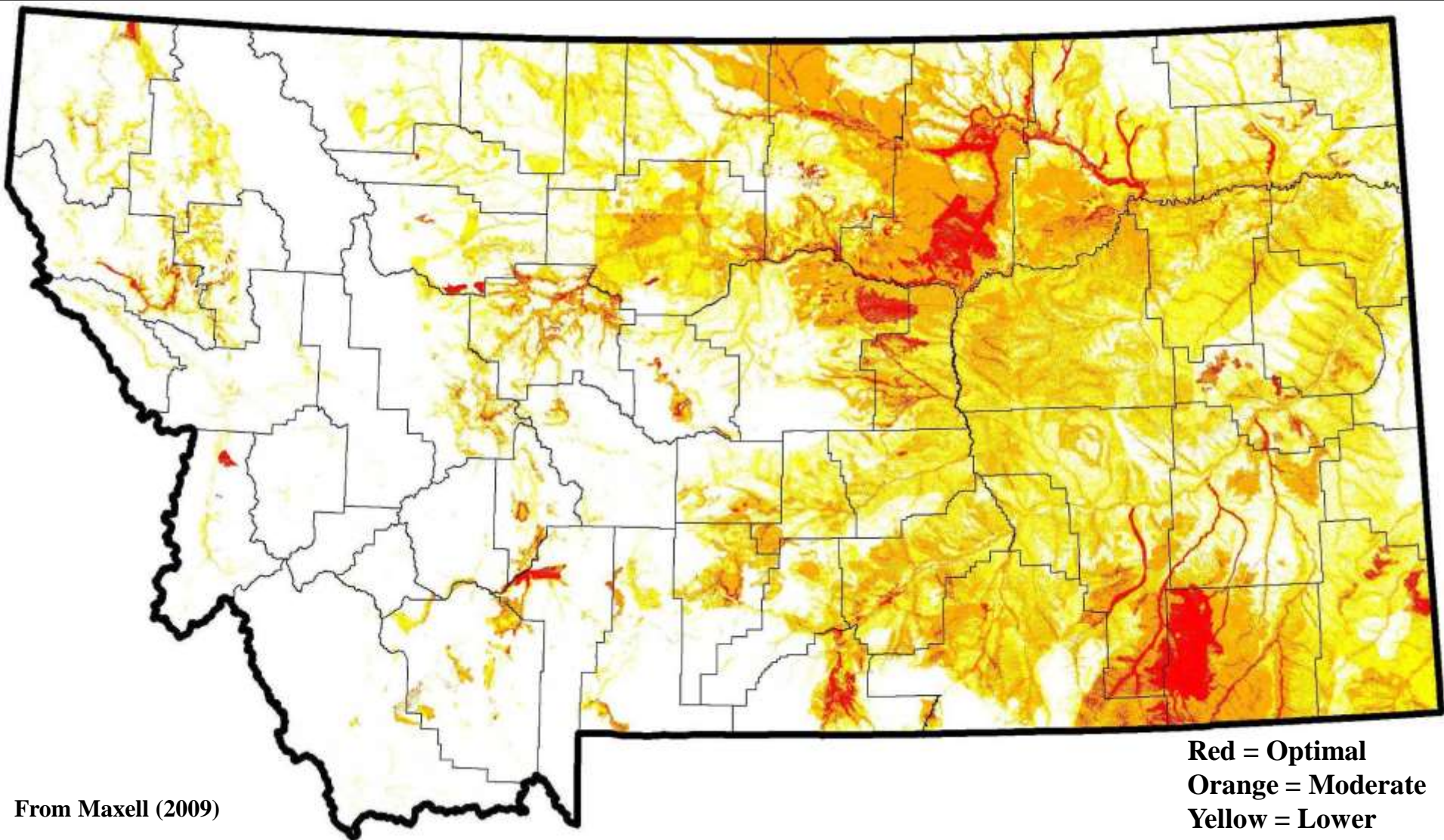
From Maxell (2009)

Eastern Racer (*Coluber constrictor*) Binary Model with Point Observations

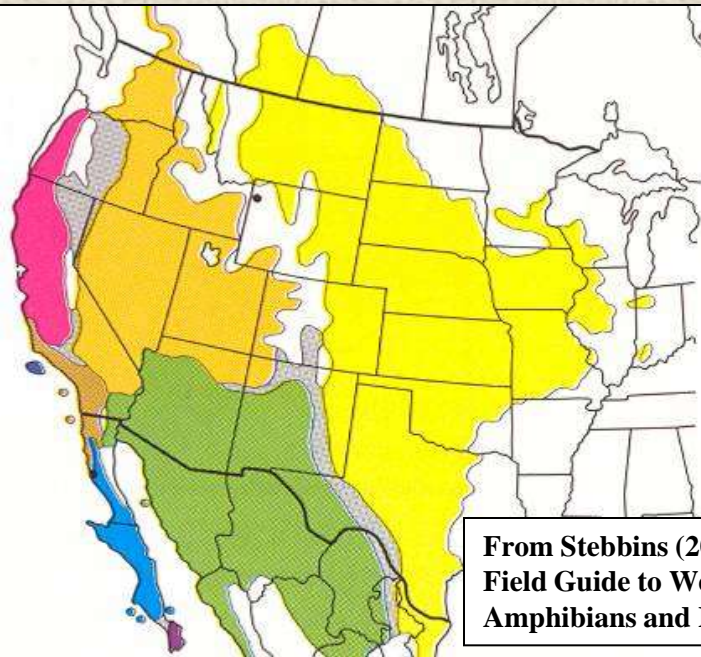


From Maxell (2009)

Eastern Racer (*Coluber constrictor*) Habitat Suitability Classes



From Maxell (2009)



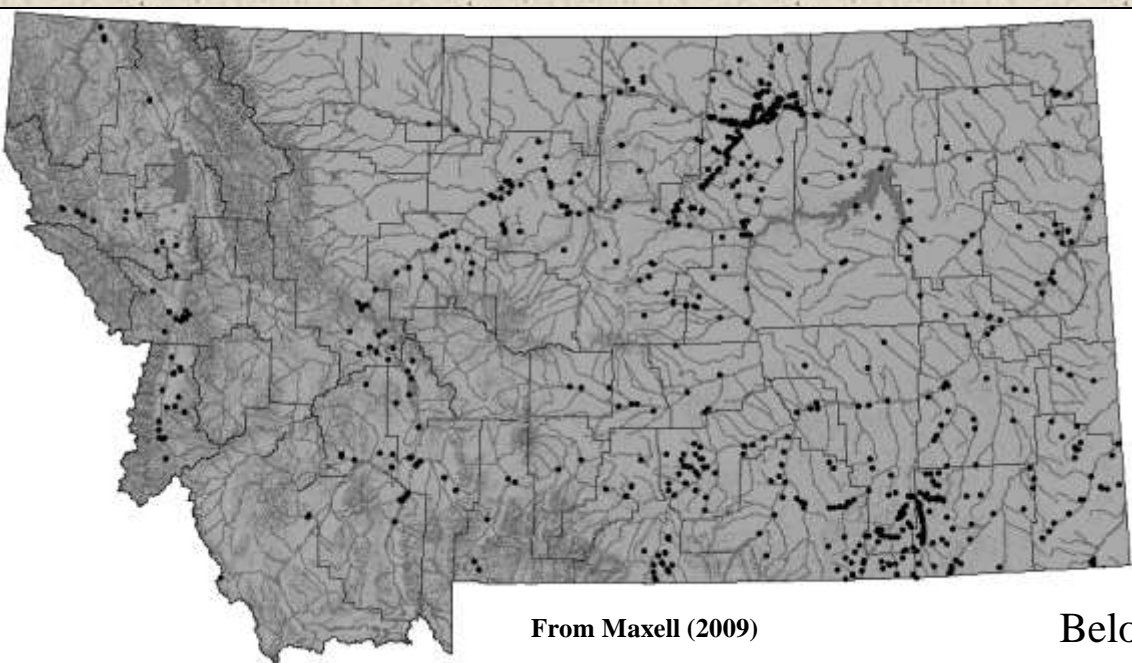
From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles

Gophersnake (*Pituophis catenifer*)

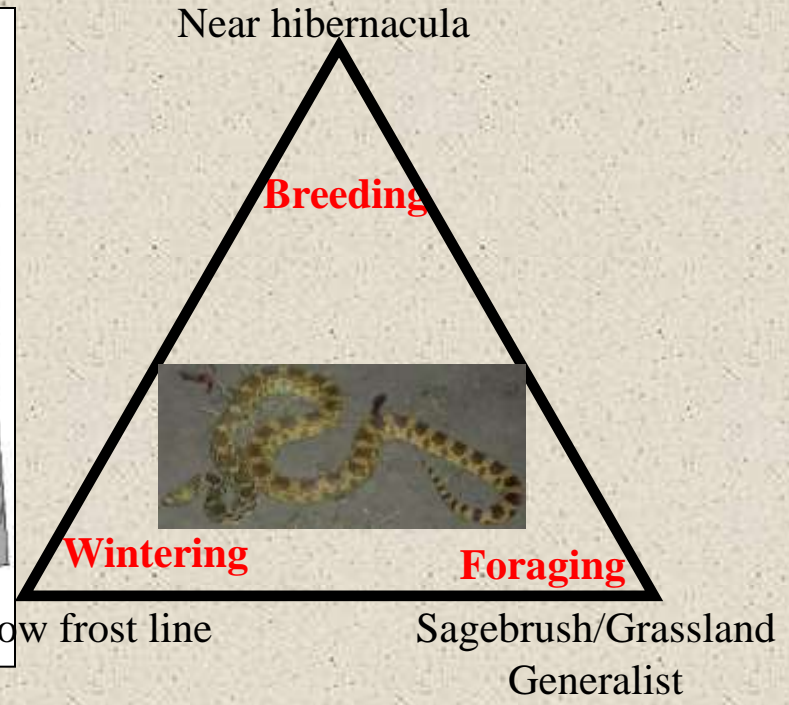


Issues of Concern

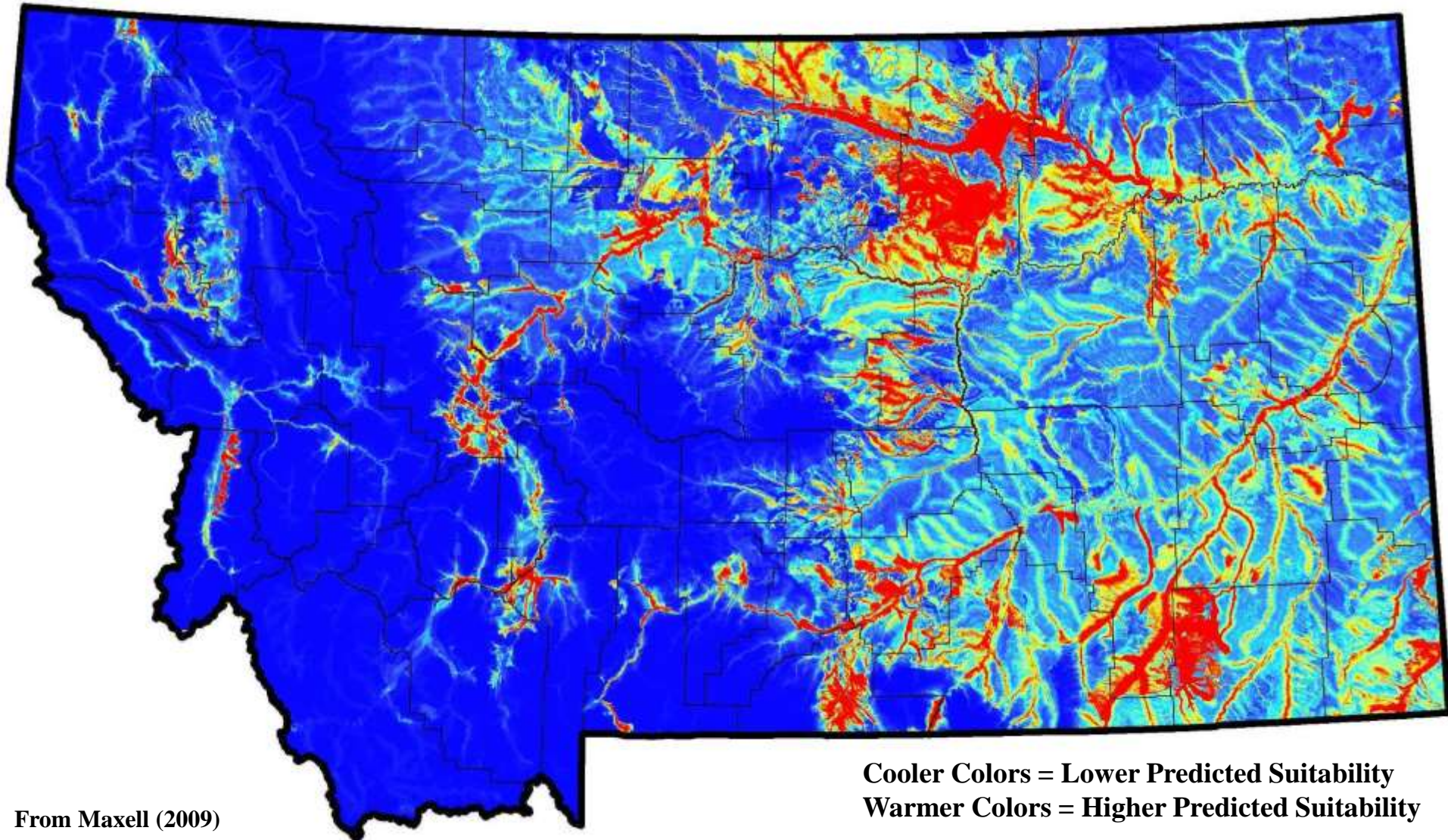
- Appears common in E
- Loss of grasslands in W
- Killed over concern over large snake
- Roads / vehicle traffic



From Maxell (2009)

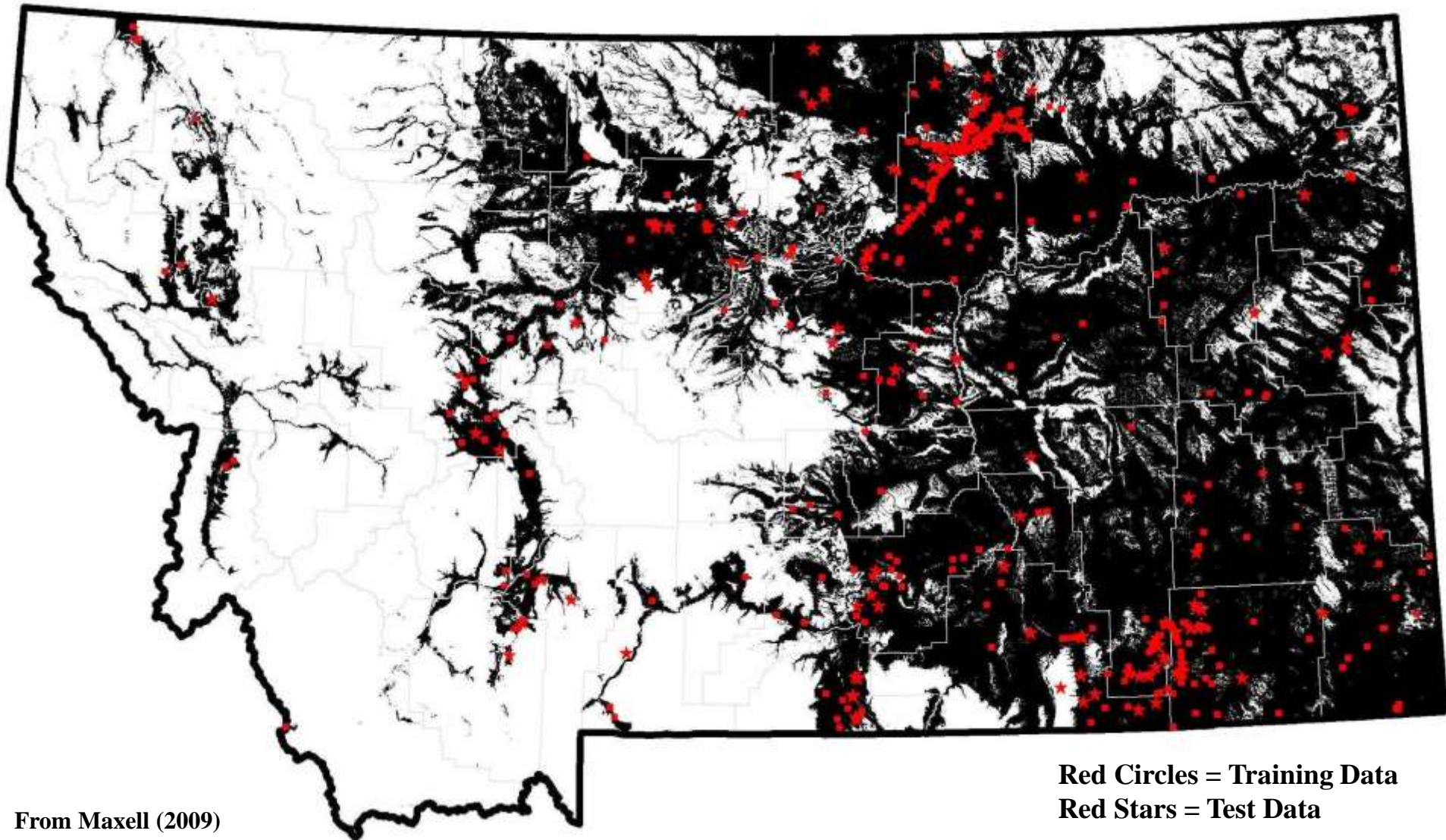


Gophersnake (*Pituophis catenifer*) Statewide Predicted Habitat Suitability Model



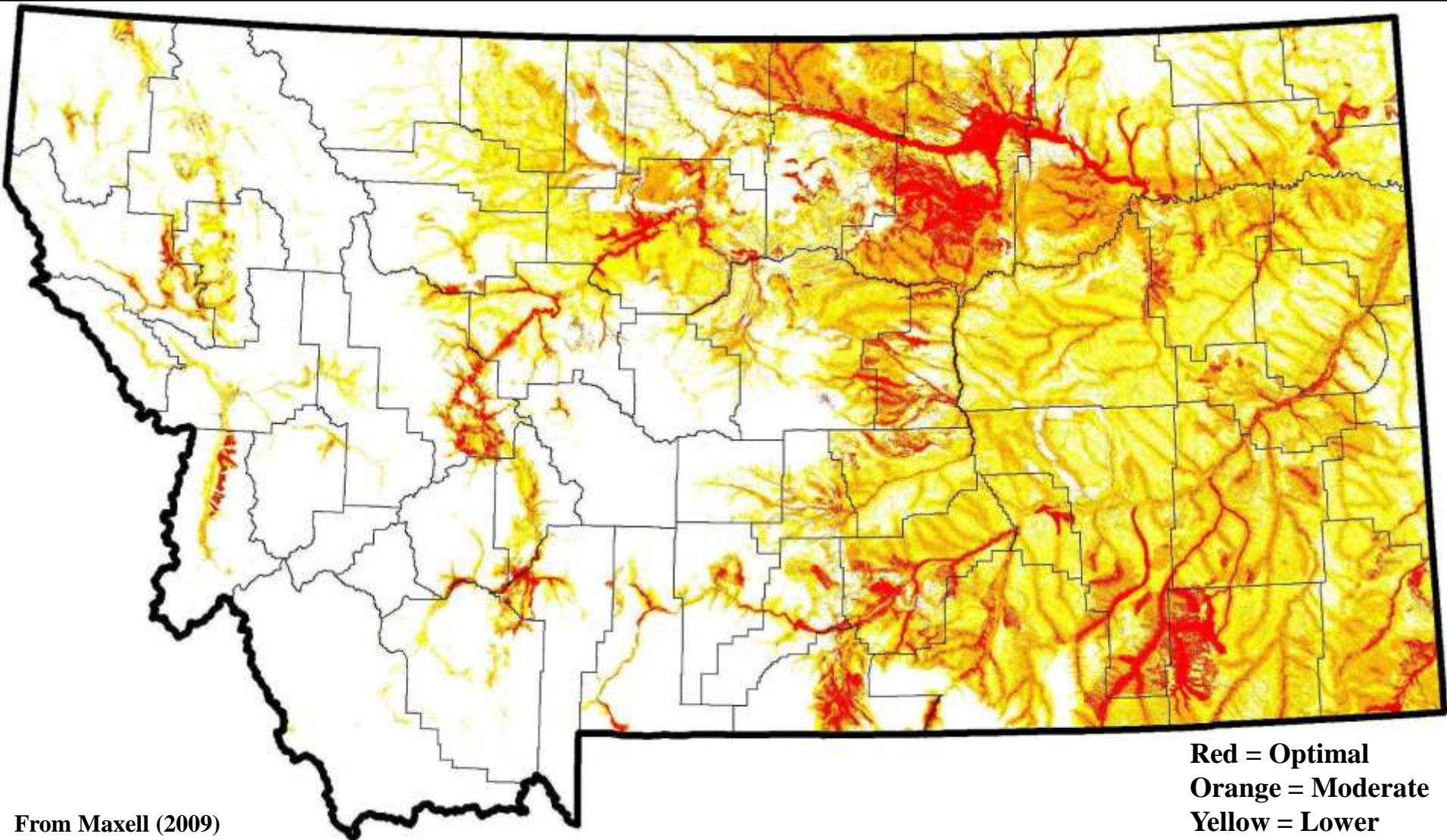
From Maxell (2009)

Gophersnake (*Pituophis catenifer*) Binary Model with Point Observations

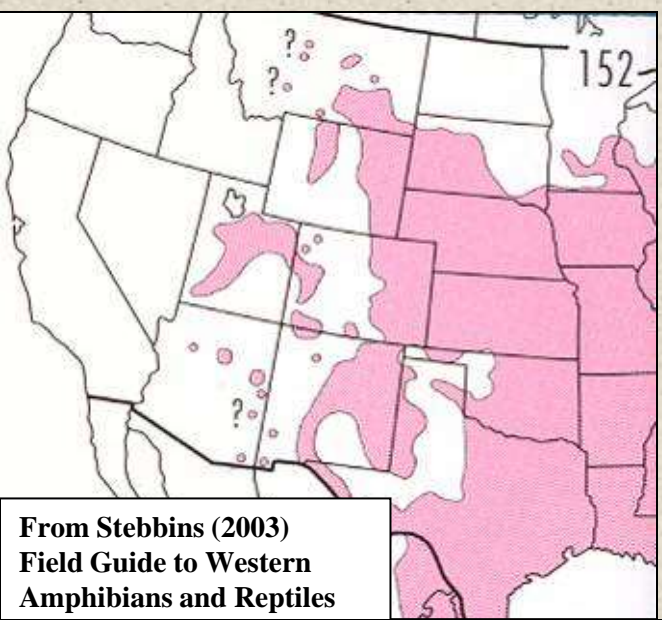


From Maxell (2009)

Gophersnake (*Pituophis catenifer*) Habitat Suitability Classes

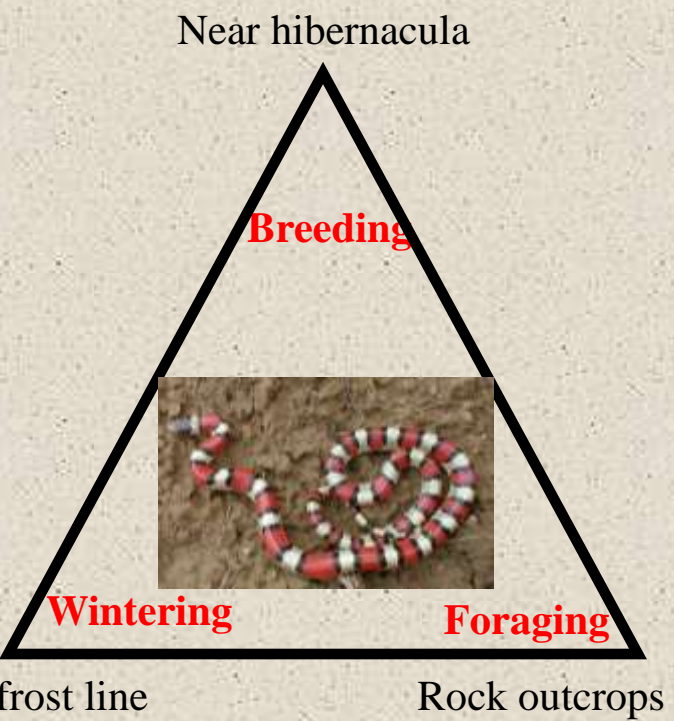
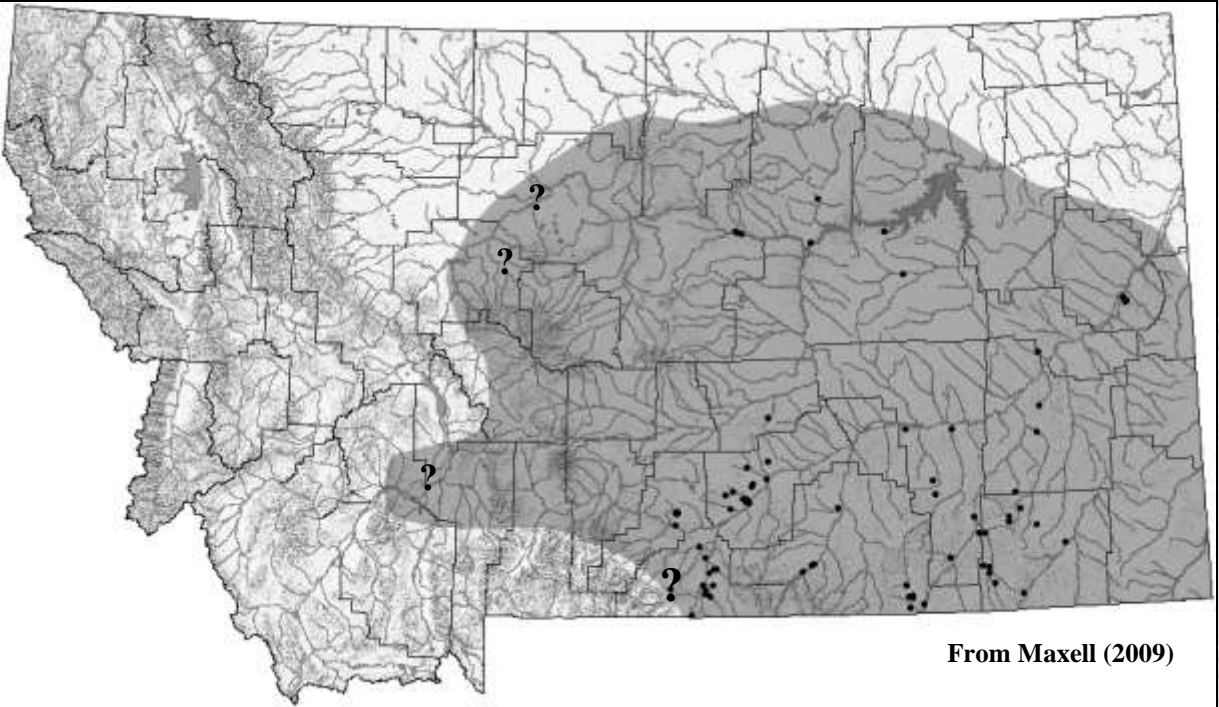


Milksnake (*Lampropeltis triangulum*)

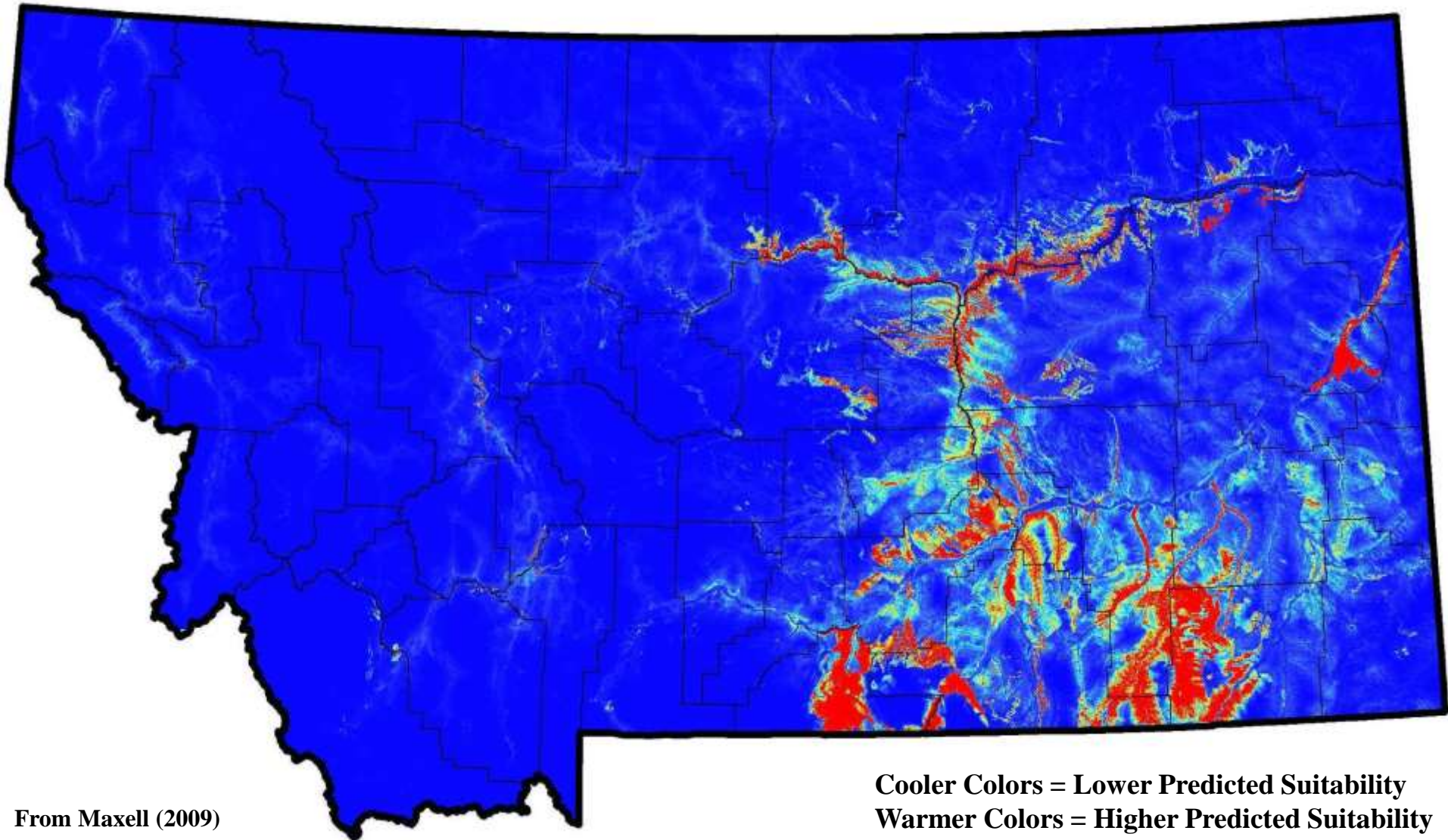


Issues of Concern

- Lack of knowledge
- Status unknown
- Few recent records
- Wanted for pet trade

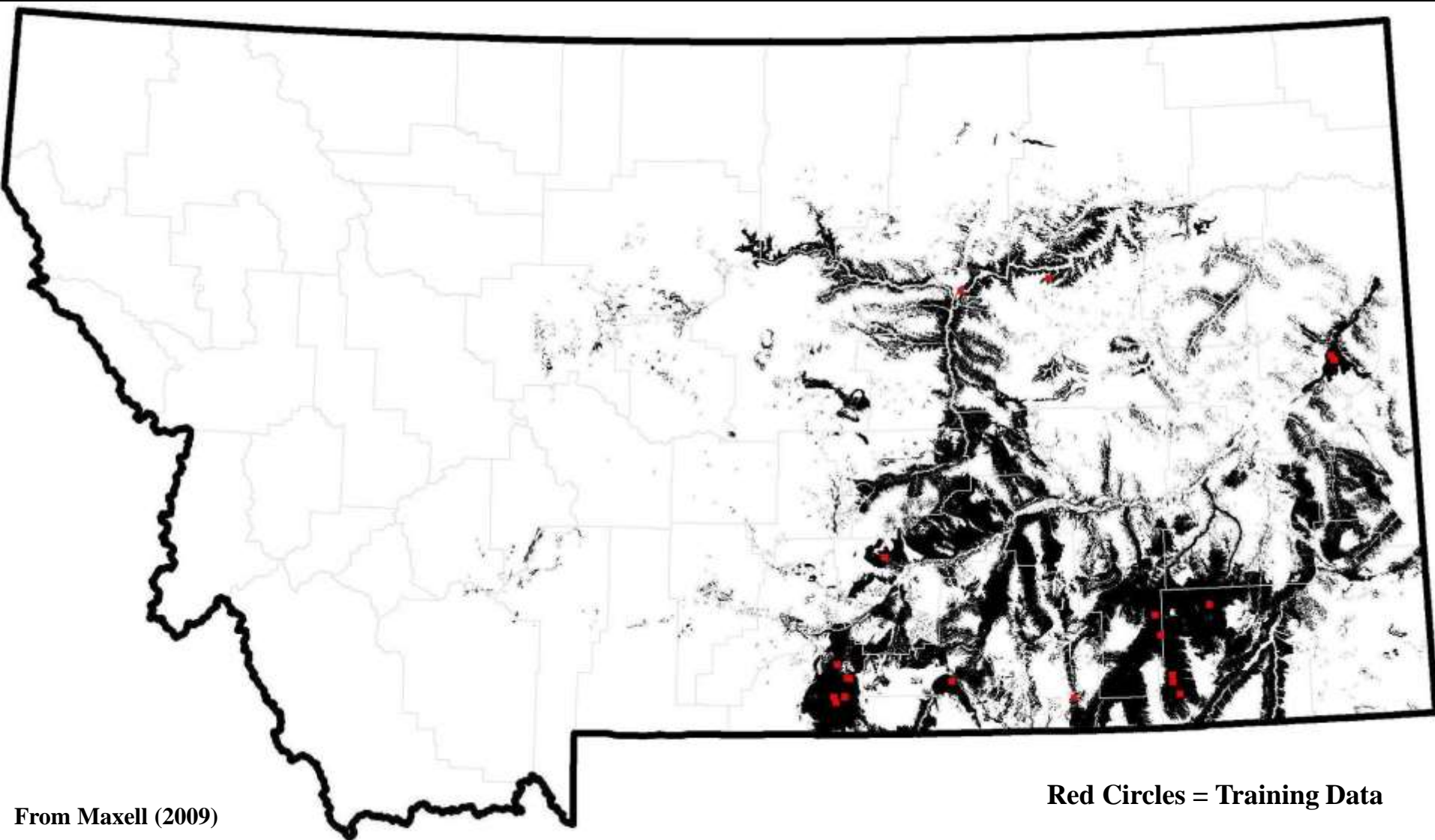


Milksnake (*Lampropeltis triangulum*) Statewide Predicted Habitat Suitability Model



From Maxell (2009)

Milksnake (*Lampropeltis triangulum*) Binary Model with Point Observations

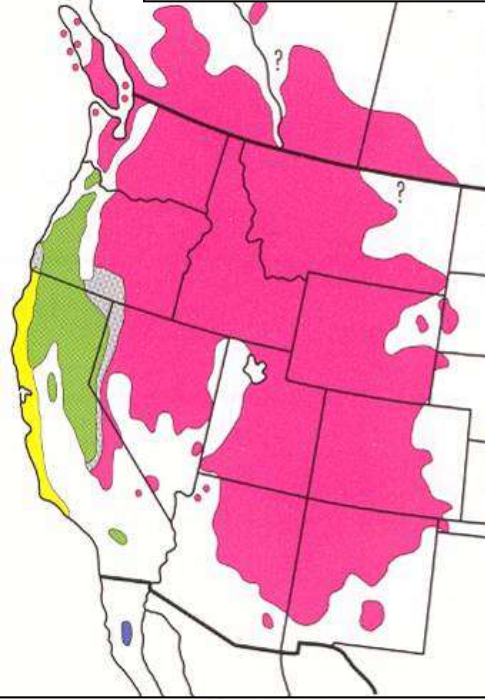


Red Circles = Training Data

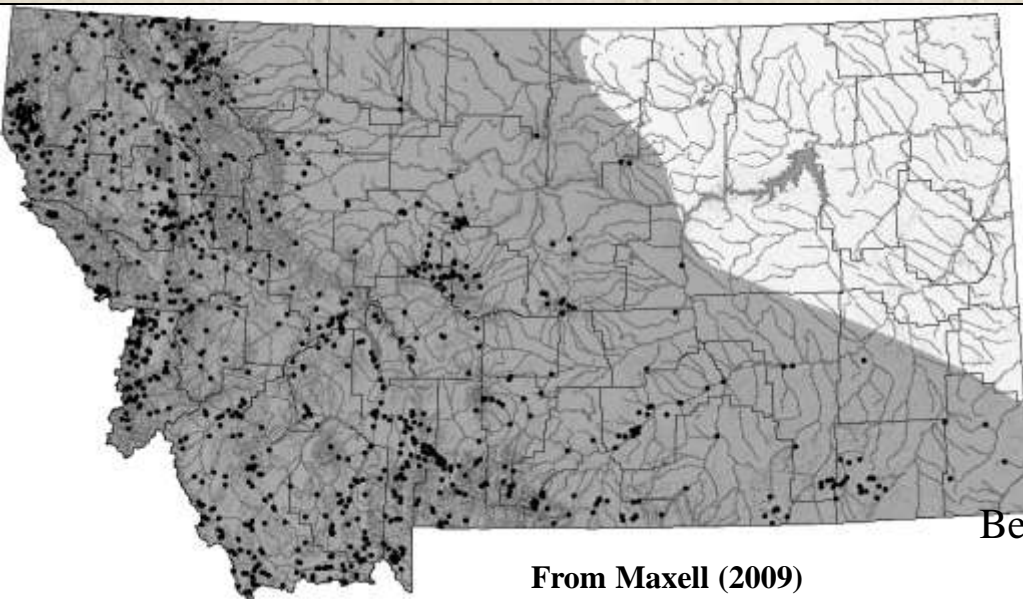
From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles

Terrestrial Gartersnake

(*Thamnophis elegans*)

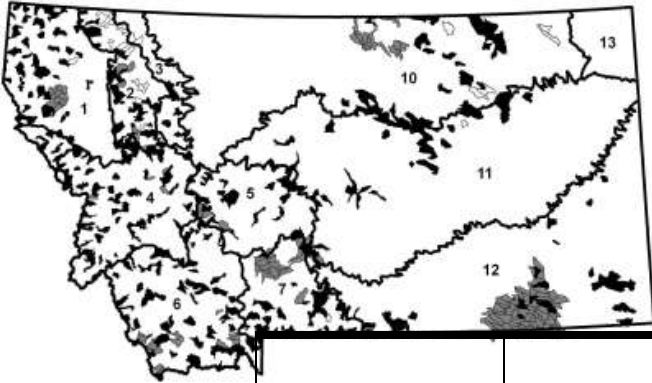


Issues of Concern
-Appears common
-Roads / vehicle traffic



From Maxell (2009)





Terrestrial Gartersnake

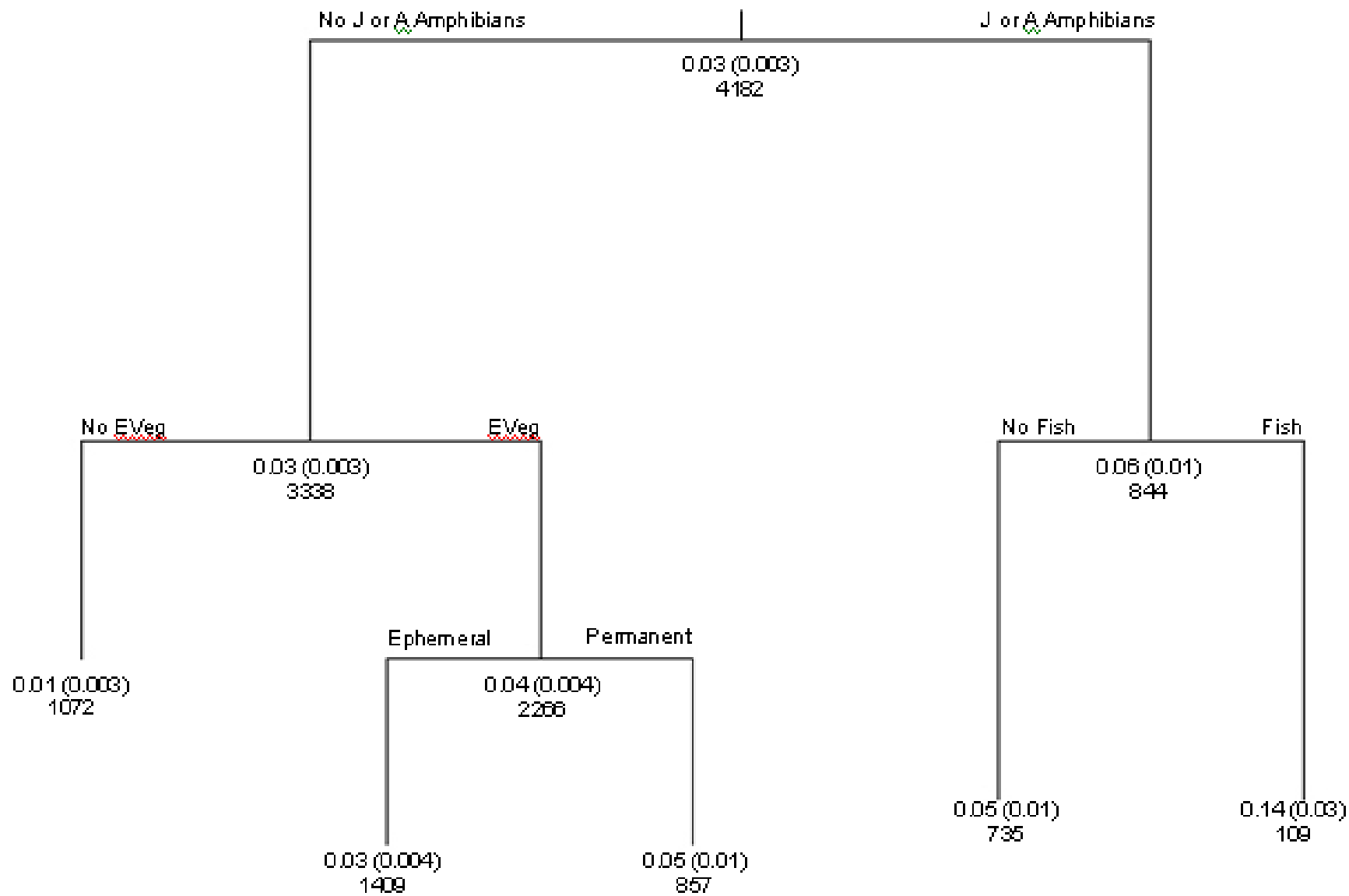
(*Thamnophis elegans*)

Occupancy Rates

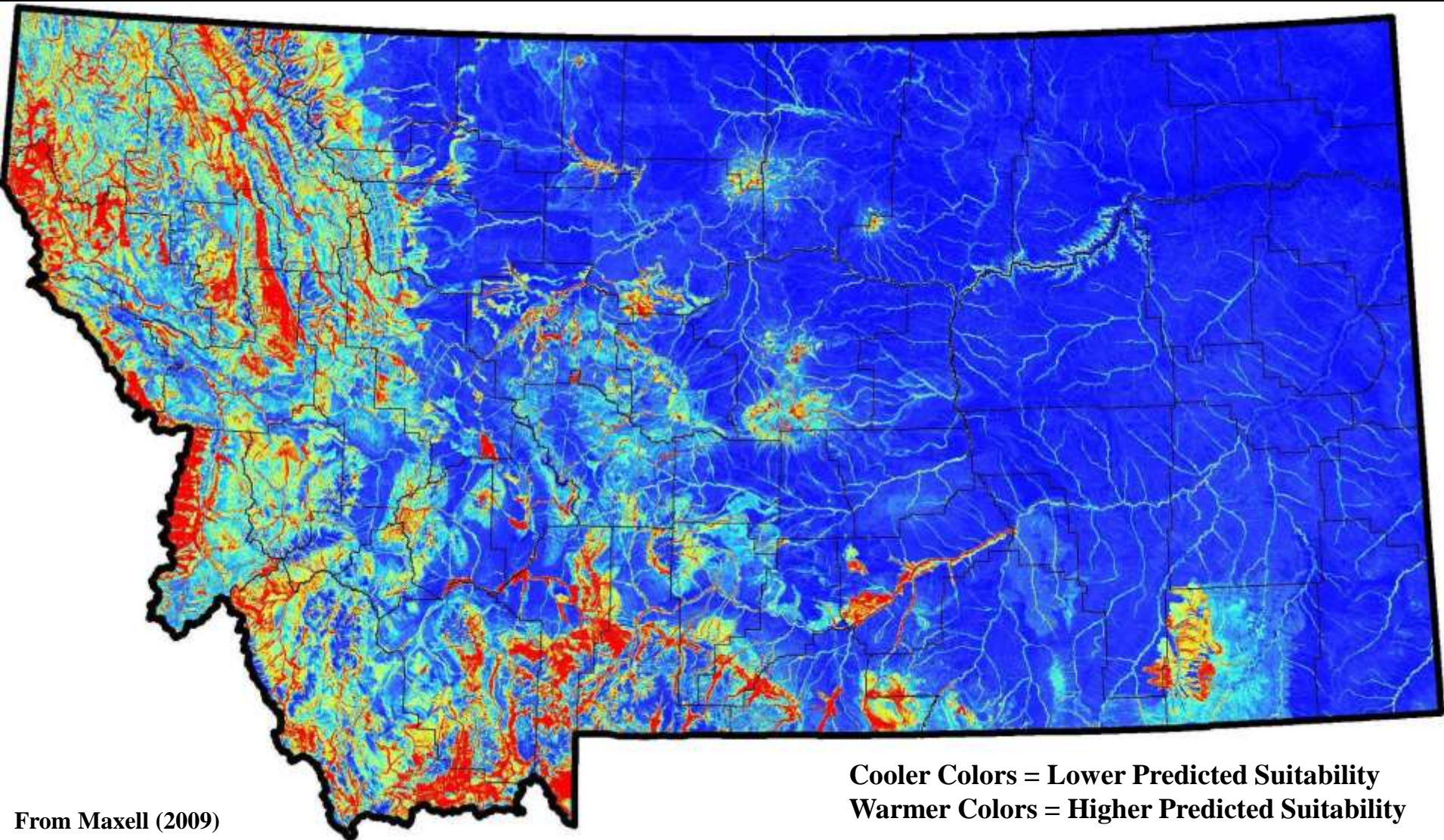
Strata	Total Number Watersheds / Sites	Percent Watershed Occupancy (95% CI ^a)	Percent Site Occupancy (95% CI ^b)
1	53 / 287	19 (10–28)	4 (2–6)
2	36 / 639	31 (17–44)	3 (2–4)
3	4 / 43	25 (0–67)	2 (0–7)
4	65 / 803	26 (17–36)	5 (3–6)
5	19 / 86	26 (8–45)	8 (2–14)
6	53 / 752	42 (29–54)	7 (5–8)
7	29 / 769	28 (13–42)	2 (1–3)
10	12 / 183	0 (-)	0 (-)
11	24 / 135	4 (0–12)	1 (0–2)
12	32 / 485	6 (0–14)	0.4 (0–1)
Overall	327 / 4182	24 (19–28)	3 (3–4)

Terrestrial Gartersnake (*Thamnophis elegans*)

CART Model

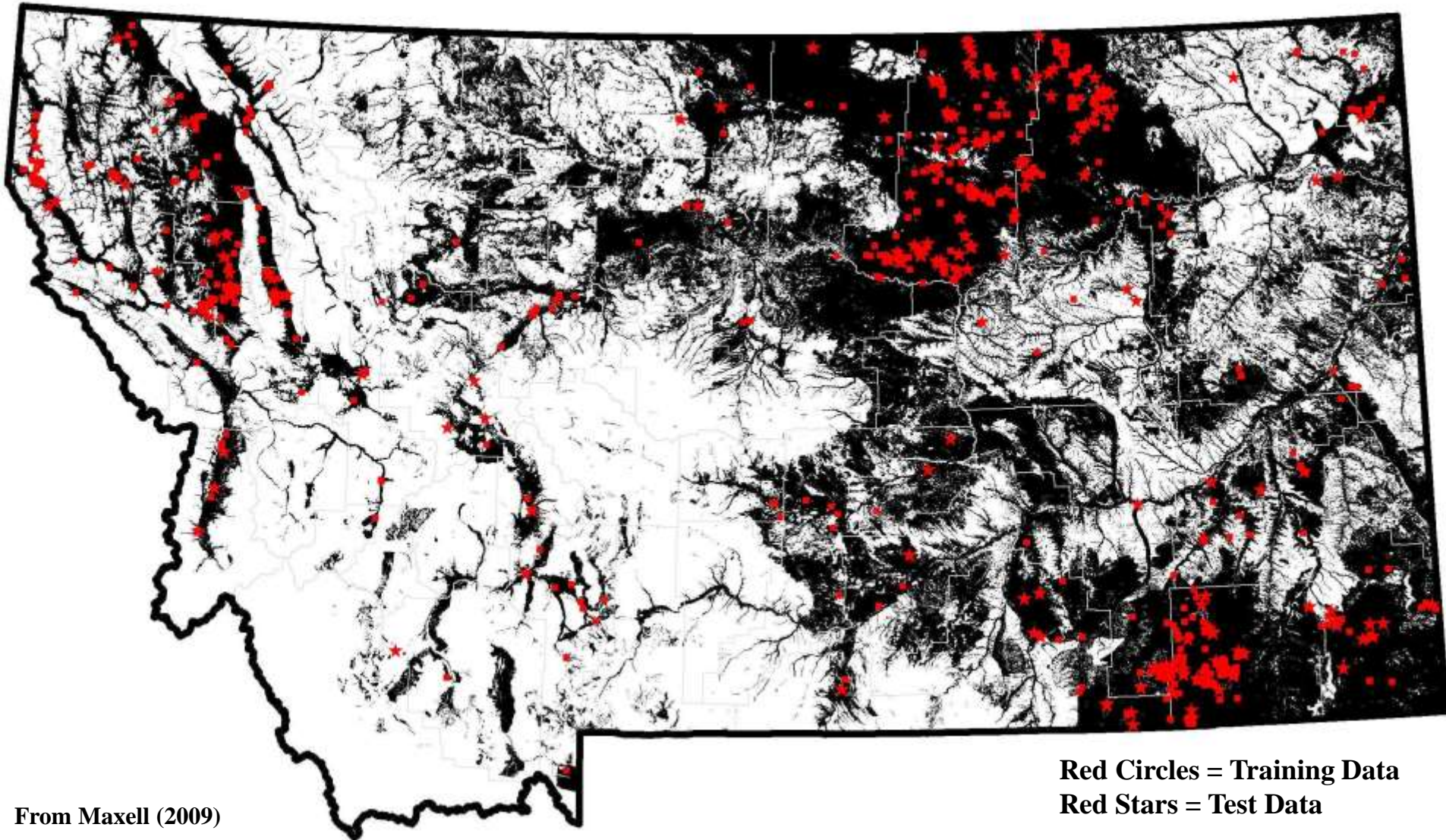


Terrestrial Gartersnake (*Thamnophis elegans*) Statewide Predicted Habitat Suitability Model



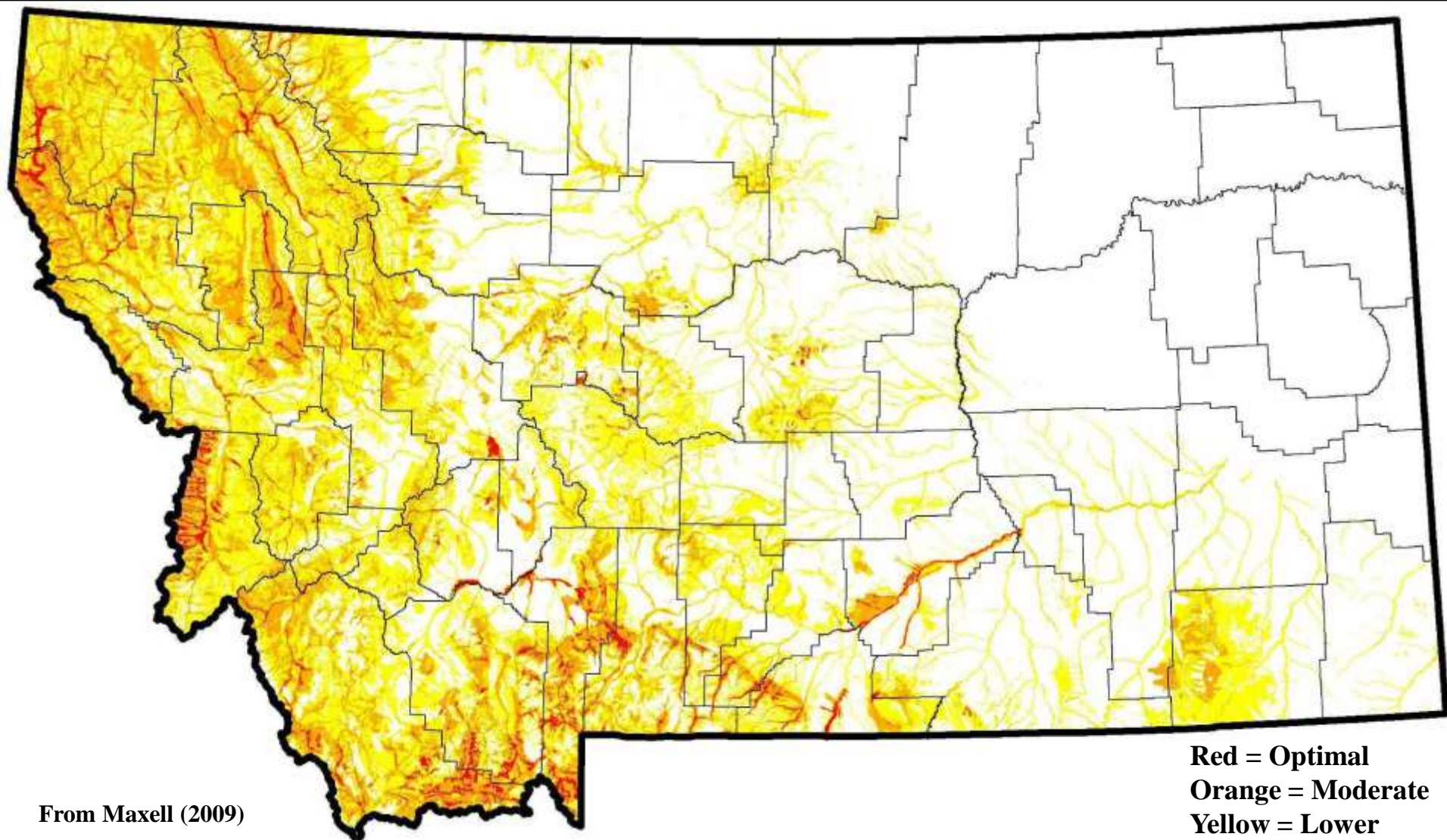
From Maxell (2009)

Terrestrial Gartersnake (*Thamnophis elegans*) Binary Model with Point Observations



From Maxell (2009)

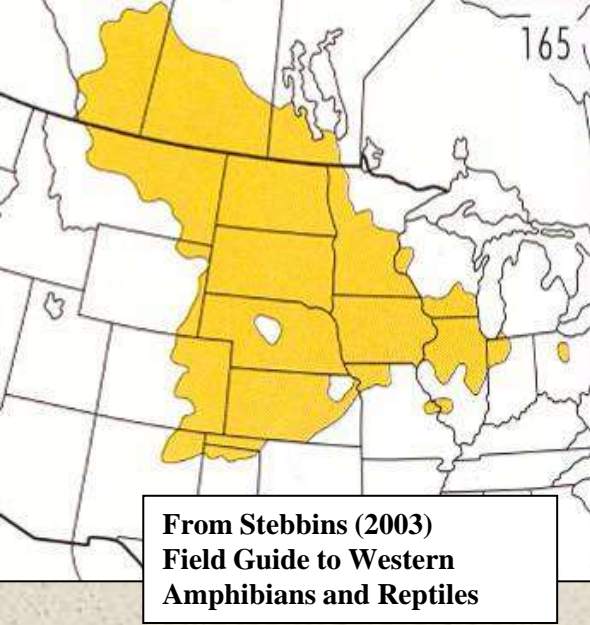
Terrestrial Gartersnake (*Thamnophis elegans*) Habitat Suitability Classes



From Maxell (2009)

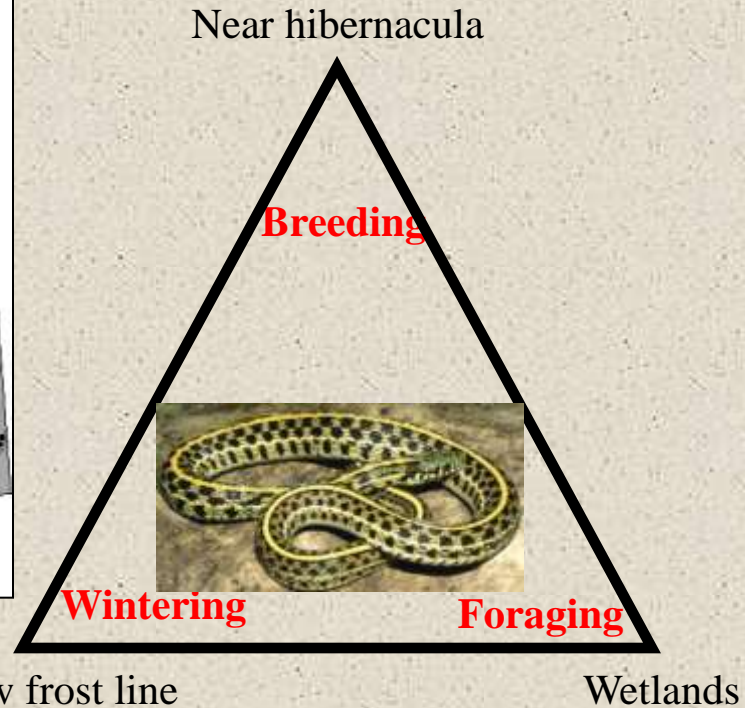
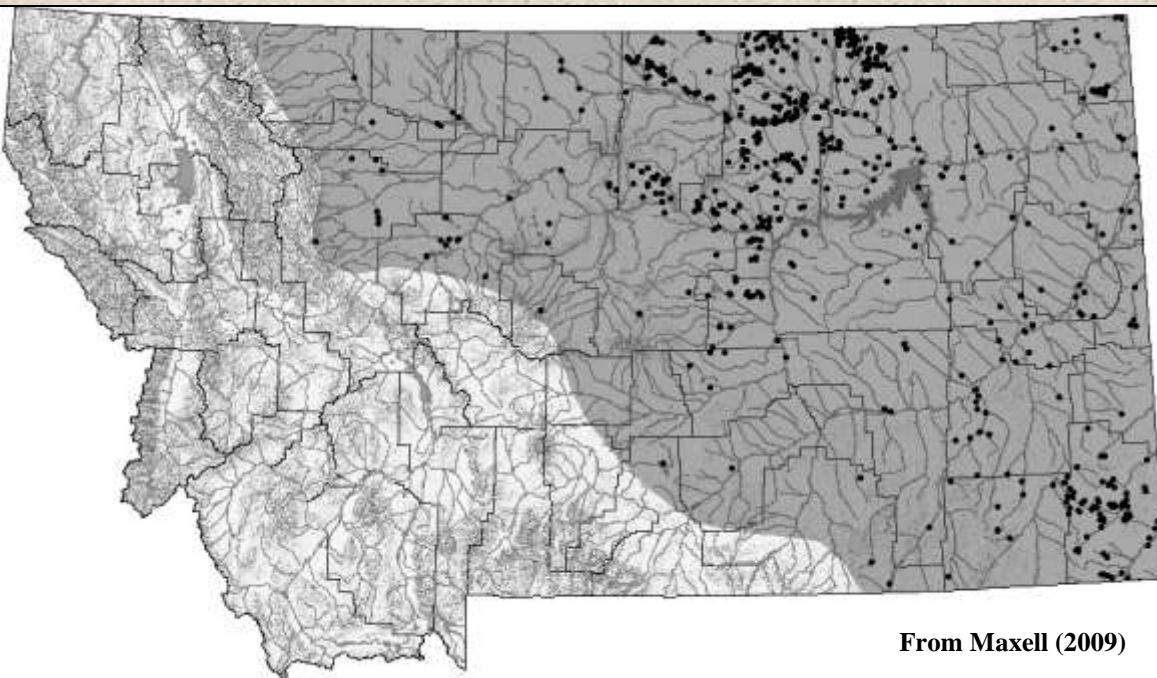
Red = Optimal
Orange = Moderate
Yellow = Lower

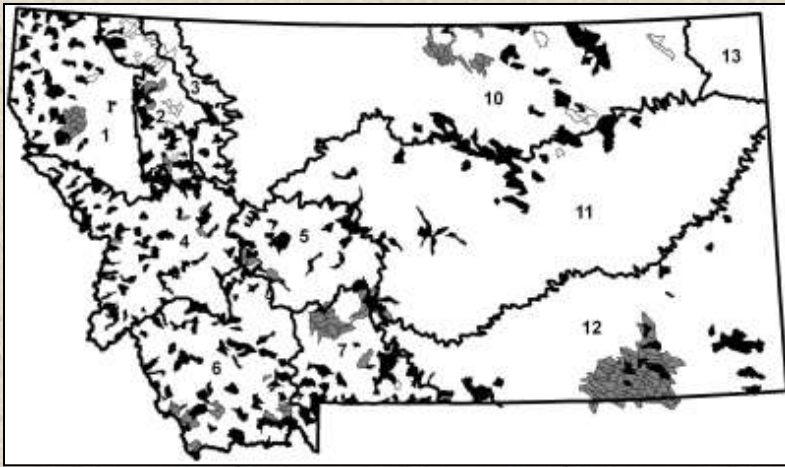
Plains Gartersnake (*Thamnophis radix*)



Issues of Concern

- Appears common
- Roads / vehicle traffic





Plains Gartersnake

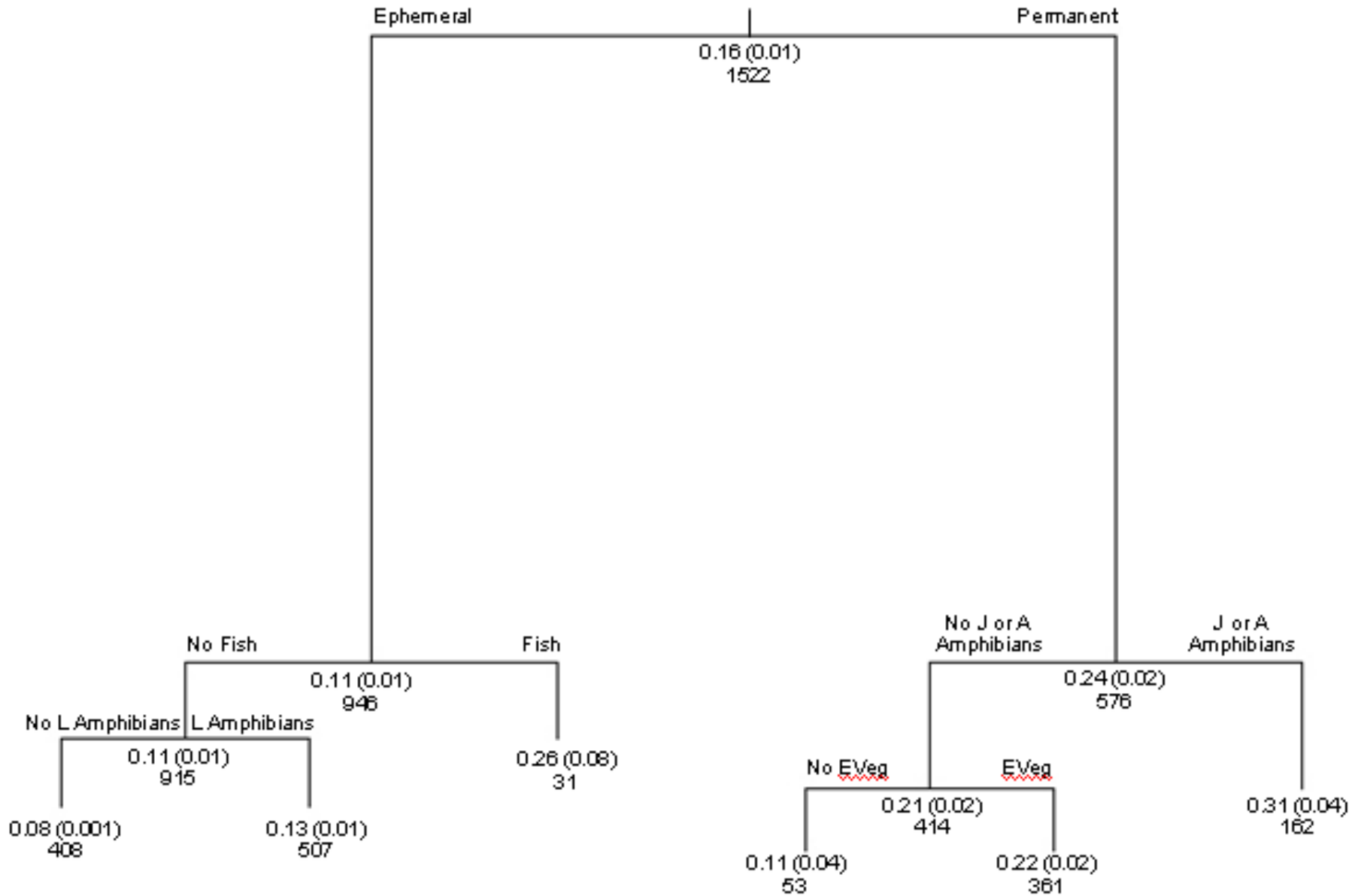
(Thamnophis radix)

Occupancy Rates

Strata	Total Number Watersheds / Sites	Percent Watershed Occupancy (95% CI ^a)	Percent Site Occupancy (95% CI ^b)
10	37 / 929	86 (76–96)	18 (15–20)
11	24 / 133	42 (23–60)	20 (13–26)
12	25 / 460	52 (34–70)	11 (8–14)
Overall	86 / 1522	64 (54–73)	16 (14–18)

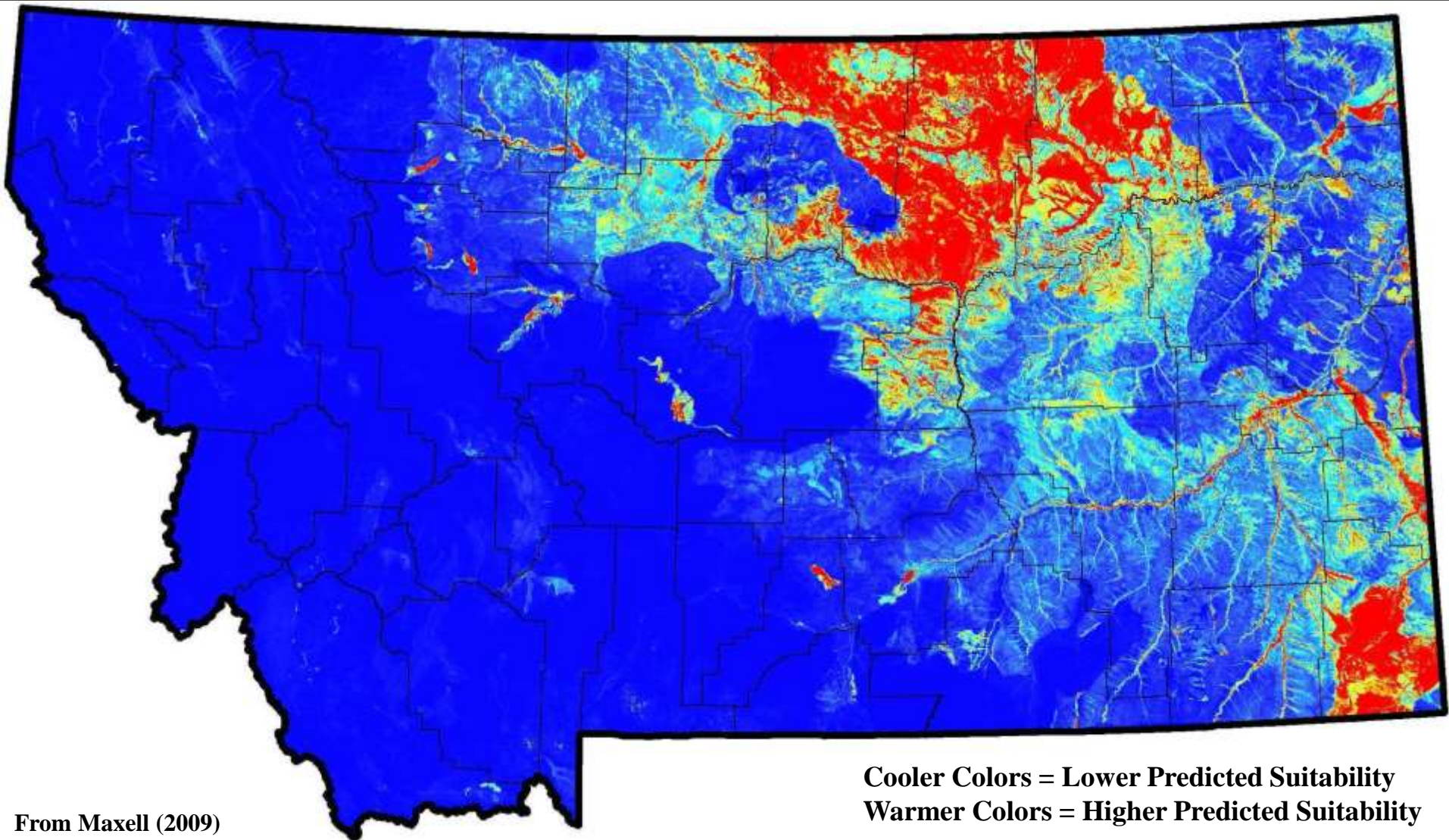
Plains Gartersnake (*Thamnophis radix*)

CART Model



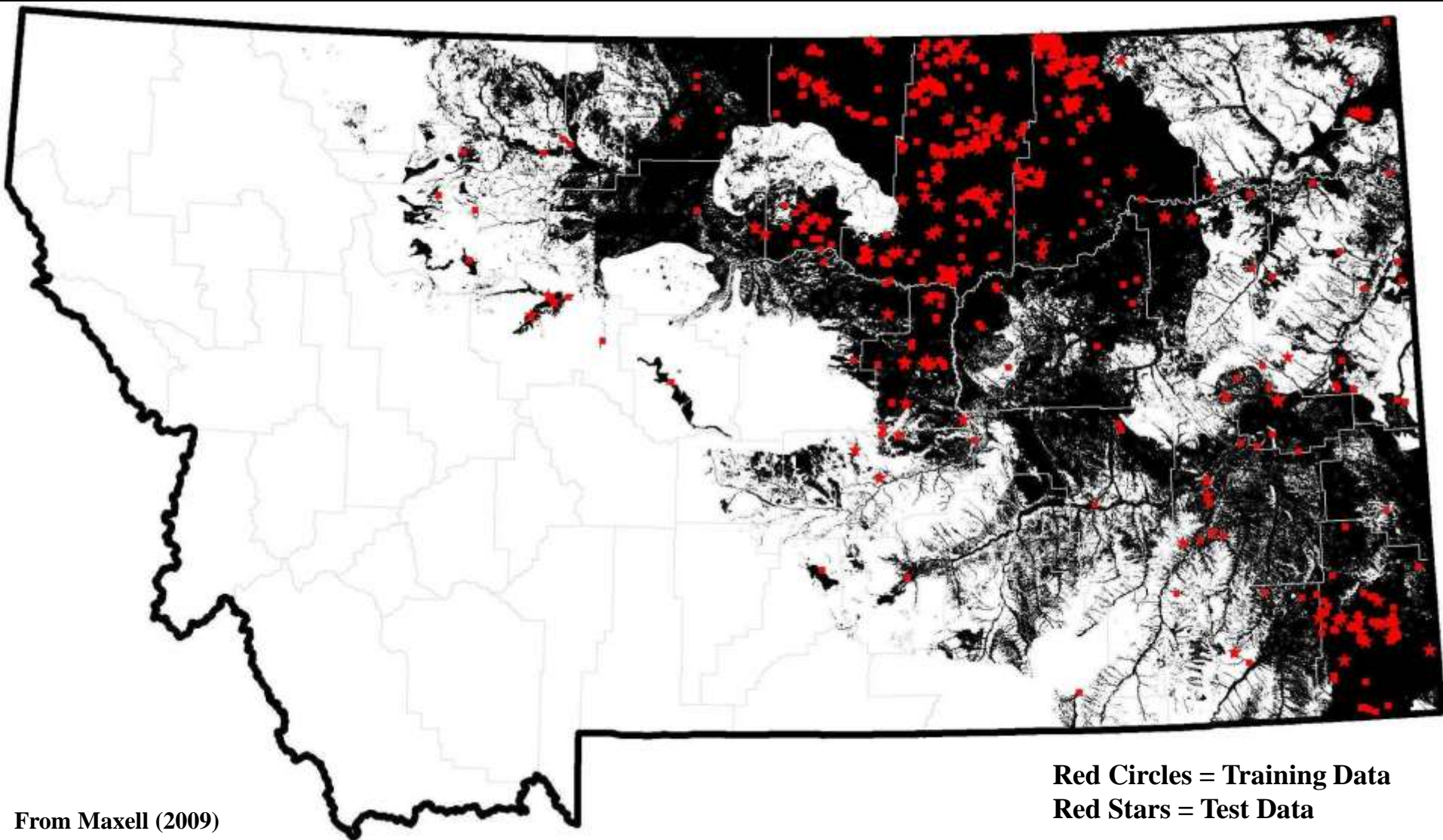
From Maxell (2009)

Plains Gartersnake (*Thamnophis radix*) Statewide Predicted Habitat Suitability Model



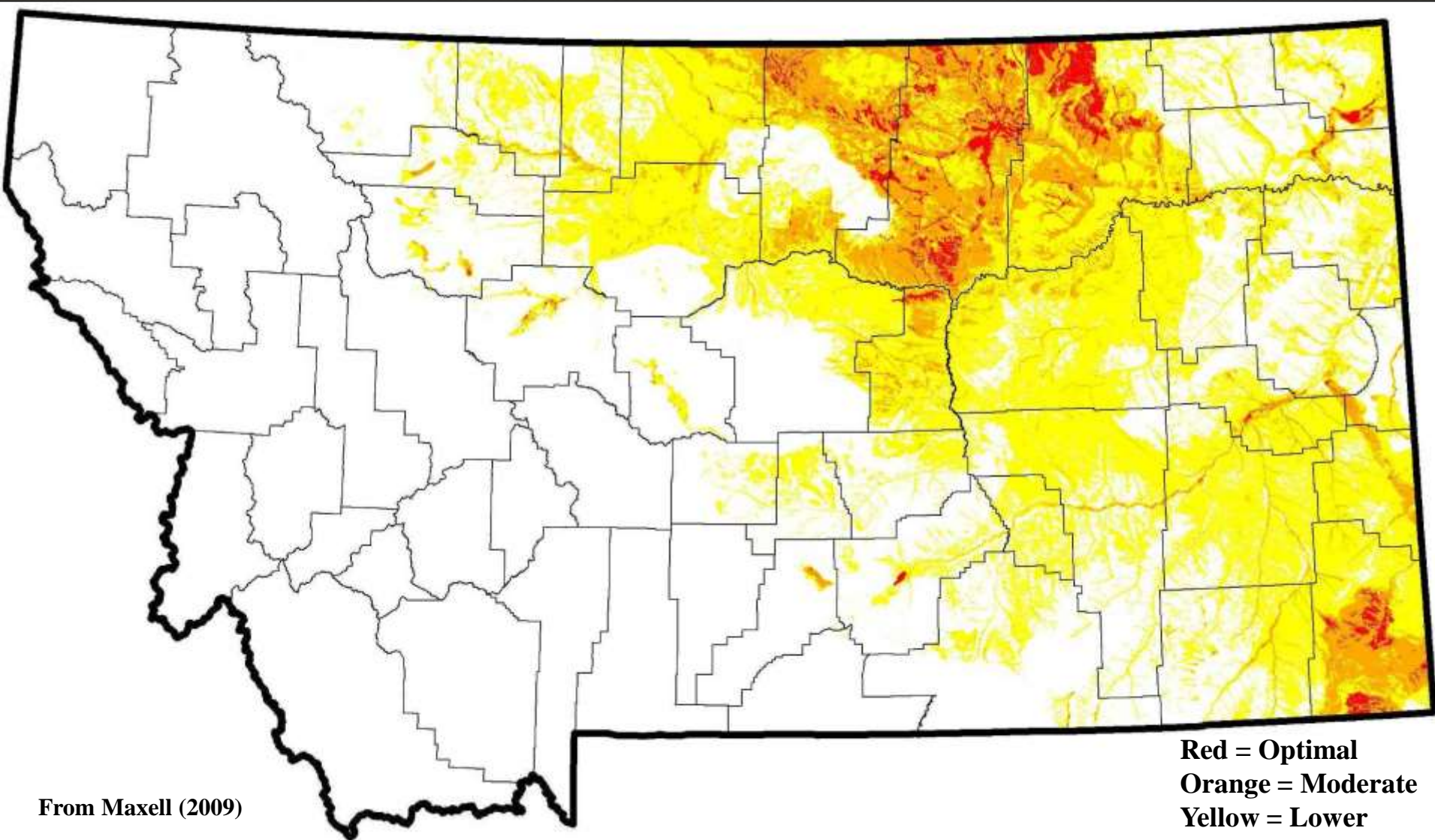
From Maxell (2009)

Plains Gartersnake (*Thamnophis radix*) Binary Model with Point Observations

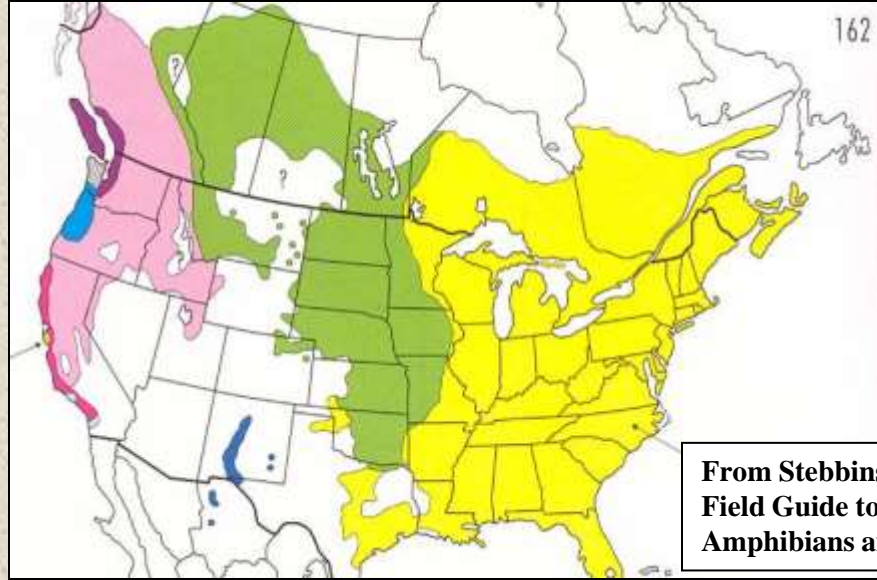


From Maxell (2009)

Plains Gartersnake (*Thamnophis radix*) Habitat Suitability Classes



Common Gartersnake (*Thamnophis sirtalis*)

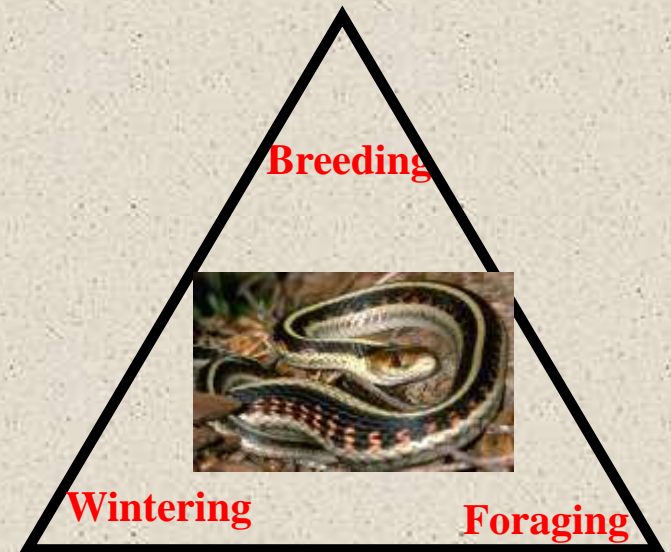
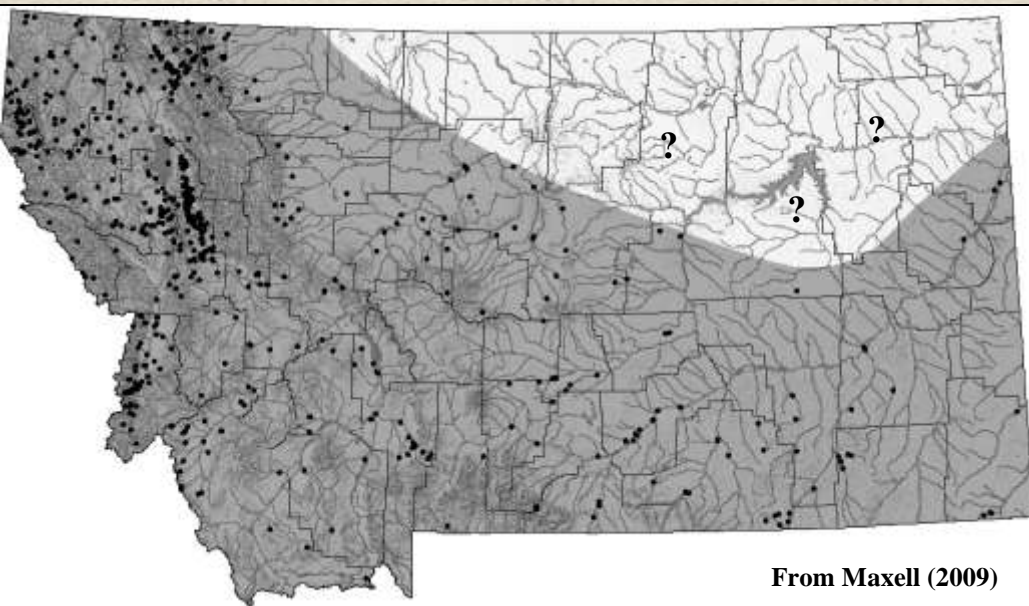


From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles

Issues of Concern

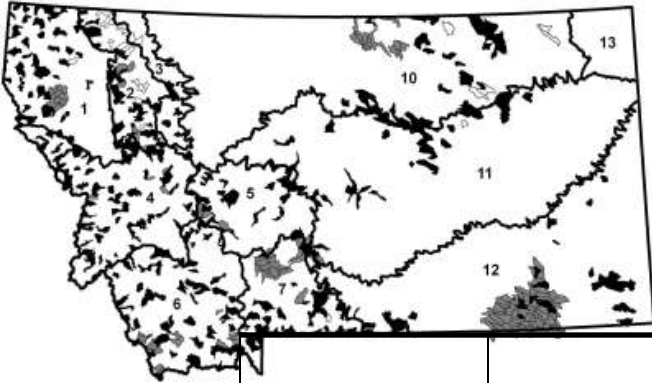
- Appears common
- Amphibian specialist
- Roads / vehicle traffic

Near hibernacula



Below frost line

Wetlands
Amphibians



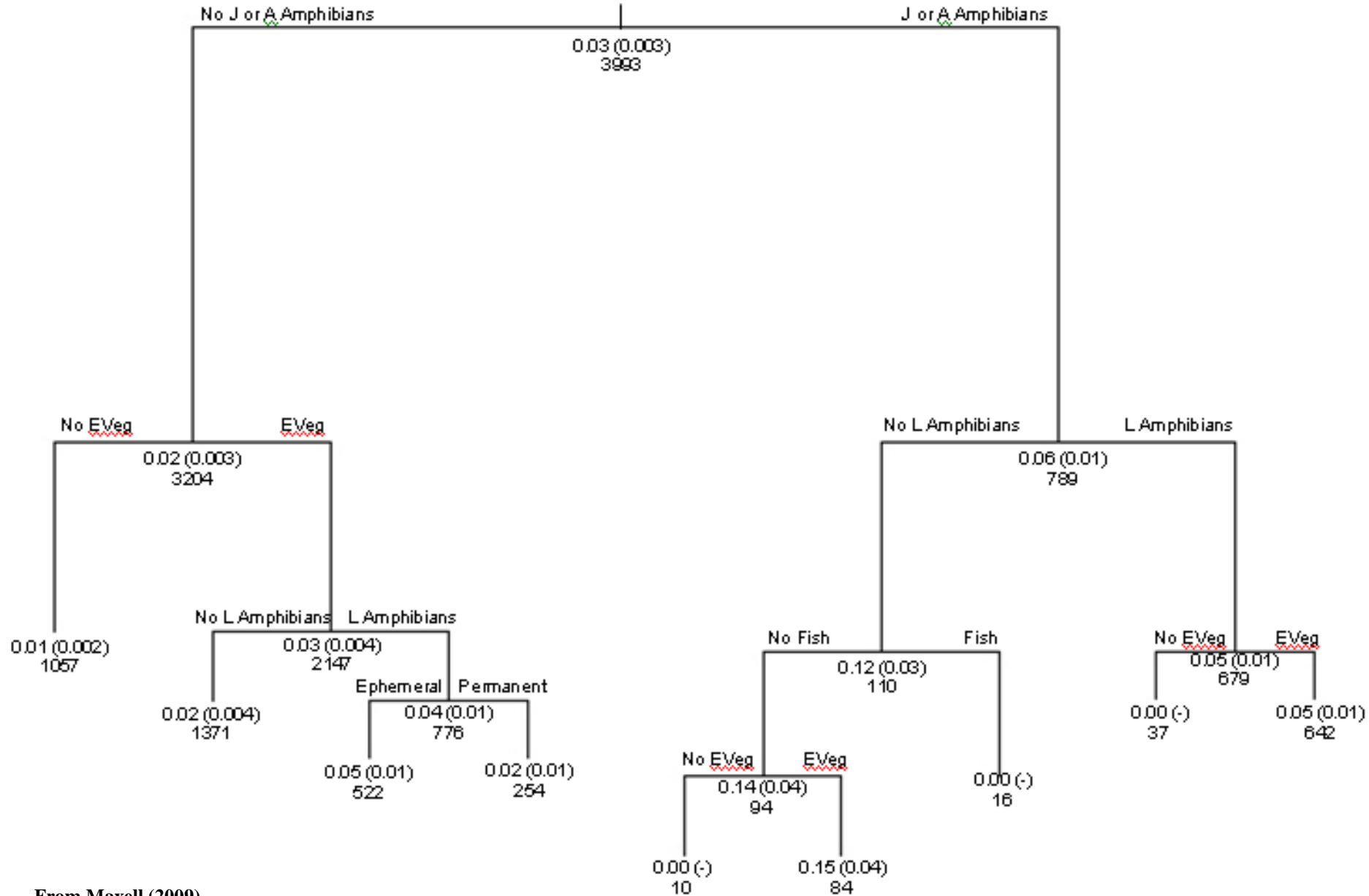
Common Gartersnake (*Thamnophis sirtalis*)

Occupancy Rates

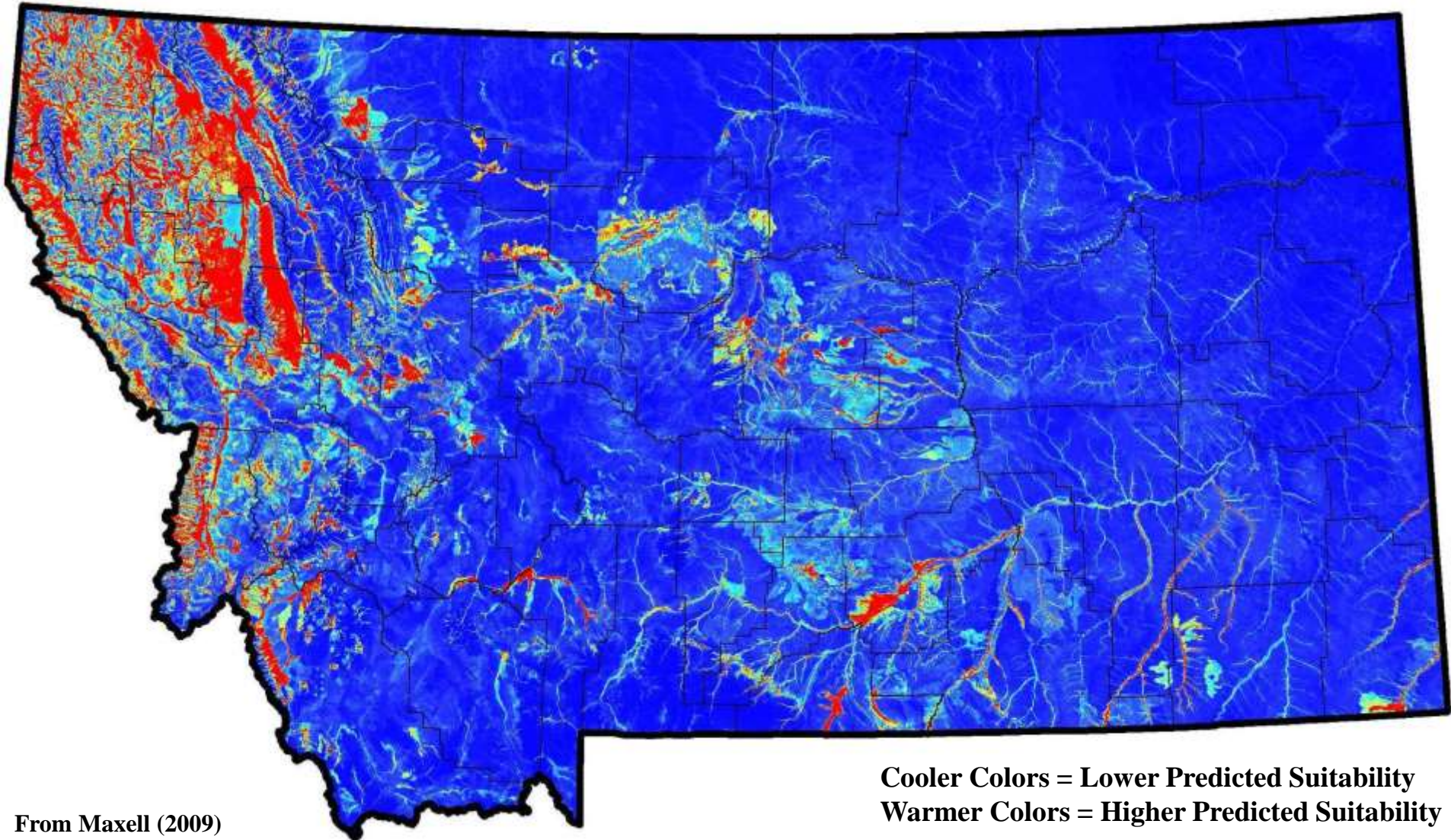
Strata	Total Number Watersheds / Sites	Percent Watershed Occupancy (95% CI ^a)	Percent Site Occupancy (95% CI ^b)
1	53 / 287	13 (5–21)	3 (1–5)
2	36 / 639	22 (10–34)	5 (4–7)
3	4 / 43	25 (0–67)	5 (0–11)
4	65 / 803	32 (22–42)	8 (6–10)
5	19 / 86	0 (-)	0 (-)
6	53 / 752	8 (1–14)	1 (0–1)
7	29 / 769	0 (-)	0 (-)
10	1 / 1	0 (-)	0 (-)
11	21 / 122	0 (-)	0 (-)
12	34 / 491	6 (0–13)	1 (0–2)
Overall	315 / 3993	14 (10–17)	3 (2–4)

Common Gartersnake (*Thamnophis sirtalis*)

CART Model

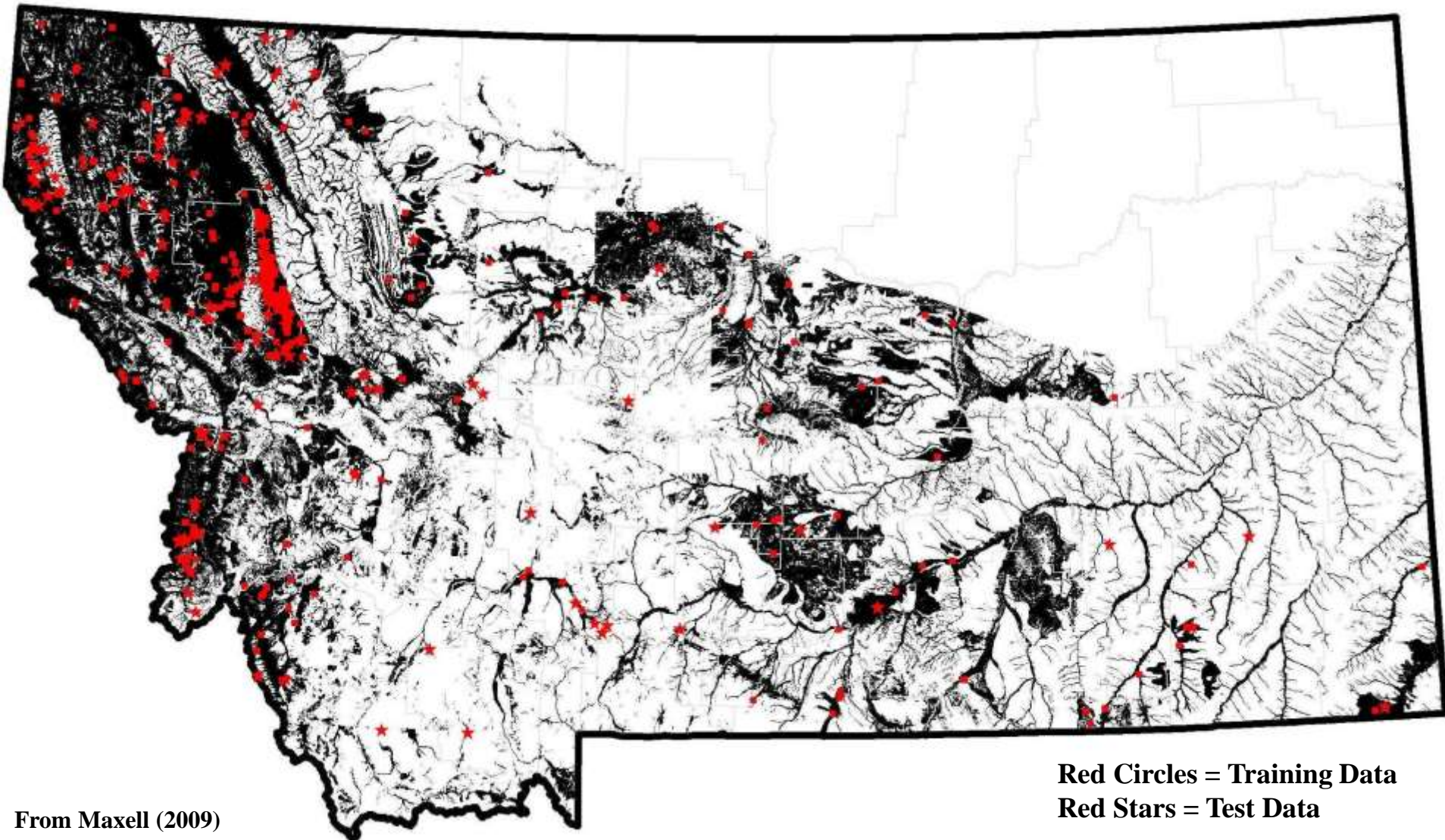


Common Gartersnake (*Thamnophis sirtalis*) Statewide Predicted Habitat Suitability Model



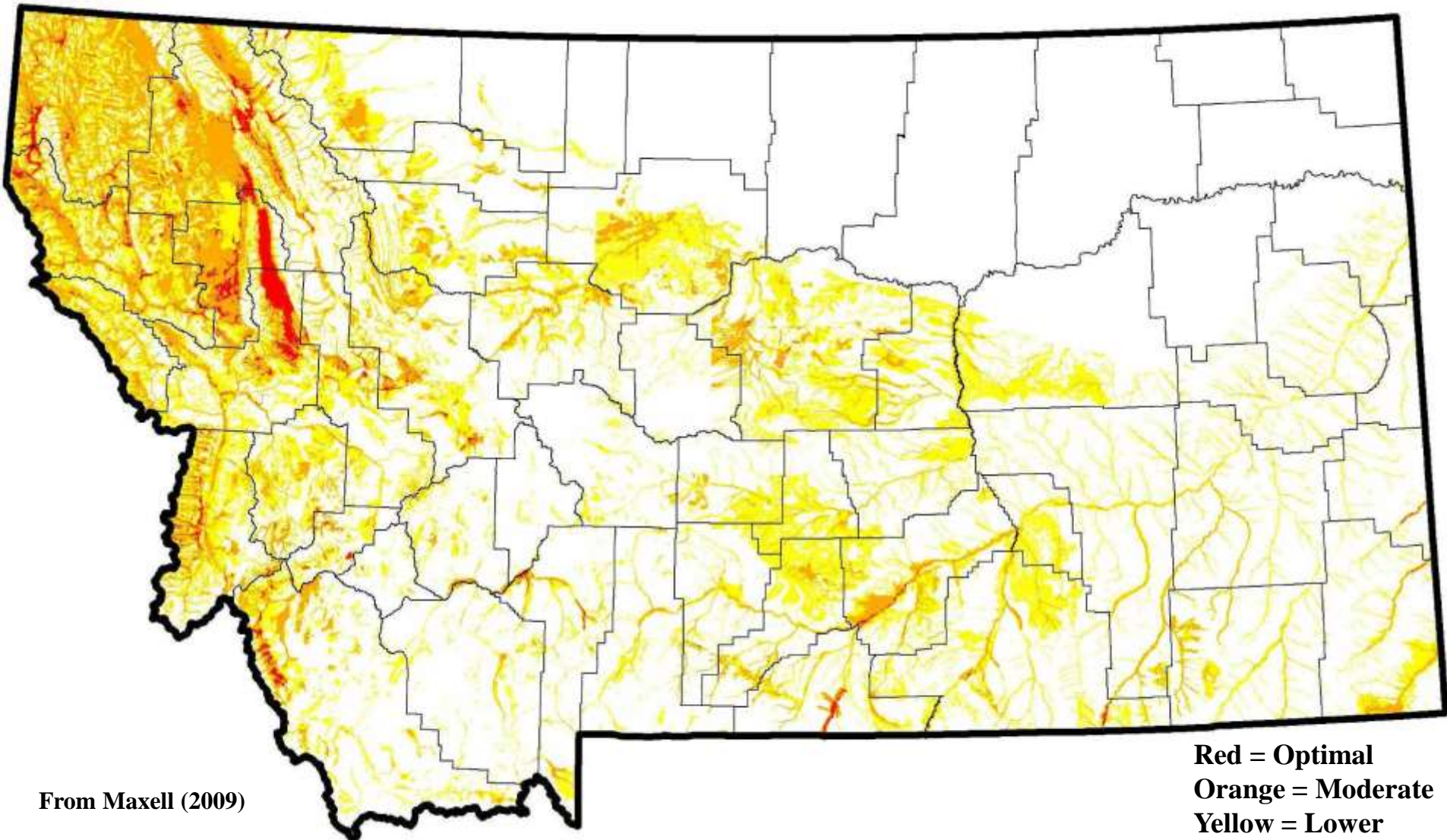
From Maxell (2009)

Common Gartersnake (*Thamnophis sirtalis*) Binary Model with Point Observations



From Maxell (2009)

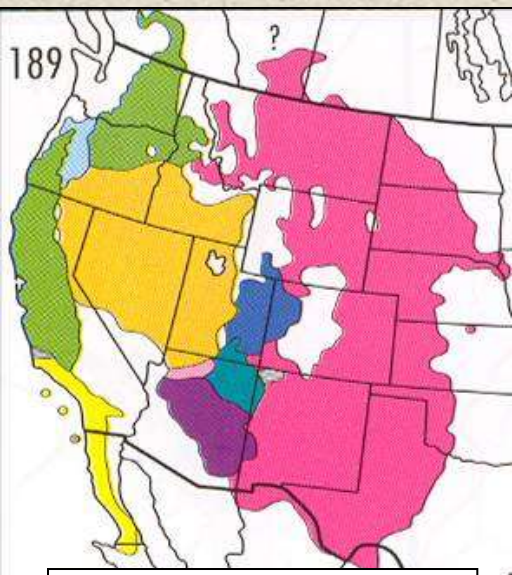
Common Gartersnake (*Thamnophis sirtalis*) Habitat Suitability Classes



From Maxell (2009)

Prairie Rattlesnake

(*Crotalus viridis*)

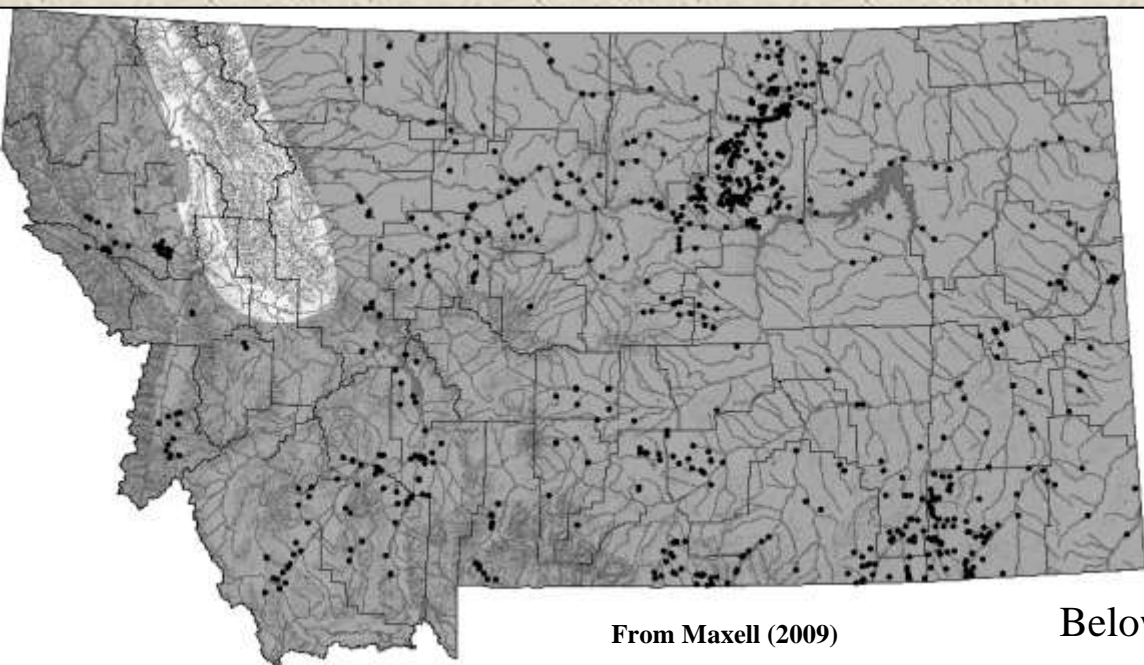


From Stebbins (2003)
Field Guide to Western
Amphibians and Reptiles



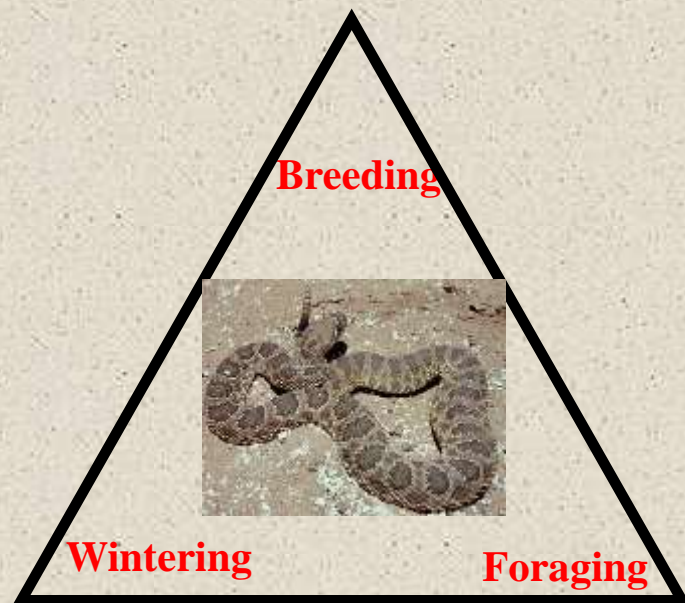
Issues of Concern

- Appears common
- Loss of grasslands in W
- Human persecution



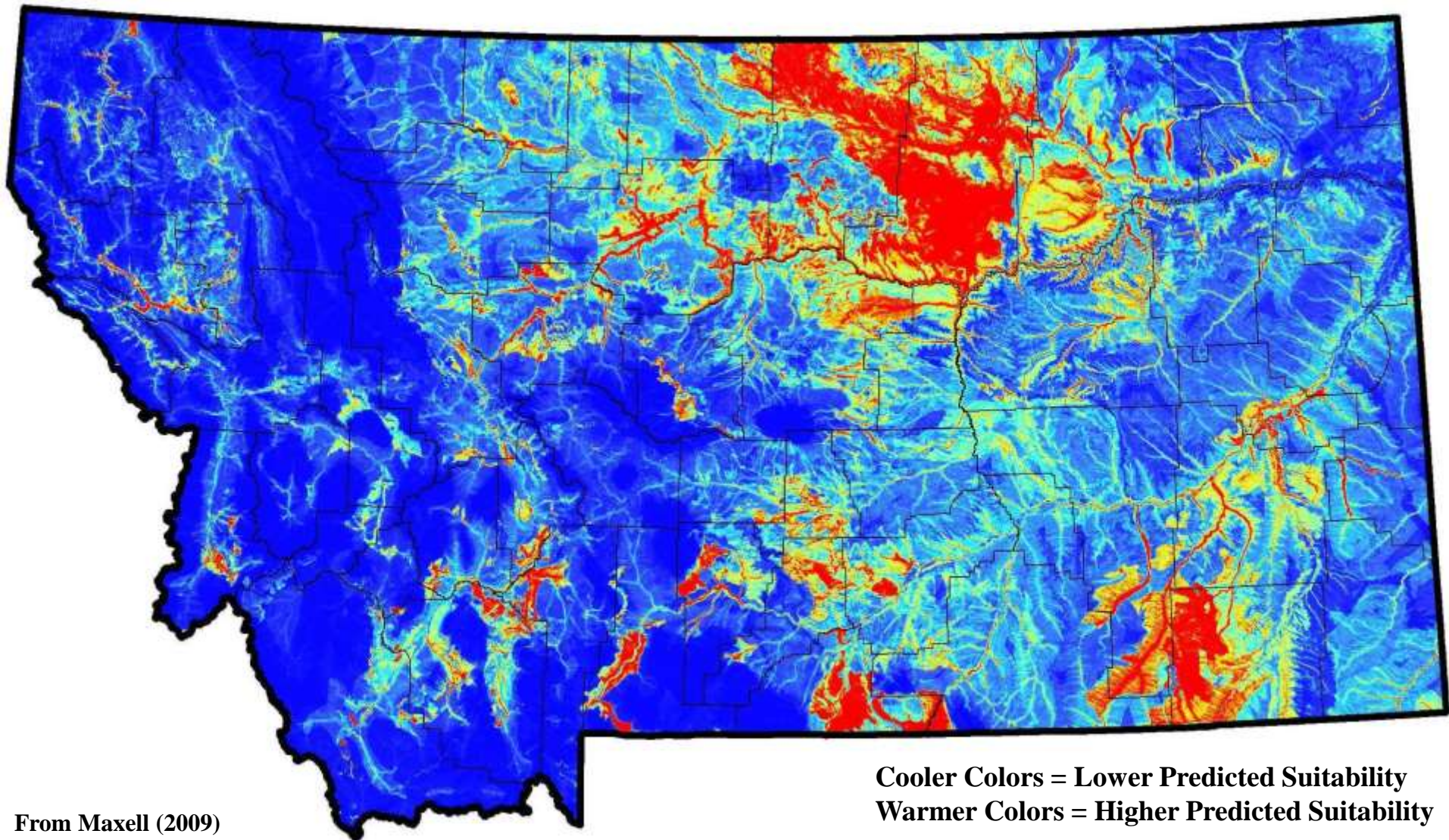
Below frost line

Near hibernacula



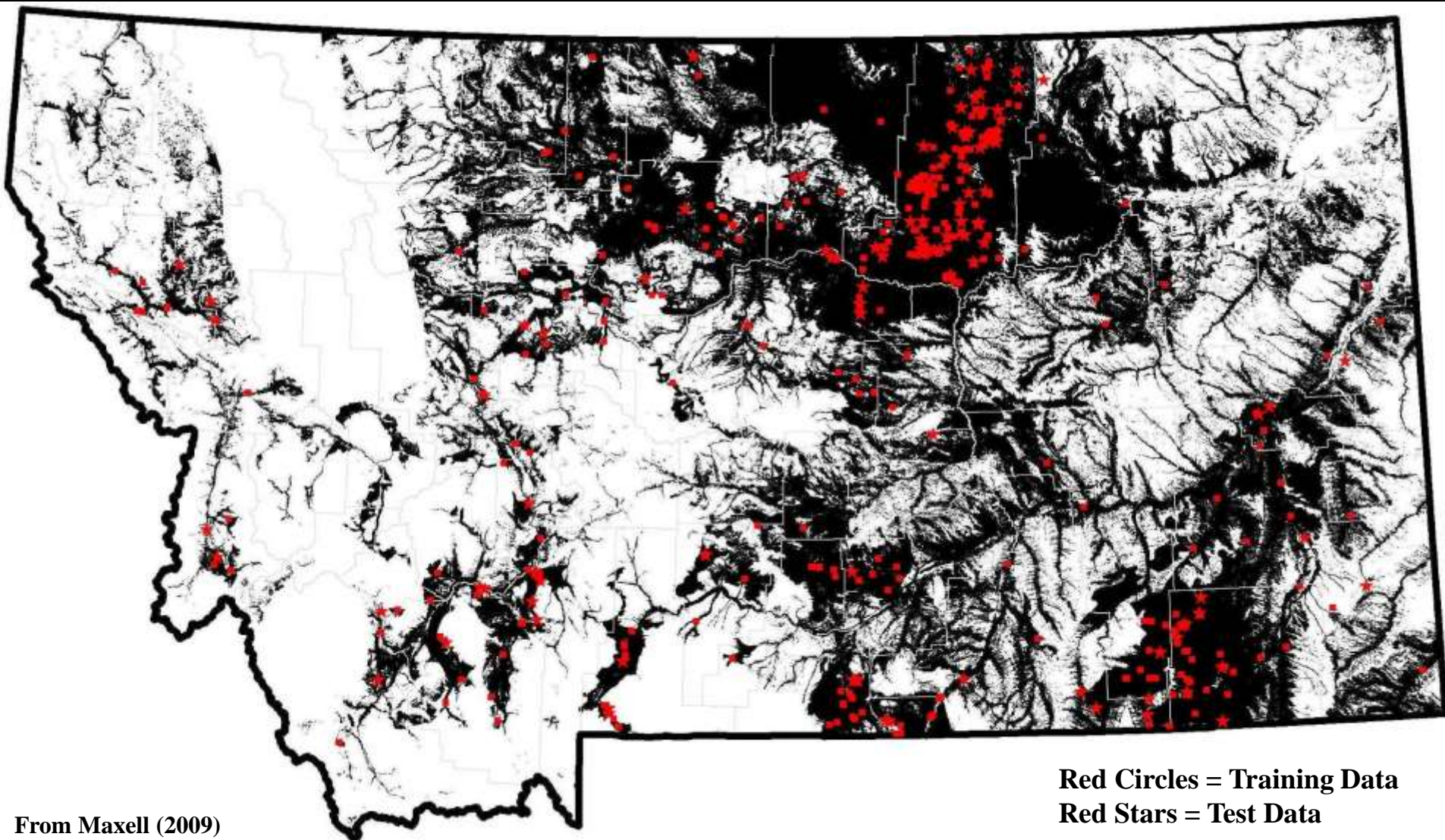
High Mammal Densities

Prairie Rattlesnake (*Crotalus viridis*) Statewide Predicted Habitat Suitability Model



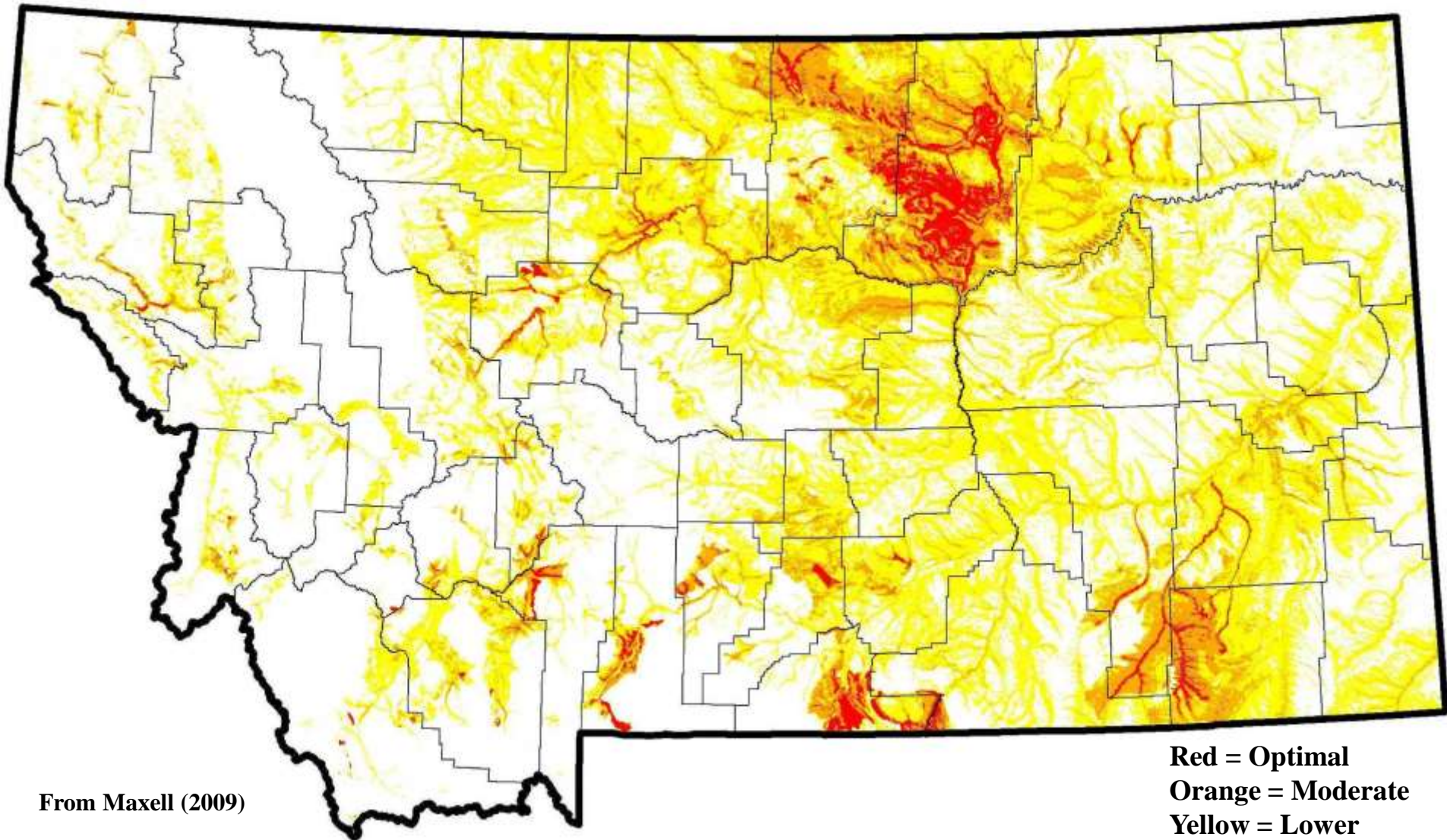
From Maxell (2009)

Prairie Rattlesnake (*Crotalus viridis*) Binary Model with Point Observations



From Maxell (2009)

Prairie Rattlesnake (*Crotalus viridis*) Habitat Suitability Classes



From Maxell (2009)