ISSUE 5 • RADICLEJOURNAL.ORG • SPRING 2021

radicle

reed anthropology review

Conservationist Extractivism:

indigenous land relationships and axolotl endangerment in the Valley of Mexico

Leila Shokat
Department of Anthropology
Reed College
Portland, OR 97202

Abstract

For thousands of years the axolotl, a salamander native to the Valley of Mexico, has been an important food source for local populations. Axolotls were included in Aztec mythology, where they play a role in the cycle of life becoming food for other life. Since colonization, the axolotl population has been threatened by a shrinking habitat, pollution, and invasive species. Researchers have proposed the use of *chinampas*, a complex farming practice used by the Aztecs, to restore the environment to its previous state of health so axolotls may survive as a species. Conservationists have also outlawed the consumption of wild-caught axolotls, due to their status as an endangered species. Here, indigenous relationships to the land are adopted in a piecemeal fashion that uses indigenous knowledge and cultivation practices but deprives indigenous peoples of their ability to live off the land, while framing axolotl conservation as vital for the maintenance of captive axolotl populations in laboratories worldwide. The use of local knowledge and rejection of local consumption practices makes room for a conservationist extractivism in which axolotl populations are revived only to be taken for biomedical research.

Keywords Axolotl, Valley of Mexico, Conservation, Standard Environmental Narrative, Consumption

Human–Axolotl Interactions

The axolotl is a salamander native to the lake system in the Valley of Mexico. Not only are axolotls native to this area, they have never been recorded living in the wild anywhere else in the world (Animals Network Team 2016). At least since the year 1245, axolotls have been the object of much fascination for those who encounter them: they play a prominent role in Mexican mythology, pieces of 20th century literature, and biomedical research. There are a few reasons for this. First, axolotls are strange looking creatures (Figure 1). Many of the early European reports from the Valley of Mexico describe their appearance in pieces: the tail of an eel, a triangular head, and beard-like protrusions around the neck area (Tate 2010, 515).

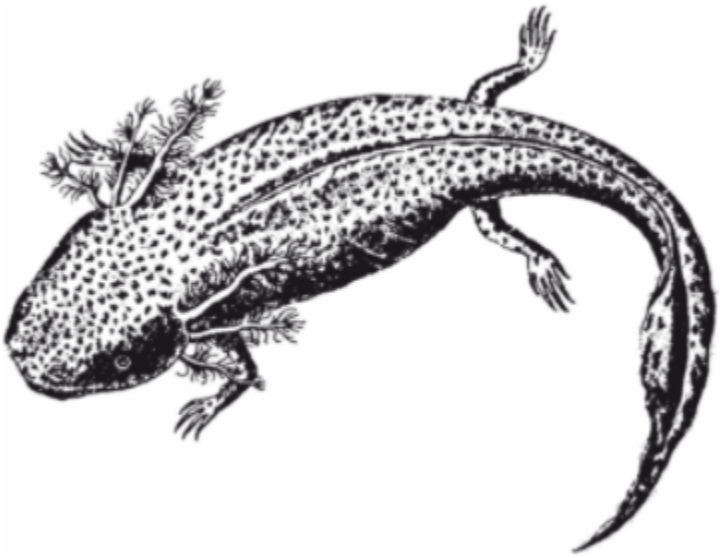

Figure 1. Diagram of an axolotl by Alexander von Humboldt (Tate 2010, 512)

Second, unlike other salamanders in the area (or even in the world), axolotls do not metamorphose to transition to life on land; they live their entire lives in the water, retaining their external gills (the beard-like structure described by many observers) rather than developing lungs. Lastly, axolotls have the incredible ability to regenerate almost any structure in their body. They can lose a limb and grow it back in roughly a month, heal any wound without a scar, and even regenerate parts of their spine, and they retain this ability throughout their lives.

Despite their highly specific wild habitat, axolotls have lived in various countries around the world starting in the middle of the 19th century. When General Forey of the French Expeditionary Forces learned of their existence, he had about 30 axolotls shipped back to France and gave many of them to a zoologist, who began breeding them for lab experiments. From these original shipments, thousands of axolotls were bred for experimental use around Europe (Tate 2010, 516–17). They have

also now been shipped to the United States and other countries, and the current center for distribution of axolotls is located in Kentucky.

Axolotls were also eaten by people living in the Valley of Mexico for thousands of years (Tate 2010, 511). They were an important source of protein for the Aztecs, as there were not many large species of fish living in Lake Texcoco, and axolotls can grow up to 18 inches long. They were sold in markets in Xochimilco, grilled or alive to be prepared at home, and have been sold at food markets as recently as the 1960s (Tate 2010, 515). While their regenerative abilities are emphasized by scientists and American journalists, their role as food is arguably more central for people who have lived alongside them for thousands of years. In Aztec mythology, the god Xolotl transformed into maize, then into a magueye (another type of plant that was eaten for food), and then finally into an axolotl in his attempt to escape death. In her article "The Axolotl as Food and Symbol in the Basin of Mexico," Carolyn Tate (2010) suggests that "for the Nahua or Aztec, becoming nourishment for others was the destiny of animals and humans alike" (Tate 2010, 520). This story of the axolotl "underscores the metaphoric relationship in Aztec thought between humans, food plants, and animals" (Tate 2010, 519). Importantly, for the Aztecs, the fact that they ate axolotls was not a sign of the animals' expendability or bare utility, but was rather part of a larger cycle that all living things go through.

Like the story of Xolotl, other stories about axolotls also tend to center on transformation. In his 1994 story "Axolotl," Julio Cortázar writes of a man who looks at an axolotl through the aquarium glass in the Jardin des Plantes in Paris and changes places with the animal (Tate 2010, 518). This theme of transformation between human and axolotl signals an important metaphorical tie between the two species. In a way, this tie is now being tested, as the axolotl faces extinction in the wild. Over the last twenty years, their population has struggled: their habitat has shrunk dramatically with the increased area of the Mexico City conurbation and the draining of Lake Texcoco (Figure 2). They now only inhabit a small area of Lake Xochimilco, where they suffer from poor water quality and the threat of introduced species (Vance 2017a, 288).

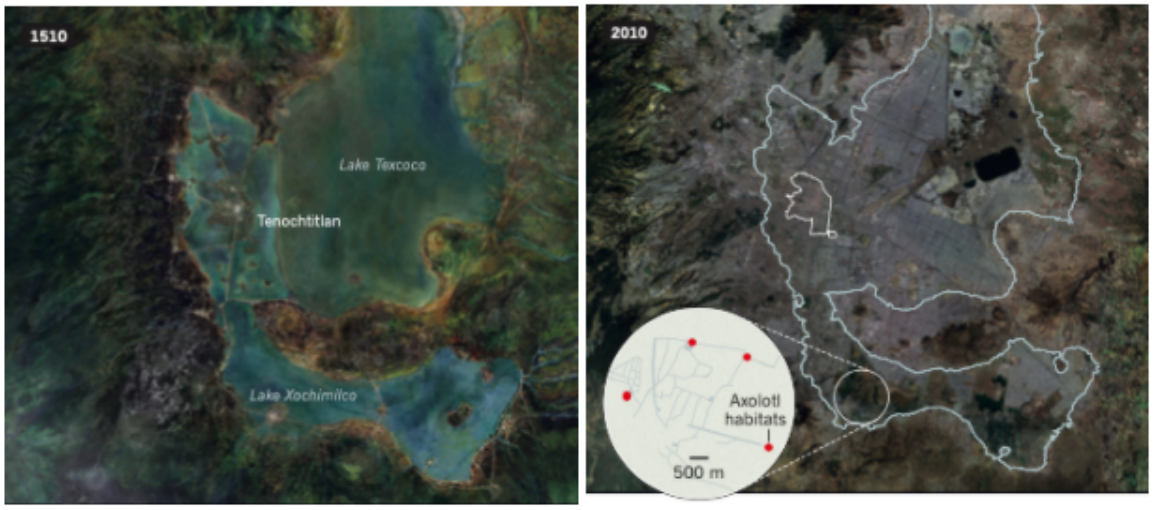

Figure 2. Axolotl habitat in the Valley of Mexico in 1510 compared to 2010 (Vance 2017a, 288)

The axolotl remains prominent in public discourses both in Mexico and abroad despite (or perhaps because of) its dwindling numbers in the wild. In this paper, I argue that discussions of axolotl conservation are an example of Paul Greenough's standard environmental narrative (SEN), and suffer from the same pitfalls. In Greenough's example of the SEN, scholars trace a "transition in rural India… from a condition of environmental harmony, distributive justice, and material abundance to one of ecological disruption, massive social inequity, and widespread misery" (Greenough 2001, 141). Greenough's problem with the SEN is that it fails "to incorporate the wide variations in animal-human relationships recognized in the past" (Greenough 2001, 169). In the example of Mexico City, conservationists imagine farming practices that were used by Aztecs as the key to a mythical past, where axolotls thrived in the perfect wilderness of the Valley of Mexico. In doing so, they simultaneously condemn the local practice of catching and eating wild axolotls while preaching the benefit that axolotl conservation will provide to modern biomedicine. Conservationists' balancing act between conservation and a certain kind of consumption reveals a misunderstanding of the Aztec conception of animal-human relationships that Tate highlights in the story of Xolotl.

Conserving Axolotls, Conserving Chinampas

As axolotl numbers in the wild dwindle, researchers have proposed the use of *chinampas* to restore the environment to its previous state of health so axolotls may survive as a species (bioGraphic 2019). Chinampas are an agricultural system that uses complex networks of channels and islands to irrigate plants by absorption and fertilize them with aquatic plants and mud from the lake system—the system was used from about C.E. 500 until the period of colonization (Narchi and Cristiani 2015, 93). The Refugio Chinampa project is one that has implemented chinampa style plots in the Xochimilco district of Mexico City in order to create a refuge where axolotls can thrive. The people behind the Refugio Chinampa project do see the chinampas' ability to not only restore environmental health and allow the axolotl to thrive, but also to support the lives of people in Mexico City. However, many online, English language articles that are written to educate the public about chinampas and axolotl conservation reveal the widespread misunderstanding of Aztec relationships to the land. These articles focus on the chinampas' ability to restore the environment of Xochimilco to a mythical past, where the environment was undisturbed. This conservationist logic, however, only leaves room for particular parts of Aztec land practice. Other parts, for example the consumption of wild caught axolotls, are denounced as a threat to the environment. The remainder of this essay will focus on mainstream English-language articles about axolotl conservation, and how they promote only a partial acceptance of Aztec relationships to the land in the name of conservation.

A Google search of "axolotl conservation" yields many short articles about the animals that usually follow a similar storyline. They begin with a photograph of the striking animal. This is followed by a discussion of the animal's significance, usually referring to its place in Aztec mythology and the potential for scientists to learn about regeneration from the animal. After demonstrating the importance of the animal, the author may paint a somber picture of the pollution and the introduction of invasive species that has occurred in Lake Xochimilco over the last 50 or so years that caused wild axolotl populations to struggle. They then turn to a summary of

conservation efforts: often a combination of breeding programs and the Refugio Chinampa project. Some excerpts from these articles illustrate only partial recognition of Aztec relationships to axolotls, and more broadly to the environment itself. It is important to consider that because they are all written in English and intended for an international audience, these articles may not be able to convey the full complexity of the issue. Their ability to accurately convey local perspectives relies on their translation of interviews with residents, *chinamperos*, and scientists.

First, descriptions of the Refugio Chinampa project describe the primary role of the chinampas as the restoration of the environment to its natural state. This is best exemplified by a quote from an article from *The Guardian*: "Barrero [a local chinampero] believes a change is coming from a younger generation of chinamperos seeking to apply the ecologically conscious agricultural practices of their forefathers, but that will take time… Once the conditions are correct, a lab axolotl is released into this restored wilderness" (Grabinsky 2018). This article misunderstands the cultural landscape of chinampas as untouched "wilderness." It also implies a return to a previous state of the environment, placing indigenous land practices in a mythical past.

Second, similar to how the standard environmental narrative fails to consider variation in animal-human relationships, accounts of the axolotl conservation project exclude a vital part of the Aztec relationship to land, and specifically axolotls. As I have stated above, the story of the god Xolotl emphasizes the interrelationship between humans, food, and animals, and this relationship is evident in the practice of eating wild caught axolotls. However, under the current conservationist logic, this part of locals' relationship to axolotls is presented as contradictory, and is even explicitly disallowed. One article in particular highlights the pure confusion that exists regarding the Aztec relationships between humans, food, and animals: "[the axolotl] is named after the Aztec god, 'Xolotl,' who is said to have transformed into an axolotl to avoid being sacrificed (though axolotls were still killed and eaten)" (*Quartz* 2018). This article assumes a contradiction ("though") between consumption of and respect for an animal. In addition to these articles' misunderstanding of the animal-human relationship, laws put in place after axolotls were declared endangered enforce the perceived disconnect between consumption and preservation. In the "threats" section of the International Union for Conservation of Nature and Natural Resources (IUCN) website about axolotls, it is stated that "the desiccation and pollution of the canal system and lakes in Xochimilco and Chalco, as a result of urbanization, as well as the traditional consumption of the species by local people, is threatening the survival of this species" (IUCN 2008). The equivalence drawn between local consumption of the axolotl, the massive amounts of pollution in Lake Xochimilco, and the draining of the lake system in the Valley of Mexico is astounding and ill-informed. Local consumption of axolotl has existed long before axolotls' survival as a species was threatened, whereas pollution and habitat transformation has quickly decimated much of their population. These instances of misunderstanding and misrepresenting the nature of axolotl consumption by locals and indigenous people show the incomplete acceptance of Aztec relationships to the land and environment by people who promote ecological conservation.

The logic that indigenous relationships to land are inherently (and only) conservationist is not at all unique to Mexico City. In *Life in Oil*, Michael Cepek (2018) writes about the inability of environmentalist NGOs to conceptualize the Cofán people, who live in the Amazonian forests,

Andean foothills, and capital city of Ecuador, as anything but denouncers of the oil industry that degrades their environment. In this way, coalitional politics are an incredibly limiting and precarious arrangement for the Cofán: "as soon as the Amazonians make choices that conflict with the image of ecological nobility, alliances and collaborations can crumble to the ground" (Cepek 2018, 194). Cepek admits that it was even hard for him to shed these romantic notions of the Cofán as protectors of the land (Cepek 2018, 200). Similarly, in the context of Xochimilco, indigenous relationships to the land, rather than being wholly accepted, are instead adopted in a piecemeal fashion that uses indigenous knowledge and cultivation practices but deprives indigenous peoples of the fruits of their labor. In both examples, we can see not only that indigenous relationships to land are fragmented, but that they are fragmented in a particular way. In each case, the part of their relationship to land that protects, cultivates, and maintains nature in its purest form is lauded. However, their attempts to benefit from their relationships to the land, by eating axolotls or by making deals with oil companies, are shunned.

Finally, it is vital to recognize that the same conservationists who denounce the local consumption of axolotls also frame axolotl conservation as vital for the maintenance of captive axolotl populations in laboratories worldwide. This is simply a different form of consumption. An entire article in *Scientific American* frames the axolotl's "conservation paradox" in terms of the need for wild animals to maintain genetic diversity in lab populations of the animals (Vance 2017b). Many other articles also mention the importance of preserving wild populations for this same reason (Kroschel 2019; Schipani 2018; GrrlScientist 2019; García 2017; *Quartz* 2018). These articles all prioritize the extraction of natural resources for scientific knowledge production over the local consumption of these animals as food, all while touting an indigenous farming practice as the means to achieve their goal.

Conclusion

As I have outlined above, the historical relationship of the Aztecs to the axolotl has been one that emphasizes the cycle of life turning into food for other life. In the new conservationist logic, however, indigenous practices of farming help to sustain axolotl populations, and the consumption of productive returns of these practices is explicitly disallowed as part of the conservationist mission. The conservationist logic follows what Greenough calls the standard environmental narrative, which sees a progression from environmental harmony to destruction, and imagines indigenous peoples only as protectors of nature (Greenough 2001, 141). At the same time as locals are demonized for their food consumption practices, scientists are praised for their use of this species to learn about regeneration. So much so, in fact, that the conservation project is often framed with the goal of preserving genetic stock populations for that research. The contradiction in this conservationist-extractivist logic is clear: indigenous consumption is denounced, and biomedical consumption is praised. This contradiction is hidden, however, because public discourse only imagines indigenous relationships to the land as conservationist—indigenous peoples are thought to leave nature untouched. The paradox of axolotl conservation is not an easy one to think our way out of, much less to solve on the ground. It necessitates the demystification of widespread ideas about indigenous relationships to land, a recognition that global extraction for biomedical

research is a form of consumption, and a more general acceptance that animal-human relationships can be, and often are, multifaceted.

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