

Western toad*Anaxyrus boreas*

Class: Amphibia

Order: Anura

Conservation Status

NatureServe: Agency:

G Rank: G4

BLM:

IUCN: Least Concern

Audubon AK:

S Rank: S3S4

USFWS:

ADF&G: Species of Greatest Conservation Need

Final Rank		
Conservation category: V. Orange		
V = unknown status and either high biological vulnerability or high action need		
<u>Category</u>	<u>Range</u>	<u>Score</u>
Status:	-20 to 20	0
Biological:	-50 to 50	-28
Action:	-40 to 40	12
Higher numerical scores denote greater concern		

Status - variables measure the trend in a taxon's population status or distribution. Higher status scores denote taxa with known declining trends. Status scores range from -20 (increasing) to 20 (decreasing).

Score*Population Trend (-10 to 10)*

0

In Alaska, seems to undergo large population fluctuations, which makes it difficult to reliably assess trends. Localized long-term declines appear to have occurred in some areas of southeast AK including Haines, Ketchikan, and Skagway (Anderson 2004; Adams et al. 2007; MacDonald 2010). However, it is unknown whether these observations represent ongoing declines or whether they are low points in the population's cycle. Until additional information is available, we rank this question as Unknown.

Distribution Trend (-10 to 10)

0

Unknown.

Status Total:

0

Biological - variables measure aspects of a taxon's distribution, abundance and life history. Higher biological scores suggest greater vulnerability to extirpation. Biological scores range from -50 (least vulnerable) to 50 (most vulnerable).

Score*Population Size (-10 to 10)*

-6

Unknown, but suspected large. The western toad has a fairly large range in Alaska and is often the most commonly reported amphibian in surveys (Anderson 2004; Ream 2016; Ream et al. 2019) Surveys at two sites in southeast Alaska recorded 1,263 adult individuals and estimated >100,000 tadpoles (Table 4.2 in Ream 2016).

Range Size (-10 to 10)

-8

Year-round resident on mainland and islands of southern Alaska, north to and including Prince William Sound (Anderson 2004; MacDonald 2010; Ream 2016). Their northern range includes Cordova, Tatitlek, Valdez, Chenega Bay and many islands in PWS (Ream 2016; ACCS 2017a; J. Ream, USFWS, pers. comm.). Estimated range size is ~170,000 sq. km. (ACCS 2017a).

Population Concentration (-10 to 10)

-10

Can congregate in large numbers during hibernation and during the breeding season (Carstensen et al. 2003; MacDonald 2010; Ream 2016). However, given its relatively large population and range size, we estimate that there are >250 sites in the state.

*Reproductive Potential*Age of First Reproduction (-5 to 5)

1

Western toads reach sexually maturity between 4 to 6 years old (Olson 1988; Carey 1993).

Number of Young (-5 to 5)

0

In Alaska, females can lay over 5,000 eggs and appear to breed every 2 to 3 years (Pyare et al. 2004; Bull and Carey 2008). However, as with other amphibians, survivorship of young is likely much lower (M. Spangler, UAF, pers. comm.; see pages 34-35 in Patla et al. 2005) and there is some evidence to suggest that amphibians do not recover as quickly as we would expect given their fecundity (Murray et al. 2009; Pilliod et al. 2010). Rather than inflate our assessment of reproductive potential, we cautiously rank this question as 0- Unknown until estimates of survivorship are available.

*Ecological Specialization*Dietary (-5 to 5)

0

Little is known about the diet of western toads in Alaska or elsewhere. In Oregon, they feed on small invertebrates such as beetles and ants (Bull 2006). We rank this question as 0- Unknown because we feel that the information available is too scant to assess dietary specialization.

Habitat (-5 to 5)

-5

Found in a variety of habitats including forests, wetlands, high-elevation sites, and anthropogenic areas (Waters 1992; Carstensen et al. 2003; Anderson 2004; Moore et al. 2011). Breeding habitat is equally flexible and includes freshwater and saline ponds, streams, fjords, and ditches with aquatic vegetation (Waters 1992; Carstensen et al. 2003; Moore et al. 2011; Holmes 2015; Ream 2016). Overwinters in burrows and natural crevices in forests and hummocks (Pyare et al. 2004; Browne and Paszkowski 2010).

Biological Total:

 -28

Action - variables measure current state of knowledge or extent of conservation efforts directed toward a given taxon. Higher action scores denote greater information needs due of lack of knowledge or conservation action. Action scores range from -40 (lower needs) to 40 (greater needs).

Score*Management Plans and Regulations (-10 to 10)*

10

Not managed or protected in the state of Alaska. A permit is required to collect specimens for scientific or educational purposes (ADF&G 2004).

Knowledge of Distribution and Habitat (-10 to 10)

-10

Distribution and habitat associations are well-known from amphibian surveys conducted in several areas of this species' range (e.g. Waters 1992; Carstensen et al. 2003; Anderson 2004; MacDonald 2010; Gotthardt et al. 2015; Surdyk and Waldo 2018; Ream et al. 2019). Habitat assessments specific to the western toad have also been conducted (Pyare et al. 2007).

Knowledge of Population Trends (-10 to 10)

2

Western toads are monitored at two sites by Klondike Gold Rush National Monument and the Alaska Herpetological Society's Stikine Long-term Amphibian Monitoring Program (SLAMP) (J. Ream, USFWS, pers. comm.). However, monitoring sites only cover a small part of this species' range and data collected are currently inadequate for detecting statewide population trends.

Knowledge of Factors Limiting Populations (-10 to 10)

10

Little is known about the ecology of this species in Alaska. Potential threats include diseases and pathogens, competition with non-native species (e.g. the red-legged frog), climate change, and human development (Blaustein et al. 2001; Carey et al. 2005; Olson et al. 2009; MacDonald 2010). Chytrid fungus has been reported in several populations of southeast Alaska (Adams et al. 2007; MacDonald 2010; Surdyk and Waldo 2018). Moore et al. (2011) found that roads had little effect on the movement and connectivity of western toads in southeast Alaska.

Action Total:

 12

Supplemental Information - variables do not receive numerical scores. Instead, they are used to sort taxa to answer specific biological or management questions.

Harvest:	Not substantial
Seasonal Occurrence:	Year-round
Taxonomic Significance:	Monotypic species
% Global Range in Alaska:	<10%
% Global Population in Alaska:	<25%
Peripheral:	No

References

- Alaska Center for Conservation Science (ACCS). 2017a. Wildlife Data Portal. University of Alaska Anchorage. Available online: <http://aknhp.uaa.alaska.edu/apps/wildlife>
- Adams, M. J., S. Galvan, D. Reinitz, R. A. Cole, S. Pyare, M. Hahr, and P. Govindarajulu. 2007. Incidence of the fungus *Batrachochytrium dendrobatidis* in amphibian populations along the northwest coast of North America. *Herpetological Review* 38(4):430–431
- Alaska Department of Fish and Game (ADFG). 2004. Policy and requirements for fish resource permits. Juneau, AK, USA.
- Anderson, B. C. 2004. An opportunistic amphibian inventory in Alaska's national parks 2001-2003. Inventory and Monitoring Program, National Park Service, Anchorage, AK, USA.
- Blaustein, A. R., L. K. Belden, D. H. Olson, D. M. Green, T. L. Root, and J. M. Kiesecker. 2001. Amphibian breeding and climate change. *Conservation Biology* 15(6):1804-1810. DOI: 10.1046/j.1523-1739.2001.00307.x
- Browne, C. L., and C. A. Paszkowski. 2010. Hibernation sites of western toads (*Anaxyrus boreas*): Characterization and management implications. *Herpetological Conservation and Biology* 5(1):49-63.
- Bull, E. L. 2006. Sexual differences in the ecology and habitat selection of western toads (*Bufo boreas*) in northeastern Oregon. *Herpetological Conservation and Biology* 1(1):27-38.
- Bull, E., and C. Carey. 2008. Breeding frequency of western toads (*Bufo boreas*) in northeastern Oregon. *Herpetological Conservation and Biology* 3(2):282-288.
- Carey, C. 1993. Hypothesis concerning the causes of the disappearance of boreal toads from the mountains of Colorado. *Conservation Biology* 7(2):355-362. DOI: 10.1046/j.1523-1739.1993.07020355.x
- Carey, C., P. S. Corn, M. S. Johns, L. J. Livo, E. Muths, and C. W. Loeffler. 2005. Factors limiting the recovery of boreal toads (*Bufo b. boreas*). Pages 222–236 in Lannoo, M., ed. *Amphibian declines: The conservation status of United States species*. Univ
- Carstensen, R., M. Willson, and R. Armstrong. 2003. Habitat use of amphibians in northern southeast Alaska. Report to the Alaska Department of Fish and Game by Discovery Southeast, Juneau, AK, USA.
- Gotthardt, T., J. Reimer, T. Nawrocki, C. Greenstein, and K. Walton. 2015. Prince of Wales Island amphibian surveys 2013 and 2014. Alaska Natural Heritage Program, University of Alaska Anchorage. Anchorage, AK, USA. Available online: <https://accs.uaa.alas>
- Holmes, I. 2015. Temporal population genetic instability in range-edge western toads, *Anaxyrus boreas*. *Journal of Heredity* 106(1):45-56. DOI:10.1093/jhered/esu068
- MacDonald, S. O. 2010. The amphibians and reptiles of Alaska: A field handbook. Version 2.0, May 2010. Alaska Natural Heritage Program, University of Alaska Anchorage, AK, USA.
- Moore J. A., D. A. Tallmon, J. Nielsen, and S. Pyare. 2011. Effects of the landscape on boreal toad gene flow: Does the pattern-process relationship hold true across distinct landscapes at the northern range margin? *Molecular Ecology* 20(23):4858-4869. DOI

- Murray, K. A., L. F. Skerratt, R. Speare, and H. McCallum. 2009. Impact and dynamics of disease in species threatened by the amphibian chytrid fungus, *Batrachochytrium dendrobatidis*. *Conservation Biology* 23(5):1242–1252. DOI: 10.1111/j.1523-1739.2009.0121
- Olson, D. H. 1988. The ecological and behavioral dynamics of breeding in three sympatric anuran amphibians. Ph.D. thesis, Oregon State University, Corvallis, OR, USA.
- Olson, D. H., ed. Herpetological conservation in northwestern North America. *Northwestern Naturalist* 90(2):61-96. DOI: 10.1898/NWN08-52.1
- Patla, D. A., D. A. Keinath, M. McGee, and D. S. Pilliod. 2005. Species assessment for Columbia spotted frog (*Rana luteiventris*) in Wyoming. Prepared for U.S. Bureau of Land Management, Wyoming State Office, Cheyenne, WY, USA.
- Pilliod, D. S., E. Muths, R. D. Scherer, P. E. Bartelt, P. S. Corn, B. R. Hossack, B. A. Lambert, R. Mccaffery, and C. Gaughan. 2010. Effects of amphibian chytrid fungus on individual survival probability in wild boreal toads: Toad survival of Chytridiomy
- Pyare, S., R.E. Christensen III, and M. J. Adams. 2007. Preliminary assessment of breeding-site occurrence, microhabitat, and sampling of western toads in Glacier Bay. Pages 16-19 in Piatt, J. F., and S. M. Gende, eds. *Proceedings of the Fourth Glacier Ba*
- Ream, J. T. 2016. Local herpetological knowledge in the north. PhD thesis, University of Alaska Fairbanks, AK, USA.
- Ream, J. T., D. Zabriskie, and J. Andrés López. 2019. Herpetological inventory of the Stikine River region, Alaska, 2010-2018. *Northwestern Naturalist* 100:102–117.
- Surdyk, S., and A. Waldo. 2018. Amphibian surveys at Klondike Gold Rush NHP: 2017 Summary. Natural Resource Report NPS/KLGO/NRR—2018/1587, National Park Service, Fort Collins, CO, USA.
- Waters, N. D. L. 1992. Habitat associations, phenology, and biogeography of amphibians in the Stikine River basin and southeast Alaska. Report of the 1991 pilot project. U.S. Fish and Wildlife Service, California Cooperative Fishery Research Unit, and Hum

Review status: Peer-reviewed

Version date: 23 April 2018

Alaska Center for Conservation Science
Alaska Natural Heritage Program
University of Alaska Anchorage
Anchorage, AK