

A close-up photograph of a Vancouver Island marmot (Marmota vancouverensis) perched on a grey, textured rock. The marmot has thick, brownish-grey fur and is looking upwards and to the right. The background is a soft, out-of-focus green.

RETURN OF THE WHISTLEPIG: VANCOUVER ISLAND MARMOT (*Marmota vancouverensis*)

DECLINE, RECOVERY, & FUTURE



MARMOT

RECOVERY FOUNDATION



OUTLINE

- A Brief Natural History of the Vancouver Island Marmot
- Past: Past occupation and decline in Strathcona region
- Present: Reintroduction challenges and successes
- Future: Hope and concern for the marmot



MARMOT
RECOVERY FOUNDATION

ABOUT THE MARMOT RECOVERY FOUNDATION

- The Foundation's mission to do the on-the-ground work needed to recover the wild population of Vancouver Island Marmots.
- The Recovery effort is a partnership between governments, landowners, & conservation groups.
- Our work is funded by individual donations, the Provincial Government, private landowners of marmot colonies (Mosaic Forest Management), and grantors like FWCP and HCTF. Thank you!



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ABOUT THE VANCOUVER ISLAND MARMOT

- The Vancouver Island marmot (*Marmota vancouverensis*) is a large rodent in the squirrel family (*Sciuridae*).
- The marmot is endemic to Vancouver Island.
- Other marmot species in Canada include the Hoary marmot, Yellow-bellied marmot, and Groundhog. The Olympic Marmot (Olympic Peninsula) & Alaska marmot (guess) round out the North American marmots.



MAP OF VANCOUVER ISLAND

- Vancouver Island Marmots are endemic to sub-alpine regions of Vancouver Island Marmot. Historically, their range stretched from north of Lake Cowichan to the mountains near Nimpkish Lake, on the unceded traditional territories of the Namgis, Kwakiutl, Wei Wai Kum, K'omoks, Mowachaht/Muchalaht, Snaw-Naw-As, Qualicum, Hupacasath, Tseshah, Snuneymuxw, Stz'uminus First Nations and Cowichan Tribes.



© Adam Taylor

MARMOT HABITAT

- Marmots live in the alpine and sub-alpine of the Island.
- They specialize in avalanche bowls and chutes. These spots tend to be tree-free open meadows; maintained by snow movement.
- Marmots rely on the open space to detect predators (primarily cougars, wolves, & Golden eagles). The marmot is not a primary prey source for these predators.
- They feed on a wide variety of plants, including lupine, saxifrage, willow, and sedges. When food is scarce, they will eat bark. At all times, they seem eager to try new foods (camera traps for instance).



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HIBERNATION

- To survive in harsh high-elevation conditions, marmots hibernate 7 months of the year, one of the few mammals whose hibernation period is longer than its annual active period.
- They lose 30% or more of their body mass during hibernation.
- They are “true hibernators” – their metabolic rate, heart rate, and breathing are extremely low. They only “wake up” once every two weeks for a bathroom break.
- 80% of the energy they use during hibernation is used during these waking periods, and when they emerge from hibernation in the spring.



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EMERGENCE

- When emerging from hibernation, the marmot's digestive system must reinvigorate before it is ready to digest food. This requires a significant amount of energy, and is a particularly vulnerable time for the marmot.
- Even if food is available, if the marmot does not have enough stored energy (fat) it can starve to death, as its body cannot digest the food.



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REPRODUCTION

- Likely as an adaptation to their harsh habitat, long hibernations, and short active season, marmots have slow reproductive rates compared to most rodents.
- A mature (3 year old plus) female typically has 3 to 4 pups once every 2 years. Marmots typically hibernate together as a family. Fathers may have several different families, but they form long-term relationships with those females. Vancouver Island marmots do not have the same hierarchical colony relationships seen in some other marmot species.
- Pups generally stay with the mothers for 2 years.



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ECOLOGICAL IMPORTANCE

- The role of the Vancouver Island marmot is understood mostly by looking at other marmot species.
- Other marmot species, including the Alpine marmot and Hoary marmot, are known to play important roles in their ecosystems, particularly in soil disturbance and creating burrows utilized secondarily by other species. The Siberian marmot has been described as a keystone species.
- Vancouver Island marmots also play this role, and are the only mammal in Vancouver Island's high elevation ecosystems to do so. Pollinators, Western toads, & Garter snakes have all been repeatedly observed to make use of Vancouver Island marmot burrows.



PAST

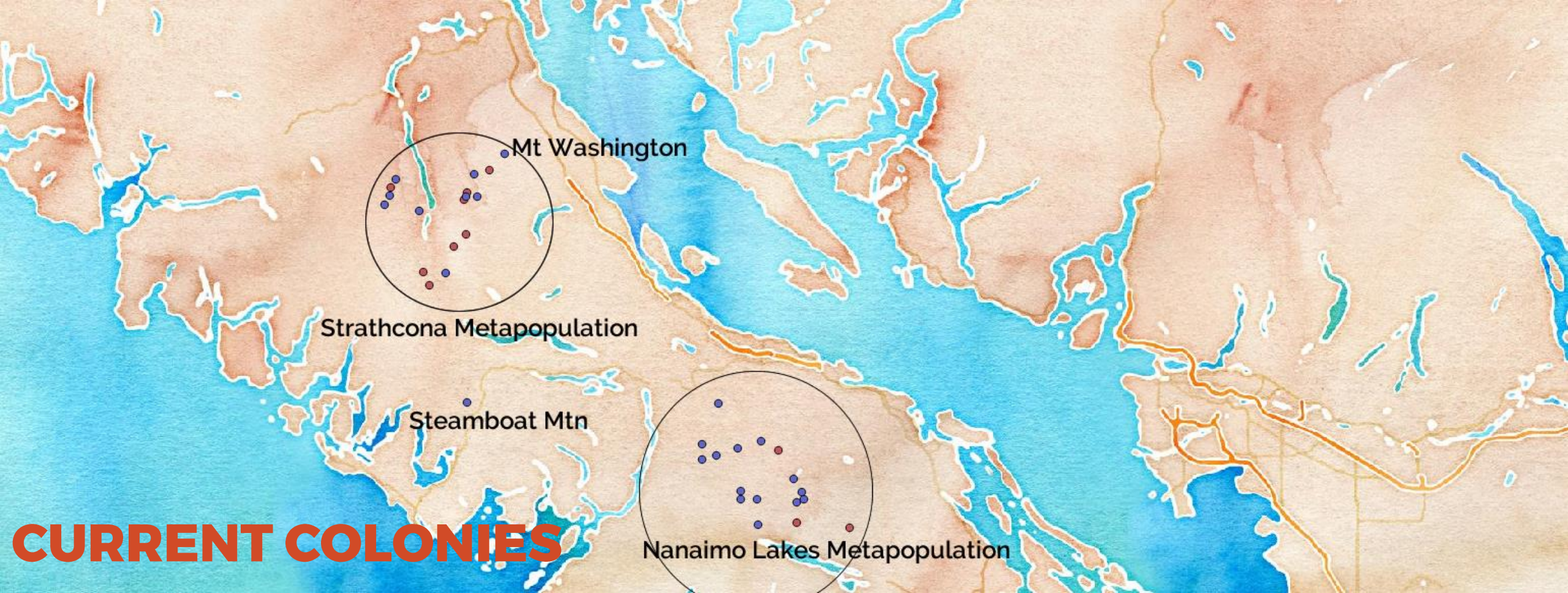
- The Vancouver Island Marmot likely diverged from a common ancestor of the Hoary marmot over 740,000 years ago. There has likely been some interbreeding since then.
- Marmot bones have been found in sea caves, suggesting that prehistorically (8000 to 8500 years ago) the marmot was far more widespread on the Island. Alpine and sub-alpine conditions were likely widespread on the Island during and following the last Glacial period.
- Tool marks on some bones suggest humans may have consumed marmots around this time.
- As alpine and sub-alpine habitat retreated in elevation, marmot populations likely did so as well.
- First Nations on the Island had varied and complex, significant relationships with the Vancouver Island Marmot.



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DECLINE

- The Vancouver Island Marmot was first assessed as Endangered in 1978, and populations in the southern Nanaimo Lakes meta-population crashed in the 1980s and 1990s.
- However, northern marmot populations likely crashed much earlier. by 1990, Mount Washington was the only known colony north of the Alberni Inlet. Marmots in that colony showed significant signs of inbreeding, suggesting that it had been isolated for some time.
- Despite documented past occupation, and little disturbance of core habitat, marmots were likely extirpated from Strathcona in the 1980s, or even earlier.





WHERE DID THE WHISTLE GO?

- In Strathcona, core marmot habitat was not significantly disturbed and marmots were not hunted, which raises the question of why the marmots disappeared.
- Unfortunately, the answer is **we do not know**.
- There were no studies, population surveys or even non-systematic counts that could shed light on the marmot's decline in this region.
- However, what we know about the decline in the Nanaimo Lakes area may here. Keep in mind, that even outside of protected areas, core marmot habitat was rarely directly impacted, and that anthropogenic influence extends into Parks as well.

WHERE DID THE WHISTLE GO?

- Though exaggerated, this map highlights the extent to which Strathcona is an island of protected area, surrounded by landscape that has been heavily altered.
- Even in the Park, roads and trails like facilitate easier access for predators.
- But perhaps mostly importantly is how changes inside and outside the Park effectively isolated marmot colonies from each other, impeding rescue effects, and increasing risks of extirpation.





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RECOVERY EFFORTS

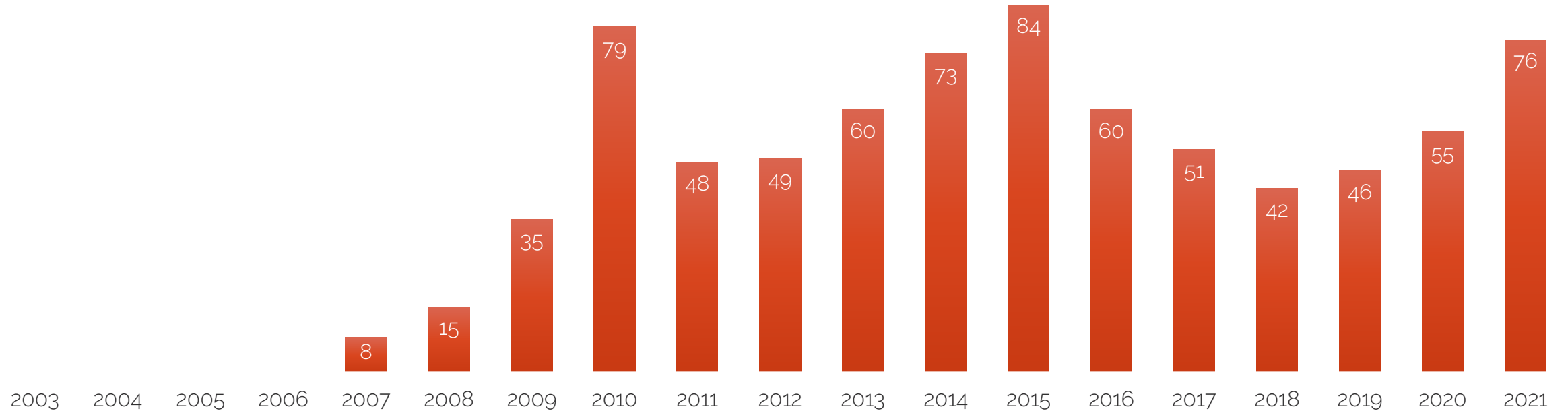
- Initially, re-introduction efforts focused on the Nanaimo Lakes region, and addressing inbreeding concerns at Mount Washington.
- In 2007, the first marmots were re-introduced to Strathcona Provincial Park. However, re-introduced marmots had poor survival rates.
- They had no “marmot infrastructure” to adopt, no wild marmots to interact with, and harsher environmental conditions than marmots that had been released successfully to the Nanaimo Lakes region.



SNOW SCHOOL FOR MARMOTS

- The Foundation began experimenting with a new release methodology to improve the survival of re-introduced marmots in Strathcona.
- Captive bred marmots were released to the wild colony at Mount Washington for 1 year, then re-trapped and translocated to Strathcona Park.
- The theory was that captive bred marmots would have a year to understand how to survive at relatively “easy” colony
- After several years of study, we demonstrated that this improved survival to prime-breeding age dramatically.
- Today, all marmots released to Strathcona Park have either gone through this “Stepping Stone” process, or are translocated wild-born marmots (these marmots also have similar survival success).

Strathcona Metapopulation, excluding Mt Washington



CURRENT COLONIES

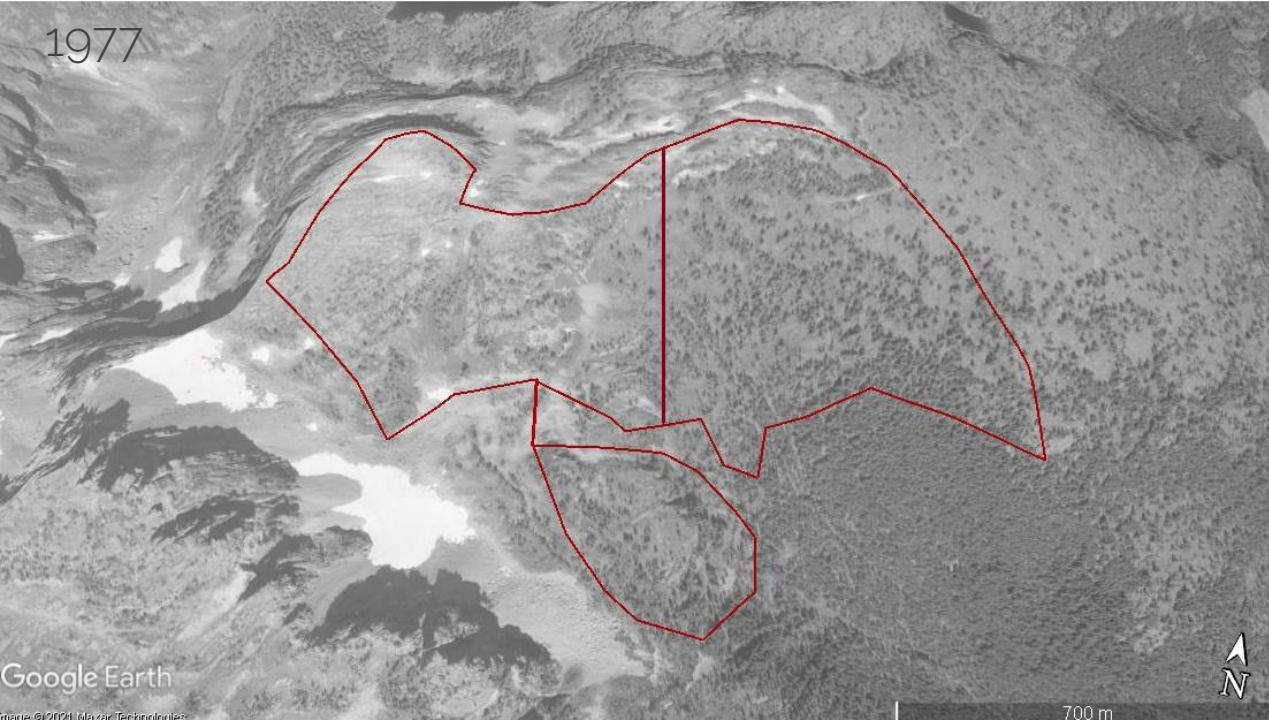
- Before 2016, numbers are inflated by a large number of captive bred marmots released, but these marmots would go on to have poor survival to adulthood.
- A hard year in 2016, in which drought and predation resulted in high mortality. That was followed up with fewer releases, but now only of marmots with better survivorship.
- In 2021, the population jumped after discovering two "new" colonies that been established by marmots naturally dispersing in the Park.



THE FUTURE FOR MARMOTS

- As of this winter, there are about 250 marmots living in the wild. The Vancouver Island Marmot is still one of the rarest mammals in the world.
- However, we do have new tools and skills that we know can be effective at improving the population. Much work remains, but we have a good idea of how to do it.
- Climate change is already having dramatic impacts on marmot habitat, and the pace of change is likely accelerating. This new challenge may make recovery more challenging in much of the marmot's historic habitat.

1977



Google Earth
Image © 2021 Maxar Technologies

2018



Google Earth
Image © 2021 Maxar Technologies

THE FUTURE FOR MARMOTS

- Climate change is already having dramatic impacts on marmot habitat, and the pace of change is likely accelerating.
- As snow energy is reduced, trees begin to colonize the sub-alpine meadows that comprise core marmot habitat. This may result in increase predator success, and ultimately, in transforming meadows to forest.
- Climate modelling has suggested that marmot habitat in Strathcona is far more resilient to climate change than in other parts of Vancouver Island.
- This has been a driving factor in selecting and pushing for re-introduction in this region, despite the challenges.



CAUTIOUS OPTIMISM

- The Vancouver Island Marmot has not “recovered” and there is both significant labour and research that needs to be done.
- However, there is reason to believe that the species can have a relatively secure place in the wild, and that captive breeding support will not be needed forever.
- Recovering a mammal species from fewer than 100 individuals has only been accomplished a handful of times globally. Unfortunately, it seems likely we will need the tools and approaches developed in these projects more often in the future, as well as the proof that it is in fact possible to save our even our most endangered species.

THANK YOU



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Our partners and funders include people like you, and:

