

## Cascade Red Fox

(*Vulpes vulpes cascadenensis*)

**State Status:** Candidate, 2010

**Federal Status:** None

**Recovery Plans:** None

The Cascade red fox is a rare, isolated Washington endemic subspecies. It is known to occur in alpine and subalpine habitats on Mt. Rainier and Mt. Adams, and there is some evidence of their presence in the central Cascades. Cascade red foxes come in a variety of coat colors including red, tan, and black (Figures 1, 2).



Figure 1. Cascade red fox in Mt. Rainier National Park (photo by Joe Higbee).

The Cascade red fox and other montane red fox populations appear to be specialized for occupying subalpine and alpine habitats, and may possess physiological adaptations that other populations lack (Aubry 1984, Swanson et al. 2005). The subalpine parklands and alpine meadows that montane red foxes inhabit (Aubry 1984, Kamler and Ballard 2002) may represent the modern analogue of forest conditions occupied in the Western mountains during the last glaciation. Presumably, the range of red foxes in the Western mountains shifted up in elevation with their primary habitat during glacial retreat. The findings of Aubry et al. (2009) support treating the montane red foxes as evolutionarily distinct. Recent genetic analyses also indicate that the Cascade red fox is distinct from the montane fox in Oregon and only occurs in Washington (Sacks et al. 2010).

The population size at Mt. Rainier and Mt. Adams is unknown, and the fox's status elsewhere in its range is unknown. The volcanoes of the Cascade Range seem to provide islands of habitat for small populations of Cascade red fox that may be isolated. A population size of less than a few thousand individuals may put the subspecies at risk of inbreeding depression and other genetic issues that could affect its future existence. A University of California-Davis graduate research project was initiated in the Mt. Rainier and Mt. Adams areas in 2010 with support from the U.S. Forest Service. Systematic surveys are needed in Washington's central and northern Cascades to determine the current status and distribution of Cascade red foxes. Scat was collected at several sites in Mt. Rainier National Park during 2011-2012 for DNA analysis to assess whether populations are connected (Akins 2012).

The Cascade red fox status in the North Cascades is uncertain. One was caught in a lynx trap in the North Cascades in the 1980s, but none have been caught during recent trapping for lynx or wolverines there, although red foxes in Yellowstone National Park are often incidentally caught in similar traps. There were also no detections of Cascade red foxes in the North Cascades during forest carnivore surveys (camera sets, hair snares, etc.) conducted in the 1990s.

Most of the apparent threats to the Cascade red fox are not new, but may be increasing in significance. Small, isolated populations are at risk of inbreeding and erosion of genetic health, and the impact of canine diseases may be more detrimental. Increasing human activities and ongoing climate change may also be facilitating movements of coyotes, a potential competitor and predator, into the range of the Cascade red fox. Lowland red foxes, bred from stock that originated in the eastern U.S. and escaped from

fur farms (Statham et al. 2012), seem to be increasing in Washington and could hybridize with the Cascade red fox. Climate models suggest that wildlife restricted to high-elevation habitats (such as the Cascade red fox) may be at risk of extinction due to climate change.

Foxes at Mt. Rainier National Park eat northern pocket gophers, snowshoe hares, songbirds, and huckleberries (Akins 2012). The foxes in the Paradise area of the park are increasingly becoming habituated to humans, which may put them at greater risk of vehicle collisions (Reese 2007).

**Partners and cooperators:** U.S. Forest Service-PNW Lab, National Park Service, University of California-Davis.

### Literature Cited

- Akins, J. 2012. Conservation status of the Cascades Red Fox. Science Brief, Mount Rainier national Park. Available at: [http://www.nps.gov/mora/naturescience/upload/CascadeFox\\_Akins2012-CCP-ScienceBrief.pdf](http://www.nps.gov/mora/naturescience/upload/CascadeFox_Akins2012-CCP-ScienceBrief.pdf)
- Aubry, K. B. 1984. The recent history and present distribution of the red fox in Washington. *Northwest Science* 58:69–79.
- Aubry, K. B. M. J. Statham, B. N. Sacks, J. D. Perrine and S. M. Wisely. 2009. Phylogeography of the North American red fox: vicariance in Pleistocene forest refugia. *Molecular Ecology* 18:2668–2686.
- Kamler J. F., and W. B. Ballard. 2002. A review of native and nonnative red foxes in North America. *Wildlife Society Bulletin* 30:370–379.
- Reese, A. 2007. Addressing food conditioning of Cascades red foxes in Mount Rainier National Park, Washington. M. S. thesis, The Evergreen State College, Olympia, Washington. 77 pp.
- Sacks, B. N., M. J. Statham, J. D. Perrine, S. M. Wisely, and K. B. Aubry. 2010. North American montane red foxes: expansion, fragmentation, and the origin of the Sacramento Valley red fox. *Conservation Genetics* 11:1523–1539.
- Statham, M. J., B. N. Sacks, K. B. Aubry, J. D. Perrine, and S. M. Wisely. 2012. The origin of recently established red fox populations in the United States: translocations or natural range expansions? *Journal of Mammalogy* 93(1):52–65.
- Swanson, B. J., R. T. Fuhrmann, and R. L. Crabtree. 2005. Elevational isolation of red fox populations in the Greater Yellowstone ecosystem. *Conservation Genetics* 6:123–131.



Figure 2. Cascade red fox in Mt. Rainier National Park (photo by Cliff Rice).