

Spring 2019

Black Market Baby Otters: An Investigation into the Origins and Consequences of the Otter Pet Trade

Summer Alexis Tuverson
Bard College

Follow this and additional works at: https://digitalcommons.bard.edu/senproj_s2019



Part of the [Environmental Studies Commons](#)



This work is licensed under a [Creative Commons Attribution-Noncommercial-No Derivative Works 4.0 License](#).

Recommended Citation

Tuverson, Summer Alexis, "Black Market Baby Otters: An Investigation into the Origins and Consequences of the Otter Pet Trade" (2019). *Senior Projects Spring 2019*. 134.
https://digitalcommons.bard.edu/senproj_s2019/134

This Open Access work is protected by copyright and/or related rights. It has been provided to you by Bard College's Stevenson Library with permission from the rights-holder(s). You are free to use this work in any way that is permitted by the copyright and related rights. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/or on the work itself. For more information, please contact digitalcommons@bard.edu.

Black Market Baby Otters:
An Investigation into the Origins and Consequences of
the Otter Pet Trade

Senior Project Submitted to
The Division of Social Studies
of Bard College

By

Summer Alexis Tuverson
Annandale-on-Hudson, New York

May 2019

Acknowledgements

The completion of this project would not have been possible without the unwavering support and guidance I have received from so many people around me. To everyone who has helped contribute to this paper, my academic endeavors, my career goals, and my emotional wellbeing in any way over these last four years, you have my endless gratitude.

Thank you first and foremost to my parents who have supported me unfailingly in any and all of the schemes and projects I've undertaken throughout my life. Your encouragement and love inspires me when I begin to doubt myself. Thank you for humoring me through the abundance of pets, trips to the zoo, and parasitic life cycle explanations that have influenced me to pursue a career focused on wildlife.

Thank you to my family for all of your support and love. I appreciate so much your cheers and kindness.

Thank you to my friends for helping me get through these last few demanding months. The camaraderie, absurdity, and warmth you share with me is invaluable.

Thank you to my hamsters, Hannaford and Mozzarella, who worked alongside me during the majority of this process.

Thank you to my mentors and colleagues at the CITES Secretariat for the extraordinary opportunity to join you last summer and for the wealth of knowledge you've shared with me.

Thank you to my Bard professors for your assistance and guidance throughout my college life, especially Jay Elliott and Bruce Robertson for counseling me through my senior project and offering indispensable advice.

Thank you to Yuka Suzuki for agreeing to be my senior project advisor. I cannot thank you enough for working with me so scrupulously this past year and for helping me improve so much as a writer and researcher. Collaborating with you on this project and partaking in your classes has been a great pleasure.

Dedicated to the otters

Table of Contents

Introduction~~~~~4

Roadmap~~~~~11

Cultural Significance of Otters

Mythology~~~~~12

Otter Culture Today~~~~~16

Trade

Otter Pet Trade~~~~~28

Confronting Otter Dealers~~~~~32

Contextualizing Commodity Chains~~~~~41

Environmental Effects and Conservation

Otter Fur Trade~~~~~44

Wild Otter Reproduction~~~~~45

Charisma and Conservation~~~~~51

Negative Impacts on Otters and Ecosystems~~~~~54

On the Basis of Ethics~~~~~56

Conclusion~~~~~60

Bibliography~~~~~67

Introduction

Hidden within a large freshwater swamp in central Thailand, twenty-seven Asian small-clawed otters will be born this year. The otter population in this swamp is separated into several extended families containing one alpha breeding pair that may have 1-6 pups at a time. Some of these pairs will not be able to reproduce this season. Of the twenty-seven otter pups born into the swamp, only ten will survive past infancy. Typically, otter populations can easily recover from these harsh infant mortality rates; yet new epidemics, almost exclusively caused by human activity, leave otters in a vulnerable position. Before our ten surviving otters reach sexual maturity, one will be slaughtered for its fur and another two will die from direct effects of pollution and habitat destruction. As the numbers dwindle, there is a tremendously increasing pressure on the remaining juveniles to maintain a healthy population level as older individuals die as well.

In the midst of the many dangers otters must prevail against, a fairly new threat emerges. Three of these last seven otters in the pond will be caught by poachers, but they won't be skinned for their fur or butchered for their meat. Soon they will be traded internationally to be pets around the world. The otter trade is one subset of a multibillion dollar industry that hinges on the legal and illegal trade of exotic pets. In most of the world, domesticated animals such as livestock, working animals, and typical "pets" are

commonplace and easily accessible, if not necessary for work or property maintenance. Nevertheless, demand for live wild animals prevails across the globe, even when the animals in question are taken illegally, or this wildlife trafficking has detrimental consequences on the environment or the actual animals captured. The primal urges that motivate a desire for exotic pets, often rooted in themes of domination and greed, give way to a sophisticated culture where pets are more like forms of art to collect and display. These pet “collectors” may spend months and many thousands in their search for a particular rare species or the perfect specimen; others may purchase an exotic animal upon encountering it in a marketplace, pet store, or online advertisement. Digital marketplaces for wildlife products have become an especially commonplace and challenging issue as internet access has spread in recent decades and people can have anything, even live animals, shipped to them effortlessly. Otters are one of the newest trends in exotic pet keeping, with a sudden yet discernable spike in reported pet otters in the beginning of the 21st century. The thought of a personal otter companion is a charming concept, but may bring with it dire repercussions.



Figure 1. *Photographer Rhett A. Butler documents a river otter for sale at a pet market in Indonesia.*

Back in our Thai swamp, four juvenile otters remain with their families while the other three survivors are being shipped internationally to different locations. Some species of otter are solitary, but these Asian small-clawed otters tend to stay in small, tight-knit groups in the wild. As juveniles, they will feel especially vulnerable being plucked from their environment and shipped alone as they likely were still under the care of their mothers at the time of capture. One of the otters dies in transit.

It's difficult to boil down the complexities of the exotic pet trade to a singular line of thinking, as the driving force behind one's decision to purchase a large African cat will likely differ from the one which motivates somebody else to buy an especially rare insect.

Common themes may be present between different species trading cultures, but the mythology that influenced this trade, the supply chains that connect potential buyers with their most coveted exotic companion, and the negative effects that inevitably follow such trade will still diverge drastically. Otters are a particularly enthralling subject to analyze in their role in the international pet trade in part due to their relatively recent popularity as pets. This spike in demand for pet otters may largely be caused by otter depictions in social media, where shared videos and novelty instagrams actively encourage people to buy real animals. By examining the roles social media and the internet play in encouraging demand in the otter pet trade, combined with the background of otter mythology in some cultures, a consideration of why otters would ever be appealing as a pet, and a view into how someone can realistically obtain an exotic animal, we can begin to understand how all of these factors combine to create an “otter culture” that gives way to otter pet keeping. Once we understand the motivators and values behind the otter trade, we must then confront the ramifications of yearning for otters, removing them from their natural habitats, indoctrinating them into human homes, and ultimately subjecting them to the life of a domesticated pet.



Figure 2. *Eurasian Otter* ([arkive.org](https://www.arkive.org))

One of our otters being shipped eventually changes hands with several live animal distributors until he is sold at a street market in Japan. An enthusiastic family living in a typical Japanese apartment complex will purchase him and he will only need to be rehomed once in his life, when the family realizes that the care and commitment required to house an otter is too demanding for them. He is ultimately given away to another couple in a more rural area with a greater expanse of land and more experience with exotic animals. Meanwhile, the other living juvenile otter that was taken from the swamp is sold more directly to a man in the Southwest of the United States. She will not be the first otter to arrive at this property. The man who purchased this otter runs an otter breeding

operation; when our otter reaches sexual maturity, she will be bred with another Asian small-clawed otter and their pups will be quickly weaned and shipped to other pet collectors in the United States or internationally. A cycle of repeated impregnation, birthing, and separation from her pups will continue until she is no longer able to breed or dies from complications associated with breeding or her captivity.

Wild animals face a multitude of threats caused directly and indirectly by humans. Often these effects are unintended consequences of human development, such as the environmental ramifications of deforestation and global warming. Other, more targeted attacks on animal life, seek to capture, maim, or kill wildlife for some other human purpose. The first such cases that may come to mind are the killing of “pest” animals, or of those desired for their meat, ivory, or furs. However, sometimes wild animals are captured but kept alive so that they may be traded as pets. The exotic pet trade, both legal and illegal, is alive and well on a global scale, operating everywhere from official customs channels to shady internet deals between adventurous animal collectors and the people who acquire these animals in order to sell them. One example of this is the recent trend in keeping otters as pets. The past decade has seen a slowly expanding, trans-continental trend of otter pet keeping, which has become more visible in recent years due to an eruption of otter-related content on social media. Not all pet otters are caught from the wild for this purpose; some of these animals are “rescued” secondhand from unsavory situations and occasionally they are bred in captivity. There are specific otters with their own social media profiles, managed by their human owners, sometimes garnering hundreds of thousands of

followers. But a seemingly innocuous trend of otter pet keeping may have grave consequences, on a larger environmental scale, on the individual otters themselves, and perhaps on human society and culture. Why are otters becoming desirable as companion animals, and where do people get them? Is there something intrinsically alluring about these animals, and can we draw from other cultural contexts to better understand what motivates some humans to go to great lengths to have their own otter, or other exotic pets? By examining the past and current state of otter trade and pet keeping, we can begin to understand how these animals are unique in their commodification, and we can predict what the future may hold if otter capture, exchange, and domestic captivity is allowed to continue.

Roadmap

This paper will explore and analyze the background of the international otter pet trade while proposing potential future realities for otter species, other organisms, and human society. As an Environmental and Urban Studies project, the backgrounds of the topics discussed here will range from ecological to anthropological to philosophical frameworks that will work together to explain the positioning of otters in trade in the world today. We will begin with a setup of past and current conceptions of otters across different cultures, moving into the logistics and complexities of trade, and finally examining how issues in trade have influenced ecology. As we work through these layered issues we will also ruminate on the consequential environmental, cultural, ethical, and otherwise fundamental implications that arise with the topics discussed here. Think of this paper not as an advocacy for the otters or a condemnation of human activity, but rather an unpacking of compound issues surrounding ourselves, otters, and the greater worldwide ecosystem. To properly situate ourselves within our relationship with otters, we must first acknowledge the issues at hand and figure out how we got here.

Cultural Significance of Otters

Mythology

Observing how otters are depicted in mythology may offer insight to the human-otter relationship. In her paper *Human-Animal Bonds I: The Relational Significance of Companion Animals*, mental health care professional Dr. Froma Walsh observes the crucial role that animals play in the mythology of so many cultures, claiming that “in ancient times and in cultures worldwide, animals have been respected as essential partners in human survival, health, and healing. Many spiritual traditions have honored the relationships of people to animal forms of life, as part of the interconnectedness of the natural world and a link to the spirit world,” (Walsh 2018: 3). Otters specifically can be found represented in the mythology of various cultures, from European to American to Asian folklore. The way in which otters factor into mythology may shape our perception of them and their relationship to humans, and it’s possible that existing relations between humans and otters have influenced the mythology.

In Japan, otters (called “*kawauso*,” which translates to “river otter”) are often depicted as intelligent but deceptive beings that conspire to trick humans (Foster 2015). This fiendish view of otters is a far cry from the current way in which otters are depicted as approachable companion pets, especially in the western nations in North America and

Europe where pet otters are becoming more popular. In some of these stories, otters are said to have shapeshifting abilities that allow them to trick people; for example, the *kawauso* may disguise itself as a woman, then seduce men who approach it before revealing its true form and eating them (Foster). The *kawauso* can also transform into children or monks to manipulate (and usually, to eat) people. There are even some stories where otters are said to possess people in order to do their own bidding (Foster).



Figure 3. A *kawasuo* by Japanese artist Toriyama Sekien (1776)

In other cultures, there is a more positive depiction of otters in mythology. According to the ancient religion Zoroastrianism, which often categorizes concepts in the

world as “good” or evil,” otters are held in high regard as they are a pet of God and are taboo to kill. Positive associations such as this could be impactful enough to contribute to trends of keeping wild animals in the home as pets. In Zoroastrianism, dogs are sacred, and other animals such as foxes, weasels, porcupines, and hedgehogs are also classified as “dogs.” Otters are included in this group of dogs, but are considered to be especially sacred. Harming a dog is forbidden, but harming an otter is much greater crime (Foltz 2010).

Otters are also sacred in some Native American cultures, where otters are considered to be “totem” animals that can represent an individual, family, or clan. Some stories claim that an otter should be called upon as a totem animal if one is going through a difficult time, as the otter will bring light. However, there are still some Native American stories that do depict otters as deceptive and mischievous, such as one story which claims that bears have short tails because an otter once tricked a bear into accidentally ripping off the majority of its tail (Smith). Even so, some Norse cultures believed that God materializes on earth in the form of an otter as a test to see how people will treat it, with the accompanying message that humans should treat otters, and by extension, nature, respectfully regardless of the otter’s behavior, just in case it is God in disguise. In both the negative and positive depictions of otters, they are shown to be living in close proximity to humans, and should usually be feared or highly respected. Their rumored ability to mimic human behavior may contribute to the idea that otters make good companion animals to people, also supported by their likeness to dogs. Otters came to hold a special significance in many cultures, as they were intangible enough in their wildness to spur speculation, but oddly familiar in a way that made them approachable as totems for mythology and symbolism.



Figure 4. *Sea otter in Alaska photographed by Michael Quinton*

Entering the 21st century, otter culture begins to develop with a new type of mythology; perceptions spread by social media. The organization TRAFFIC, also known as the Wildlife Trade Monitoring Network, largely faults the way otters are romanticized on social media for spurring the otter pet trade. Kanitha Krishnasamy, Southeast Asia's Acting Regional Director for TRAFFIC, has warned that "the fact that so many otters can be so easily acquired and offered for sale to thousands at the click of a button and subjected to little or no regulation, is a serious problem." Nicole Duplaix, Chair of the IUCN-SSC Otter Specialist Group, added to these comments that "the online commerce of very young otter

cubs for the pet trade adds a new dimension of concern. The appeal of these cute animals is undeniable, but otter cubs are difficult to hand rear and susceptible to the same diseases as cats and dogs,” (WWF.panda.org 2018). Pictures, videos, news stories, and even social media accounts that depict otters as playful, friendly, and adorable have changed the cultural attitude toward otters from one of fear, awe, and wonder to a desire to observe and interact with them as if they were pets. Social media that specifically portrays otters as pets or in a “pet-like fashion” (such as interactions with humans, responding to commands, eating from a dish) only further shifts these perceptions, as otters appear to be loving companions that are as affectionate and manageable as any other pet. With a new wave of “otter-lovers” aspiring to own an otter of their own, we must be attentive to how the human-otter relationship is shifting. There is a new “mythology” developing on otters that is not entirely reflective of reality. Seemingly innocent changes in the mythology into admiration, adoration, and desirability can easily devolve into over-indulgence and domination.

Otter Culture Today

Are people attracted to otters solely because they are cute, or are there deeper emotions that are specifically linked to otters? Is the allure of having an exotic pet enough to fully explain the pet otter trend, or could larger symbolism explain why someone would go to the trouble and expense of having their own otter? Before social media became mainstream, otters did exist in human culture. Referring back to past otter mythology, we

can better understand how existing perceptions informed the otter fads of today. Contemporary media depicting otters blends previous stigma from mythology and other past depictions with new trends born from internet otter culture and other current events, such as otter conservation movements. Other times, the endearing quality of otters and other animals can be planted onto another cause or product as a means of promotion. To demonstrate the power of animal identification and admiration in humans, I will explain how companies will use animals in their logos and advertisements to appeal to a wide audience. Animals make powerful personal mascots; this is a concept that businesses can use to their advantage. Charismatic “animal spokesmen” can make a mundane company more relatable to individuals, such as in the case of insurance company GEICO’s famous gecko commercial star. *Brand Mascots: And Other Marketing Animals* by finance specialists Stephen Brown and Sharon Ponsonby-McCabe discusses how and why businesses use the natural human desire to identify with animals as a marketing tool; for example, “the pandemonium that occurred in Chile, when a black sheep became the brand mascot for Becker’s beer and the nation was so captivated by his chutzpah that cardboard cut-outs of the ovine with attitude were repeatedly stolen from retail stores,” (Brown and Ponsonby-McCabe 2014: 19). For potential customers, positive sentiment for a company may have far less to do with the actual quality of products sold and more about identification with the animal mascot presented. Animals, especially when they are anthropomorphised to represent some human qualities, become vehicles for people to better understand their own natures. Instead of accepting animal behavior as necessary survival mechanisms, we tend to interpret animal motivations and qualities as similar to

our own. A company attempting to market their product may recognize this tendency and will often assign animal mascots human personalities, speech, or clothing, “for consumers, one way for them to understand and engage these complex multifaceted brand-brand relationships is through anthropomorphism. Anthropomorphism not only allows consumers to relate brands to themselves, but allows them to relate brands to one another and the broader socio-cultural context in which they are embedded,” (Brown and Ponsonby-McCabe: 40). Corporations are merely utilizing the human bond with animal figures to promote their own agenda. People are always seeking to better understand their own natures (have you ever taken an online personality test or a BuzzFeed quiz?) in addition to the human condition as a whole. Interpreting ourselves through animals allows us to assign a corporeal metaphor to the emotions and behavior we exhibit. As anthropologist Donna Haraway describes this relationship in *Animal Sociology and a Natural Economy of the Body Politic, Part II: The Past Is the Contested Zone: Human Nature and Theories of Production and Reproduction in Primate Behavior Studies*, “people like to look at animals, even to learn from them about human beings and human society...we polish an animal mirror to look for ourselves,” (Haraway 1978: 37). Prominent qualities that we notice in animals become metaphors for our own psyches. There are countless horoscope websites on the internet that will claim to tell a curious user what their “spirit animal” is and what this can tell you about your personality and future. Many of these sites attribute to otters the same symbols and meaning associated with water, due to the animal’s aquatic habitat. From the spiritual standpoint, there appears to be no differentiation between the thirteen otter species, with “otter” often being referred to as a

“species,” when otters actually compose a subfamily of several different genera. Lucky browsers can feel comforted that their otter “spirit animal” represents tranquility, energy, creativity, and healing powers. Some websites are more specific—there are apparently many people who dream about dead otters and they want to know what their subconscious is telling them. An interpretation for a dream like this is that otter relationships are representative of human relationships, as otters are one of the few animals that tend to form lifelong mating pairs. A closer look into otter mating habits reveals a darker narrative, as forced copulation amongst otters is common, and male sea otters will sometimes even force themselves onto harbor seals. Otter mating sometimes entails a violent struggle that leaves the female with facial lacerations. Nevertheless, this element of otter mating habits is often omitted from more popular depictions of otters, as people like to focus on the more darling aspects of otter coupling, such as their tendency towards monogamy. This is an example of how picking and choosing which otter qualities and behaviors are palatable enough to be depicted on websites like these shape a new mythology that is not entirely reflective of reality. Traits like this that are considered “human-like” make otters more relatable to some--if otters mate for life, people may draw their own conclusions that otters are capable of love and other complex emotions that make them more accessible to identity with. Dead otter dreams symbolize a troubled love life for a human, and should be taken very seriously. Seemingly lighthearted internet pages about otter symbolism may appear to be just for fun, but it could also shed light on why many people connect with otters. Now, if you’re a user on gay dating app “Grindr,” you may identify with the otter tag if you’re lean and hairy. Outside of this context, people love otters because they are a perfect

combination of cute and exotic, while also unexpectedly human-like. We see ourselves in their intelligence, in their monogamy, in how they care for their pups. People naturally like to identify with other animals because we share just enough in common with them to relate, and their distinct qualities allows us to draw additional symbolism from their appearance and behaviors. Otters remind us of our dogs in how they are affectionate and furry, smart without being smarter than us, but also unique and rare.

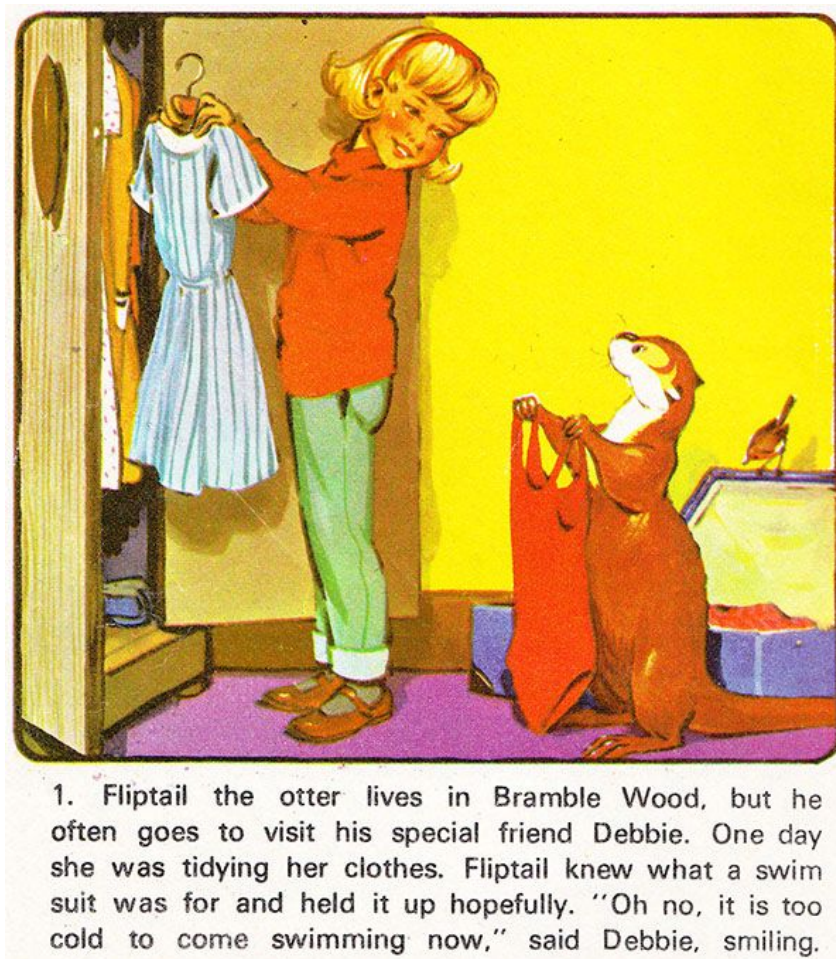


Figure 5. "Fliptail the Otter" comic by British illustrator Bernard Long, 1970s

Instagram posts, Youtube videos, and Facebook groups are filled with cute otter content that draws interest from otter-fans of all ages. Children are especially likely to identify with and desire closeness with animals. Psychiatric nurse Catherine Gray Deering mentions in *A Cognitive Developmental Approach to Understanding How Children Cope with Disasters* that many people, and often children, will “identify with animals as childlike symbols of their own vulnerabilities,” (Deering 2000: 23). Animals become placements of safety, comfort, and companionship that children idolize, with charismatic and unique creatures appealing to them just as they do to adults. A top comment on one compilation of pet otter videos, “i love otters [sic] they are my favorite animal and my spirit animal i will adopt one very soon,” reflects hundreds more comments with similar sentiments. The way many of these comments are written seems to indicate that children are especially interested in the concept of having a pet otter. Comments range from the non-committal—“otters are so cute I want to get one but my mom doesnt [sic] want to” — to serious inquiries about where to find otter breeders or adoption groups. It is difficult to determine how many of these commenters actually do go through the process of owning their own pet otter, and how many of them are persuaded to do so by content they find on the internet. We can explore “internet otter culture” as a space not only where fascination with otters is often generated, but also where many actual transactions occur to purchase live otters as pets.

What is it about otters that makes them so attractive as pets? This may come as a surprise to the masses of children declaring their intentions of pet ownership on otter

Youtube videos, but otters often come with a complicated care regime. The IUCN Otter Specialist Group offers an extensive online care guide for Asian small-clawed, Cape clawless, Nearctic, and spotted-necked otters. This guide is available to the public but intended for use by professional facilities for captive otters. Instructions include basic information about appropriate diet and land/water ratios for each otter species to more complex necessities such as proper sensory barriers, advanced medical needs, and pup care. Even experienced pet owners may struggle with providing the basic essentials of an otter habitat, like a healthy and consistent water temperature, humidity level, and foraging opportunities. Romanticization via social media of otters as viable pets usually ignores their intricate care routines and sometimes delicate health; the people purchasing otters as pets today are often ill-prepared to handle otter pet keeping, which can lead to either abandonment of the animal or ignorant maltreatment.

Aside from general videos and images of nameless otters, there is also a growing list of “celebrity otters” with social media profiles; some people who adopt or purchase a pet otter will create online personas for their animals on websites such as Facebook, Instagram, or Twitter, gaining hundreds of thousands of followers. Otter-lovers who follow instagram stars such as @carteltheotter, @Bingo-the-Otter, and @babietheotter are all the more encouraged to aspire for a pet otter of their own. Tokyo-based Instagram user @ponchan918 has revealed to the followers of her account, which is dedicated to the family otters Takechiyo and Aoi, that she and her husband purchased their otters from a pet store, where they were wrongfully told that keeping an otter is no more difficult than a dog. It

seems counterintuitive to bring a semi-aquatic animal into a human home; otters also require a varied daily diet of fish and crustaceans that can also include dried food. They are definitely exotic pets, but otters continue to be idealized as fancy dogs that can live alongside humans in a typical family. But why otters instead of other carnivores? And why not just a cat or dog as pet, of which there are many available for adoption, already domesticated and easier to care for?

Domination over animals is a tricky relationship that spans thousands of years in various formats. The motivations behind domesticating a pet will be different from hunting an animal for its products or even keeping livestock. Otters offer a unique challenge as a potential pet, as they are indisputably “wild” yet appear to have a tamability about them. People who seek exotic pets tend to enjoy the novelty of being one of the few to attempt to bridge the gap between humans and “inaccessible” animals. “What types of emotions trigger the desire to own a great ape or a big cat or a long snake or a killer arachnid? What motivates the owners? A desire to dominate must be a factor,” writes journalist and philosopher Peter Laufer in *Forbidden Creatures: Inside the World of Animal Smuggling and Exotic Pets*. He continues that “to anthropomorphize--an attempt to create a relationship across the species divide by making the animal seem human--obviously is a factor,” (Laufer 2011: 137-138). Laufer raises two critical ideas in this passage; the desire of exotic pet collectors to dominate wild animals by taming them in their own homes, and how the act of pet keeping itself is a form of both domination and anthropomorphism. Raising exotic animals in a suburban home manages to bring animals closer to humans figuratively and

literally. We anthropomorphize traditionally wild pets by adapting them to our human lives and assuming that they prefer this lifestyle over their natural habitats. In assuming that wild animals, which usually do not live well as domesticated pets, can and should be raised in a human home is a form of anthropomorphism as we impose our own human desires and needs unrealistically onto feral creatures.

There is a sense of accomplishment in proving that a wild beast enjoys living with people instead of its own kind, and the excitement of the challenge of domination is greatly increased between taming a hamster and a lion. “Challenging” animals become a trophy of domestication for the owner. In *Dominance and Affection: The Making of Pets*, human geographer Yi-Fu Tuan digs into the rich history of pet keeping and the complicated human-animal relationship. He speaks about one particular Emperor as early as 218 A.D. parading mutilated (and therefore, weaponless) lions, leopards, and bears through his guests’ rooms, “tame and rare animals of great value were on their way to becoming inanimate art objects,” (Tuan 1984: 75). In the world of exotic animals, pet keeping is often less about how easy and pleasurable the pet experience is for a person and more about the rarity and magnificence of owning inaccessible critters. “In the European Middle Ages, the reasons people kept wild animals were varied, ambiguous, and hard to disentangle. Vulgar curiosity, pride of domination, prestige, and scientific interest were among the most important motivations,” (Tuan: 76) as even centuries ago people have been intrigued by the unique challenge and uncharted realm of keeping wild animals in their own homes. Large, seemingly untamable creatures are fascinating to encounter and for some, a

prodigious prize to own. However, a middle ground does exist; the average exotic pet owner may not be seeking or ready to tame the world's fiercest animals, and otters may hit that desirable spot of both challenge and safety. Otters do not seem as feral and thus dangerous to house as, say, a tiger or a wolf. Their charisma and approachability, combined with their rarity in the pet world compared to cats and dogs, charms curious collectors enamored with their soft bodies and impish nature. And for whatever reason, instead of appreciating otters from afar and choosing to adopt a more easily trained animal, there are people who go to great difficulties to defy all natural conditions to raise a wild otter in their own home.



Figure 6. An instagram post from bingo-the-otter

The histories of other pet animals may be able to reveal more on humans' motivations in regards to domestic pets. In 1961 a kitten named Susie was born in a barn in the Tayside Region of Scotland. Unlike the other barn cats, Susie had distinct folds in her ears that made them lie along the curve of her head. She was described as having an "otter-like" appearance and a fascinated neighbor took her in. When Susie had kittens the next year with the same folded ears, those kittens were saved for breeding and thus the cat breed of the Scottish Fold was created. For at least a decade after the breed was established, Scottish Fold breeders faced much criticism; the breed was not allowed to be shown in Europe because the kittens were prone to genetic abnormalities such as deformed limbs and tails, infections, mites, and deafness. The gene that causes the ear fold has been described as either an autosomal dominant or incomplete dominant trait, and cats with homozygous fold genes are especially vulnerable to severe health problems. Nevertheless, Fold enthusiasts continued to breed these cats because of their unique look. Today there is more acceptance for Scottish Folds, especially in the United States, due to more responsible breeding. However, the history of the Scottish Fold details how the health of these animals was often sacrificed for the possibility of a cute pet. As otters are given more significance in the pet world and often treated as a household cat or dog, some of the concerning breeding practices that are carried out on animals like the Scottish Fold may eventually befall "domesticated" otters. As a primary aspect of an otter's appeal as a prospective pet is their charming and adorable appearance, there is legitimate concern that rogue otter breeding operations could harm animals in their process. Tuan claims that "breeding animals to achieve and maintain certain traits calls for an indifference to

individual lives,” (Tuan: 108). This is clear in the history of many breeds of cats and dogs, but it can also be applied to the ethics of breeding exotic animals. He makes claims throughout this chapter that human vanity is the prime motivator for animal breeding--aside from cases where animals are bred for conservation purposes, the practice of animal breeding with the intention of producing pets is conducted solely for human benefit, often at the cost of animal welfare. The author continues on that “the procedures just sketched are the impolite backstage activities. In front, for all to see, are the owners and their pets,” (Tuan: 109). Hopeful owners of exotic pets may be involved with or otherwise supporting shady breeding practices in order to acquire a trophy pet; they may also be unknowingly purchasing animals that were mistreated, unhealthy, or born from the sacrifice of rejected inferior siblings. This begs the question of how otters and other exotic pets may be bred in captivity for the sake of the pet trade and what negative effects this causes. Scottish Folds are often still described as otter-like both in how their ears look against their heads as well as how they will sit upright on the back legs. There is definitely something very alluring about the appearance of otters that has made them an appealing pet desired by both naive families and ambitious pet collectors. Will people sacrifice the well-being of otters just so that they can have a photo-worthy, unique pet? The issue of the ethics of animal breeding may offer a bleak outlook. As long as humans intend to breed otters as pets, motivated by money or their own need to control nature, these animals will be bred not for their own betterment but for a human vanity that is blind to necessary reproductive practices that produce healthy otter offspring in the wild.

Trade

Otter Pet Trade

In much of the world, the capture, trade, and ownership of otters is prohibited; however, sometimes the laws are ambiguous enough to allow for the ownership of otters or other exotic pets. For example, very few American states have laws specifically allowing ownership of otters, but most states don't outright ban non-domesticated carnivores or animals from the Mustelidae family and may allow pet otters with a permit as long as the animals are deemed to be well-cared for. Although acquiring and keeping the necessary permits for otters as pets is almost always much more intensive than the same process for common household pets, this trend continues to escalate at a global scale. The reality of how difficult it often is to gain access to pet otters is a testament to how passionate people are about owning otters specifically. The thirst for otters is so strong that some will bend the law for a chance to sell, trade, or purchase a pet otter. In Indonesia, there is a growing trend of pet otters, so while some otter species are protected, Smooth-coated otters and Small-clawed otters can still be captured and traded. These two species are also often captured for the pet trade in Malaysia, Thailand, and Vietnam. In Nepal and Singapore, otters can be harmed or killed if they are on private land; the Otter Specialist Group suggests that sometimes people use this law as a "loophole" to capture otters for the purpose of trade. Otters are usually caught from the wild when they are very young (infants to juveniles), although wild otter capture was fairly rare up until around 2000. Unfortunately, it is often difficult to track the extent of otter captures, since many of these

incidents are kept quiet because they are either illegal or only ambiguously legal. Otter trading activity becomes more visible when distributors advertise the animals online. Other charismatic mammal species have fallen victim to an over-enthusiastic pet trade, such as in the case of the slow loris. The genus *Nycticebus* composes the slow lorises, a group of small and venomous primates located in parts of Asia, distantly related to the lemurs of Madagascar. For hundreds of years, indigenous tribes from Cambodia to Malaysia have kept or hunted lorises as they are rumored to harbor medicinal and even heavenly qualities. The slow loris has already been led to endangerment due to these direct threats from humans, as well as immense habitat destruction; yet there have been increasing efforts to remove the remaining individuals from the wild for use in the exotic pet trade. Exact figures on how many slow lorises are captured from the wild and traded are difficult to estimate due to the largely hidden nature of these illegal activities. TRAFFIC acknowledges that “it is very easy for this kind of trade to slip under the radar, despite perhaps thousands of lorises being traded annually.” The anticipated force of slow loris trade was threatening enough for the animals to be transferred in 2007 from CITES (the Convention on the International Trade of Endangered Species) Appendix II to Appendix I. International commercial trade of species listed under Appendix II is highly regulated, while international commercial trade of species under Appendix I, the most protected category, is completely prohibited. Interest in owning slow lorises as pets has been propelled in large part due to viral videos of the animals being handled by humans. Viewers are captivated by the slow loris’s baby-like wide eyes and seemingly mild temperament. What an inexperienced viewer will not understand is that a slow loris will remain still and

appear to be calm when faced with threatening situations. The Duke Lemur Center, the largest lemur sanctuary in the world, has specifically explained how in certain viral videos where slow lorises appear to be raising their arms to be tickled, these animals are actually terrified and acting out of fear. They were not raising their arms for easy tickling access; when fearful, the slow loris will raise its arms to access poisonous glands located in its armpits. The uneducated viewers, who are untrained to recognize the basic body language of the animals, are the same pool of individuals attempting to adopt one into their human home. Unless these potential owners are highly trained in the care of their freshly adopted slow loris, and this new pet cannot be returned to live in the wild, slow lorises will continue to be hurt by mistreatment in human homes, and habitat destruction in the wild. With a new wave of captive otter videos available, these same issues now threaten the otter.



Figure 7. A still from a slow loris “tickling” video posted by Youtube user nw1024. This “arms raised” position is understood by experts to be a defense mechanism for the slow loris. More than 1.3 million people have viewed this copy of the video.

As videos of human-otter interaction continue to circulate, more viewers will gain a false impression that these two species must be compatible, perpetuating this idea that otters are suitable pets and encouraging activity in the otter pet trade. As the number of “social media otters” grows, these misleading depictions spread further to the corners of Youtube, Instagram, and Reddit, viewership increases yet again and the cycle continues. Distributing information about why owning exotic pets like this is destructive can only be so effective when advocacy must compete with a high demand; and as otters become rarer in the wild and more difficult to obtain as pets, demand will increase with the newfound rarity. Conservation biologists Richard J. Hall, E.J. Milner Gulland, and F. Courchamp explore in their paper “Endangering the Endangered: The Effects of Perceived Rarity on Species Exploitation” how, when a species receives additional protections in response to increasing threats, there “can also be an incentive to hunters responding to increased consumer demand for goods perceived to be rare, and therefore valuable,” (Hall, Milner-Gulland, Courchamp 2008: 1). Basic protections and widespread awareness of how the pet trade is hurting otter populations will not be sufficient in curbing the destructive increase in demand. As long as this ethically and ecologically ignorant culture exists that feeds into the demand for pet otters, and avenues to obtain live otters are available, untrained individuals will purchase these animals. Groups that monitor animal trade are often surprised at how openly people advertise illegally obtained animal products or live animals on the internet. This past summer I had the privilege of interning with the CITES

Secretariat as part of the United Nations Environment Programme in Geneva, Switzerland. During my time there, I sought to learn more about illegal wildlife trades and how they are conducted. There was one conference I attended during which a presentation was given on wildlife cybercrime. The presenters discussed how surprisingly common it was to find illegal activity in regards to wildlife trade being conducted over social media sites; often the issue was not necessarily finding this activity, but proceeding with legal action that was appropriate for online spaces, where jurisdictions blend and anonymity is easily attainable for traders. At the presentation's conclusion, the question that everyone in the audience seemed to ask was why the presenters did not touch upon "the deep web" and "dark net" and how wildlife is traded in those spaces. The answer provided was simple--there was so much activity presented out in public online spaces that law enforcement usually is not even able to extend the scope of their search to hidden online avenues. This was, to me, a sobering revelation about how frequently wildlife must be traded online and how surely challenging it must actually be to intercept wildlife, animal products, and illegal actors when these transactions are only traceable through the internet.

Confronting Otter Dealers

Otters have been offered for sale on Facebook, Instagram, Twitter, 4Chan, and of course, Craigslist. As part of my research on this topic, I have decided to conduct my own investigation into the online exchange of pet otters. Consulting the Institutional Review

Board at Bard College, I have created a fake email address to help me go undercover and discover how easy it could really be to buy a pet otter on the internet. I must be careful, however, as online traders are likely wary of investigations by legal entities, and if I reveal to a correspondent that I am conducting research for my paper, I may not hear back from them again.

I chose the email alias JCDanielV@gmail.com in honor of Johann Christian Daniel von Schreber, the German naturalist who first described the North American river otter. To preserve the anonymity of the individuals involved in this section, any names, addresses, and other identifying information have been changed. My intention was to seek out an otter distributor online, contacting them via email and inquiring about the live animals they sell, how they obtain them, and any other information about the seller I can glean without blowing my cover.

I began my search at a general website for free classified advertisements. A search for “otters for sale” fetches several results of all baby Asian small-clawed otters for sale, \$300-500 a piece. Asian small-clawed otters are usually the only otter that an individual can legally own in the United States, although some states may specify what species are allowed with a permit. I want to know how easy it can be for someone to legally purchase an otter online, and if these otter brokers are willing to bend the law a bit for an interested customer in a no-otter state.

The first result, from Kansas City, Missouri, says: "I got [sic] male and females ready and available now. They are 12 weeks old and supper [sic] friendly . They have had their shots and [sic] potty trained. They goes [sic] with kids and other home pet like cat and dogs. This [sic] babies are raised as pet in my home and are USDA licensed , so they can live in any city or state now." Missouri is one of the US states that has no specific ban on pet otters; while it may be legal to breed otters here, they still cannot "live in any city or state" where owning otters is illegal or requires a permit that the new owner must apply and obtain approval for. This seller seems to be posting duplicate advertisements for several states, so it's not immediately apparent where they are actually located. These baby otters are listed as being 12 weeks of age, when Asian small-clawed otters are just beginning to open their eyes. Typically in the wild, these babies will not wean until they are 14 weeks. Each otter pup supposedly costs \$300 from this seller; to find out more, I needed to contact them.

The seller also left an email address and phone number on the ad so I sent them a quick and casual message.

Jay Daniel <jcdanielv@gmail.com>

to [redacted] ▼

Hey there,

I saw your ad online for baby otters, are you still selling them? What is the process?

thanks xx

Figure 8. *My first attempt at contact with an otter seller*

Another advertisement on this same site shows a similar offer. Like in the first ad, the description for this listing contains several grammatical errors, which makes me wonder if these alleged sellers are in the United States at all, or at least non-native English speakers. This second ad, claiming to sell an unspecified age of baby Asian small-clawed otters in Virginia, offers an email address to contact them as well. I sent this seller the same message as I sent to my friend in “Missouri.”

The next seller I look into on this page offers a link to their personal exotic animal selling website, so I take a look. In a stark contrast to the vague information and broken English of the two previous advertisements, this website’s sleek atmosphere and comprehensive descriptions feel much more legitimate. There is even an exact Montana address posted, along with an email address and phone number. Aside from otters, this seller claims to breed a host of exotic animal species, including red kangaroos, prairie dogs, and tarantulas. The otters on this site come with a steep price tag as well; one otter will set

you back at least \$2,100, which is seven times more than the listed price of an otter from the Missouri seller. I sent a slightly different email to to the address listed on this page.

Finally I did a search on Youtube for otter pups for sale, as some breeders will post videos of their litters to entice potential customers. One such video of playing baby otters had a name and email address attached to the description; I contacted them with a message nearly identical to the first email I sent out and eagerly waited a response from at least one seller.

Within a few days of sending out emails, I heard back from my seller in Virginia.



to me ▼

Yes, they are available.

Figure 9. *The first email response I received*

It's a fairly short response and it didn't address my inquiry about the process of purchasing a baby otter, but I was grateful that someone replied at all. I decided to test the waters by asking another couple of questions. I am careful not to dig for anything too personal, such as this seller's age, gender, or race. And while I am technically misrepresenting myself by using a fake email address and name (and by neglecting to mention my true intentions) I do not lie in any of my messages.

Jay Daniel

Are you able to ship them? Will it matter if owning an otter is not legal in my state?

Figure 10. *I press further in my inquiry for more information*

While I waited for the Virginia seller and the others to respond, I decided to do a quick Google search of the email address that had just replied to me. The first results show me that the “Virginia” seller is advertising these otters for sale on several different websites, claiming to be from a different location each time. In addition to the baby otters, he appears to be on these same websites selling black scorpions, Siberian Husky puppies, and “Mattress” puppies that I assume are actually Maltese puppies based on the pictures provided. After the search results that show the other animals this person seems to be selling, there are more hits for this same email address advertising medical marijuana for sale online. He sounds very busy and I begin to wonder at this point if the otters exist at all or if these are a series of scams. Within a few hours of my last message, Virginia responds.



Figure 11. *Another email response from the seller allegedly working out of Virginia*

At this point I felt like we were starting to bond a bit so I went ahead and asked him about where the otters come from. Over the next month we exchange several emails and I am offered a fascinating look inside what the process may be like if I really did intend to purchase an otter online. This seller seems to dance around my questions about proper otter care and any general inquiries about how his operation functions, but he does start to respond more quickly and with more information compared to our first messages. Eventually we begin to discuss pickup logistics. I want to know if this seller is willing to ship the otters and from where. He then asks me where I am from; I can sense that our conversation will likely come to an end soon unless I am willing to put down a deposit on my otter or reveal a bit too much information about myself, so I try again to get some more useful information.

Jay Daniel <jcdanielv@gmail.com>

to [REDACTED] ▼

I am from Southern California. Where are you located? What are the prices with shipping? Do you mind if I ask if you breed the otters yourself, or do you buy them from somewhere else?

[REDACTED]

to me ▼

Im in [REDACTED] with the babies available with us hear, price including shipping will cost \$350 to be shipped to south Ca, i buy asian otters from African and it's being shipped to me

Figure 12. *More of our exchange*

Here is the insight I've been fishing for. According to this email, the otters we were looking into buying allegedly aren't bred on-site (the seller's city is in the United States, but not Virginia as he had originally advertised) but are rather exported from Africa. This means that the baby otters, which are already allegedly shipped to customers at a dangerously young age, must at first be shipped at an even younger and more fragile stage to the seller with whom I've been communicating with. Although this disclosure is certainly helpful in piecing together my understanding of the supply chain in place here, so many more questions have been raised. Are these otters in Africa caught from the wild, or is there a separate breeding operation there that ships them to our seller? How much does it cost to get these otters directly from the African source? Are the baby otters shipped with their mothers, or are they weaned early? What is the legality of this transaction? I don't think that my correspondent will provide me with this information if I ask. As I consider these possibilities I must also keep in mind that this seller is not an especially credible source; he could be lying about his location, or where he gets the otters, or even if these otters exist at all. This experiment merely shows what a hopeful otter owner may go through if they decide to seek a pet otter from the internet.

Some of the language used in the advertisements I encountered is intriguing as well. These sellers almost exclusively use terms such as "babies" instead of "pups," and other deliberate choices like "potty trained," "socialized," and even "bundles of joy" that feel more like they belong on an online parenting forum than they do as a sales pitch for an exotic pet. Youtube videos featuring a charming otter clip or full compilations of different otter videos

commonly use similar language in their video descriptions, referring to the otters as “babies” even when they are well past the weaning stage. This kind of language helps sell the idea that these otters are suitable future members of your family and normalize them as pseudo-puppies that are as acceptable to purchase as any common pet. This sort of tactic used in the baby otter advertisements begs the question of how far these otter distributors are willing to go to market their product to an audience that is perhaps ill-equipped to care for an exotic pet. There is still a lot more information I would like to know about the seller I communicated with and the otters he allegedly manages, but I don’t have any real authority in this situation; the only information I can access is what he chooses to tell me. Nevertheless, even powerful law enforcement entities with an abundance of accessible resources still often struggle to pursue shady activity within the international wildlife trade.

Online activities like this can be challenging to track into the real world as actors maintain a certain level of anonymity and the legality of these transactions is difficult to define if the regions of the distributor and buyer are hidden or if multiple countries are involved that each have their own stance on animal trade. Illegally traded otters are often first discovered during an interception at check points when crossing borders or boarding flights. Seizure data can help officials better understand how live otters are being trafficked, while also reminding us that there must be trafficked otters going undetected that will not be counted in the data. Because of this extensive hidden activity, the true scope of the problem of illegal otter trade can never be fully realized.

Contextualizing Commodity Chains

Exotic pets—or any pets, for that matter—usually are not born into the human families they permanently live with, and either originate from a domestic otter breeding situation or directly from the wild. There may be many actors in these commodity chains aside from the captor and the final owner, and this may also change depending on the legality of the trade and the region(s) involved. Pet otters can also pass through a number of homes, as people realize that owning an exotic animal is more difficult and costly than they'd realized. There are sanctuaries and shelters that accept exotic pets because of the high abandonment rate; some of the popular “social media otters” were rescued from such places. “Pip the Otter,” an Asian small-clawed otter with nearly 100,000 instagram followers, was allegedly bred for conservation purposes, but adopted out to a zookeeper as a pet because her mother couldn't care for her. Some stories of how otters came to live alongside people, playing with their children and cuddling the cat and dog, make charming twitter bios—other narratives are a sobering reminder of how the trend of exotic pets can result in neglected, abused, or otherwise unhappy animals that often become unhealthy or die.



Figure 13. *"Pip the Otter" and the Bengal cat she lives with*

People seeking out their own pet otter may also reach out to select otter "breeders." As is the case with capturing wild otters, breeding otters to sell as pets varies in legality depending on the region. Whether the breeders are otter-enthusiasts raising one litter at a time alongside their own pets, or "exotic farms" that breed a variety of exotic animals, these animals are brought into the world by humans for financial gain. These distributors also often advertise on social media, as well as exotic pet websites where hopeful otter owners can directly contact the breeders. Simple Google searches reveal several internet forums

where people post questions about and requests for otter breeder contacts, often acknowledging that their intentions are illegal. Many posters are from states like California, which is notorious for strict exotic pet laws and legally ambiguous to own a pet otter in—other posts called for breeders for sea otters, which are illegal to own in every US state. The relatively new trend of the otter pet trade, aided by the unique protection of the internet as a trading tool, has allowed these potentially illegal or otherwise harmful activities to take place in plain view of any onlookers.

Environmental Effects

Otter Fur Trade



Figure 14. "Sea Otter Revenge" comic by Gill Hatcher

In 1700, there were an estimated 200,000 sea otters inhabiting the North Pacific Rim of the Pacific Ocean. Over the next 200 years, the worldwide population would be reduced to about 2,000 individuals due to overhunting (<http://www.otterproject.org/about-sea-otters/natural-history/>). One of the otter's most charming characteristics, dense and soft fur, makes it all the more attractive for the modern day pet collector, but for hundreds of years this fur was more valuable when skinned off the animal and made into clothing. Sea otter numbers steadily decreased due to hunting from indigenous Native American populations, but the most devastating hits to the

population occurred after the mid-1700's when Russian explorers travelled to Alaska to purchase large shipments of furs. Thus began the maritime fur trade. Trade did often include furs from other animals, but consisted almost entirely of otter furs. In *Otter Skins, Boston Ships, and China Goods*, geographer James R. Gibson recounts that "in 1804 Captain Sturgis traded ermine skins for sea-otter skins at the rate of five for one, but within two years a hundred ermine skins would not fetch one sea-otter skin...fur seal skins...were worth only one-fiftieth as much as sea otter skins," (Gibson 2014: 240). As sea otters became rarer to find, demand only increased—price did as well, which only encouraged more hunting and the cycle repeated. Although the transactions were primarily facilitated by Russians who acquired furs through indigenous peoples of the Pacific Northwest Coast and native Alaskans, the trade had a global reach, drawing high demands from across the United States as well as Russia, China, and Britain. "Otters" became nearly synonymous with their form as lifeless furs, appreciated for their monetary value and functionality as an insulator rather than their inquisitive behaviors and dog-like appearance. This overzealous fur trade continued until 1911 when sea otters gained protection under the International Fur Seal Treaty, yet by then the population numbers were irreversibly damaged and sea otters had become locally extinct in many areas along the Pacific Rim.

Wild Otter Reproduction

Sea otters are considered "slow breeders" in that their populations take a long time to grow, which has made recovery especially difficult (Sanders 2014). Most animals lie

somewhere on a spectrum between *K*-Selection and *r*-selection, which helps describe their general reproductive strategy. Animals leaning more to one side may be referred to as “*K*-selected” or “*r*-selected” species, depending on which end of the spectrum they favor. Otters are *K*-selected species, which means that instead of rapidly producing and hoping some of their pups survive, otters tend to have fewer babies, with longer gestations and rearing periods to give each pup the highest chance of surviving infancy (Sanders). Humans are a prime example of a species that utilizes *K*-selection, as we tend to only have one child every year or every several, yet our infant mortality rate is significantly lower than that of an *r*-selected animal such as a salmon, which can lay thousands of eggs and will provide little to no parental care after the deposit. Usually, *K*-selection is an effective strategy for larger mammals like otters, but only birthing one or a small handful of babies each year means that each infant death hits the population significantly harder. With many otter species already suffering from threats to their young such as predation and drowning, any additional interference from humans can easily dismantle population replacement rates.

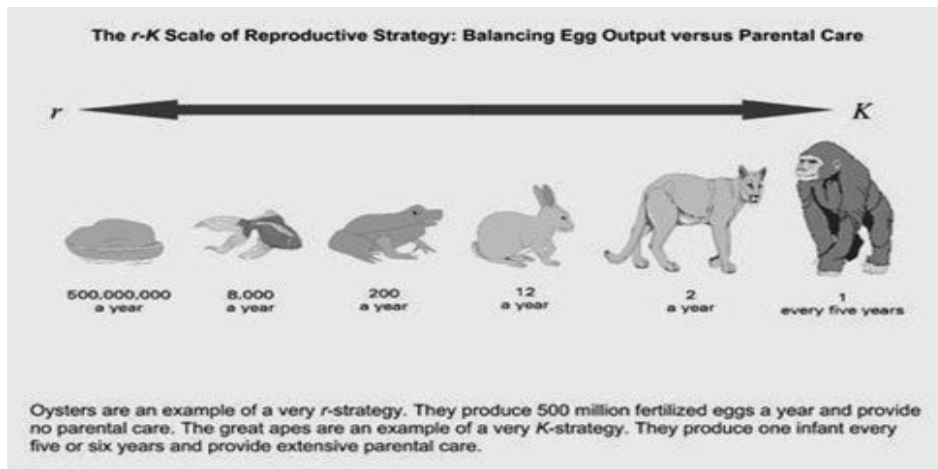
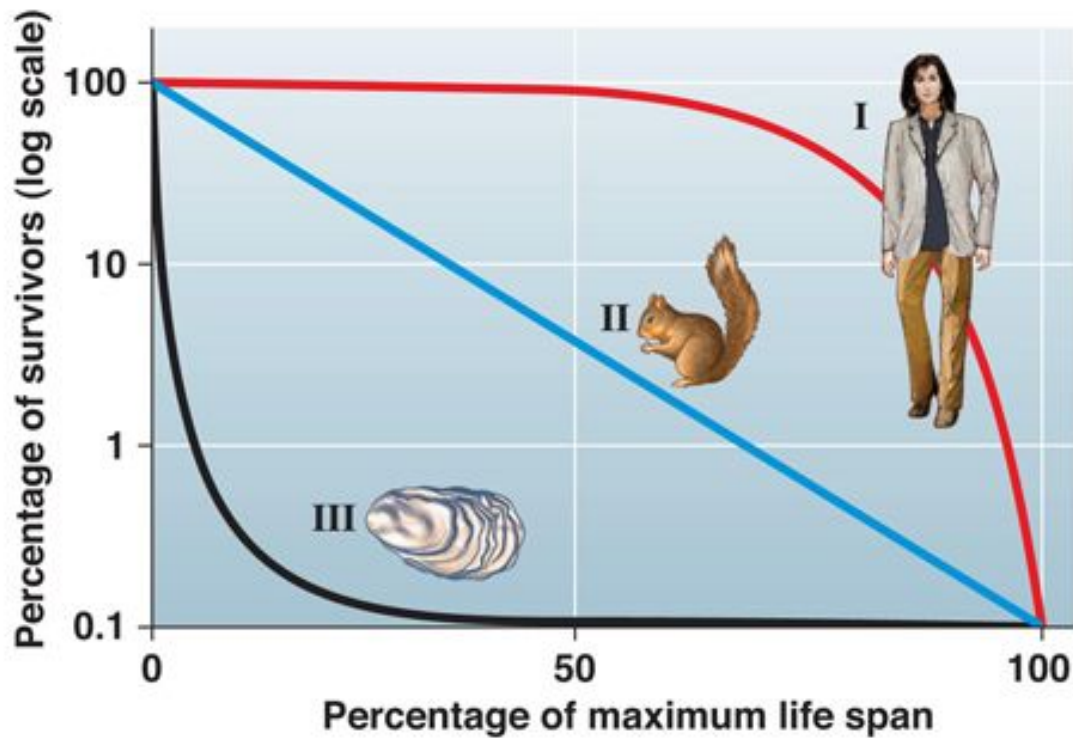


Figure 15. Animals that favor *K*-selection as opposed to *r*-selection tend to produce fewer offspring less frequently. *K*-selected species rely on higher infant survival rates to maintain a healthy replacement rate, while *r*-selected species can afford high rates of infant mortality as long as a few individuals survive.

Otters are not the first *K*-selected animals to struggle from sudden environmental changes. Marine researcher Peter Reijnders, who curates educational materials for University Wageningen in the Netherlands and University Kiel in Germany, explains how marine mammals face several challenges to their survival due to their evolutionary history. These include “single offspring per pregnancy,” advanced “age at sexual maturity,” and a lengthy and high dependency on mothers from their pups (Reijnders 2015: 4-19). Some of this research suggests that the chance of a marine mammal surviving can be significantly decreased after the death of its mother even years after its birth. Paleontologist Annalisa Berta, marine scientist James L. Sumich, and marine mammal researcher Kit M. Kovacs unpack more about the life histories and reproductive habits of these animals in *Marine Mammals: Evolutionary Biology*; this text helps shed light on many of the biological habits

and consequential effects bestowed upon marine mammals, including sea otters. Most marine mammals slide far into the *K*-selected side of the reproductive strategy scale and will dedicate more time and energy to fewer offspring, sometimes only rearing only a few children throughout their lives. An orca may wait five years between births, and a North Atlantic right whale will often wait six (Berta et al. 1978). Under typical circumstances, this relaxed reproductive rate is sufficient for keeping the population afloat. These animals tend to have lengthy lifespans as well, sometimes exceeding that of humans, so it is not necessary for each year's pups to replace the entire previous generation. However, since these species rely on a low infant mortality rate to justify their small families, hazards such as drastic habitat damage and overhunting can quickly demolish whole herds over several years as the fragile infants or their mothers are killed (Berta et al.). Because *K*-selected species usually require several years to sexually mature, environmental threats will often wipe out individuals before they have had a chance to reproduce.



© Pearson Education, Inc.

Figure 16. The survivorship curve of a K-selected species (I), r-selected species (III), and a species near the middle of the reproductive strategy spectrum (II). Few of the oysters on survivorship curve III will survive to adulthood, and a miniscule percentage will reach their full potential lifespan. This low survivorship remains sustainable due to extremely high birth rates. K-selected species on curve I require such high survivorship to counteract their slow reproductive rate. When survivorship or the already-low birth rate drops significantly, K-selected animals may not be able to sustain their populations.

Because otters already have fragile and somewhat unreliable breeding rates, disruptions such as habitat loss and population decline can have devastating consequences for the continuation of these species. Observing how other populations of K-selected

animals have been permanently damaged by human-introduced threats can help predict what can happen to otters if the species are not adequately protected. One non-mammal example of this hazard can be witnessed in the albatross, a collection of 22 species of large seabirds. While many species of birds age rapidly, an albatross can live around 50 years, and is an excellent example of a *K*-selection strategist. An albatross will often wait ten years or more before first mating, which affords it enough time to select a perfect life-long mate (Dobson and Jouventin 2010). The happy couple will then raise one egg at a time, caring for the chick for nearly a year before its ready to fledge the nest. Albatrosses have faced rapid decline in recent years due to human-introduced threats such as direct hunting, strangulation from fish lines, and choking on plastics, in addition to general habitat destruction. There is a subsequently exponentially negative impact on the population of these animals, as the number of albatross chicks born each year cannot replace the number of individuals lost. Ideally, each mating pair should raise at least two chicks to adulthood to maintain a proper replacement rate, but as more albatrosses die or lose their partner before breeding or rearing children, there is increased pressure on the remaining albatross pairs to raise enough chicks to compensate for the uptick in losses. Another reason why *K*-selected species tend to adapt poorly to any great environmental change is each generation is produced less frequently and therefore is much slower to adapt to even subtle changes; an *r*-selected animal that gives birth within a year of its own can literally evolve to accommodate shifts in water temperature or food quality so much more quickly than a large mammal could. Otters are already challenged with many of the environmental threats that other marine animals are struggling with; as environmental degradation of

their habitats continues, and more individuals are removed from the wild for the sake of the pet trade, remaining otter populations will only shrink until extinction is inevitable.

Female otters usually raise just one pup at a time, but may not sexually mature until they are a few years old and often have years where they do not birth a pup. Of the sea otter pups that are born, only about 25% of them will survive their first year. Events like the maritime fur trade would be devastating for any species so severely hunted, but sea otters are especially vulnerable because they may not be able to recoup their numbers quickly enough to crawl out of their endangered status. With new cultural movements that celebrate otters and even paint them as suitable pets, there is concern that a drive to obtain pet otters could actually have more negative effects on otter populations. Increasing reports of otters taken from the wild for the purpose of the pet trade foreshadow how potential over-capture of wild otters could further damage otter populations in a way reminiscent of the scars left from the maritime pet trade. However, since otters today are more often glorified as companions instead of for their coats, the modern otter craze could prove to be beneficial to otter species.

Charisma and Conservation

Modern day perceptions of animal rights and environmental preservation would likely prevent systems like the maritime fur trade from spiraling out of control so quickly. Depicting otters as friends instead of fur producers causes people to care about their

existence in the wild as well. Each year on World Otter Day some of the self-described “otters” of the gay community mentioned earlier will post pictures of themselves or animal otters to help raise awareness about otter endangerment.



Figure 17. *An instagram user poses in recognition of World Otter Day*

Depleting otter populations is considered morally problematic in itself now, not just because it means the product supply is running short. And while the charisma of otters is what has made them so attractive for the pet trade, this charm will serve them well in terms of conservation advocacy. In “Human Preferences for Species Conservation: Animal Charisma Trumps Endangered Status,” environmental psychologist Agathe Colleony compares the frequency with which people donate to species they personally like as

opposed to the animals that were in greater need of support. The research suggests that people who intend to donate to wildlife causes are more likely to put their donation towards “charismatic” animals like penguins and pandas, with actual endangerment level being a less important factor in where to donate to. The threat of polar bear or elephant extinction is more concerning for most people than the preservation of an obscure species of frog or insect. People are also more likely to donate to help animals more similar to humans, which usually means that mammals are given a top priority. In the 2013 study that this paper focuses on, 29 species were placed up for “adoption” through a zoo program where visitors could donate however much they wanted to their chosen species. The European otter listed was ranked 7th in donations, higher than any of the non-mammal options. Otters are one of the endearing animals that people enjoy advocating for, and enough financial support could help slow or reverse negative environmental changes that otters are currently experiencing. More otter fans means there will be increased call for otter conservation and potentially resources for pro-otter initiatives. Organizations such as the UK-based “International Otter Survival Fund,” the “Friends of the Sea Otter” advocacy group founded in 1986, and countless zoos, aquariums, and sanctuaries have taken initiative to promote otter welfare and spread awareness, education, and empathy. Interactive events such as a yearly sea otter conservation workshop held at the Seattle Aquarium allows experts and novices alike to learn about breakthroughs in otter ecology research and conservation. Prospective otter owners may be more flexible in their plan to actually acquire an otter if they are informed of the environmental impacts that the pet trade can have. As long as otter culture doesn’t cause too many individuals to be taken out

of the wild for the pet trade, people who want to get involved with otters could prove to be valuable advocates for the survival of these species.

Negative Impacts on Otters and Ecosystems

The disappearance and hardships of wild otters is more than just a moral concern. Humans and other species may experience increasingly visible consequences of environmental imbalance if otters do not maintain sufficient protections. Many types of otters are considered to be keystone species for their ecosystem, meaning that they are largely depended on by other species to preserve the habitat equilibrium. Otters function as both predator and prey, curbing fish and crustacean populations from overgrowth and serving as a vital food source for larger carnivores such as sharks, orcas, and some land predators. When otter populations dwindle, and are thus effectively removed from this crucial food web, the smaller prey animals flourish, but then begin to over-compete for resources. The apex predators start to drop in numbers when their otter prey becomes scarce, further enabling the explosion of the bottom feeder populations that the otters once helped control. When the population of a higher lever predator such as otters drastically drops and the populations of the prey species consequently blossom, this “trophic cascade” can cause irreparable damage to the ecosystem. This kind of population imbalance can be quite bad for humans as “pests” that otters feed on, such as insects, experience population booms. An area’s otter population is also sometimes used as an indicator for the the overall “health” of an ecosystem; the average health of the otters in a habitat is usually correlated

to the health of the other animal and plant species nearby. Without otters present to observe, it may be more difficult for wildlife aids to identify habitats in jeopardy and to effectively establish reversal projects. This puts all of the species in this environment at risk, which includes the fish we like to eat, the large animals we like to watch, and the plants we like to collect. Past examples of removal of otters from the wild has proven how devastating the effects can be on neighboring species, which effects humans as well (otterproject.org). Previously, sea otters were sometimes hunted to near local extinction because people nearby didn't want the otters to eat too many of the available fish. What happened in these areas was that the population of sea urchins, usually controlled by the otters' appetites, grew to great numbers. The urchins then excessively consumed kelp forests that were crucial breeding grounds for the local fish species, nearly destroying the reproductive cycle of the fish in this area and vastly reducing the amount of fish available for people in the years after the otter removal. Although most people likely don't care directly about kelp forests or even about how sustainable an otter population is in a given area, anyone who consumes or is involved with the distribution of fish species in these places should take notice of how otter population decreases can dramatically impact a multitude of species around them. Threats that have typically endangered otters, such as habitat destruction, littering, and hunting have had devastating impacts on these surprisingly vulnerable animals, with official breeding programs not being successful enough at this time to combat the population drops. The rising extraction of otters from the wild for the purpose of the pet trade is now further perpetuating the existing issues caused

by fewer otters. If otters become extinct or nearly so, we could see greater and more permanent consequences for ourselves as the population shifts imperil aquatic ecologies.



Figure 18. "Pup 681" found orphaned along the central California coastline and later transferred to Shedd Aquarium in Chicago, Illinois

On the Basis of Ethics

Aside from any argument that causing harm to otters as individuals or through population depletion can hurt humans as well, there does still exist a moral obligation to be ethically conscious in regards to otters simply as an extension of compassion for other living beings. Especially in cases of direct human-animal contact, humans must take special consideration to ensure that the creature they interact with experiences no unnecessary

suffering. There will always be debate amongst people about what qualifies as animal abuse and neglect, but cruelty itself should never be weighed as a viable option. At this time, the most extended example of contact between humans and otters is through domesticated pet keeping, an exercise in human vanity and power.

Some more extremist branches of animal rights will actually advocate for the abolition of pet keeping of any animals. This argument extends beyond considerations of animal care maintenance and contentment levels and questions the validity of a narcissistic human desire to “own” an animal and even compares it to a sort of slavery. Ethics philosopher Heather M.N. Kendrick engages this line of thinking in her piece on “Autonomy, Slavery, and Companion Animals” in *Between the Species: A Journal for the Study of Philosophy and Animals*. Here she proposes that pet keeping is a form of “benign slavery” that is undoubtedly still an unconsensual relationship between owner and captive, yet unlike more familiar examples of human slavery, may be a “state of slavery in which the enslaved individual is provided with a pleasant life free of significant suffering and want...those who assert that pets live a luxurious life in order to counter the claim that they are slaves...have failed to realize that being treated kindly and being a slave are not mutually exclusive,” (Kendrick 2018: 239). While this debate on animal captivity as being akin to slavery is thought-provoking and does raise a question of how valid pet keeping is if the animal in question is “provided with a pleasant life,” it is unlikely that such a widespread pet culture could be eradicated anytime soon. A more pragmatic solution to these concerns is to address specific instances of pet keeping that are especially harmful;

one way to begin this process is by identifying which species do well as pets and which ones really ought to be left in their natural habitats.

Although the practice of pet keeping is haunted by its undertones and history of domination, one hopes that most captive animals, exotic or not, are treated with the affection, respect, and care that their species requires. Many pets lead happy lives, and it is sometimes necessary for even wild animals to live within captivity, such as in the case of injury or an orphaned infant separated from nature too long to survive in the wild. Yet even if we concede that such animals may require *captivity*, they needn't necessarily be kept as household pets. The difference between healthy pets and ones suffering from neglect or abuse is not always apparent; some species can thrive as human companions, others require certain natural amenities that a typical household cannot provide. In the case of some species, trying to keep a wild animal as if it were a cat or dog is abusive in and of itself. "Cruelty to animals is deeply embedded in our human nature," Tuan admits, "our relation to pets, with all its surface play of love and devotion, is incorrectly perceived unless this harsh fact is realized. Cruelty in the sense of indifference to the pain and needs of another being is a product of necessity," (Tuan: 89). The desire to own a pet is a selfish one, and going to the extent of unnecessarily obtaining a wild creature completely disregards the well-being of the animal. To reiterate—there may be occasional situations when an "exotic" animal must live in captivity; there is never a situation when a person must have an exotic animal. If the kind of people who seek exotic animals are those who love and appreciate them, then they must acknowledge that their efforts to own wild

animals more often harms them. Exotic pet keeping carries more implications with it as opposed to other forms of art that do not involve the captivity of living beings. Philosopher and animal rights activist Tom Regen, who advocated for an end to not just meat-eating but all forms of animal exploitation in his work on animal rights theory, *The Case for Animal Rights*, maintains that “being kind to animals is not enough. Avoiding cruelty is not enough. Housing animals in more comfortable, larger cages is not enough. Whether we exploit animals to eat, to wear, to entertain us, or to learn, the truth of animal rights requires empty cages, not larger cages,” (Regen 1983: 208). Some animals, such as common domesticated companions like cats or dogs or rats or pigs, may be able to thrive in human homes and are therefore morally permissible to keep as pets. This is not the case for large or sensitive exotic animals that will require more than even the most expensive artificial habitat can offer. Otters have suffered greatly at the hands of the pet trade and often do not have their dietary or physical needs met as pets. The most satisfying way for otter lovers to honor this animal is to leave otters alone in nature instead of in bathtubs and backyard pools. Efforts to preserve natural otter habitats and dissuade ignorant exotic pet collectors from purchasing otters that they cannot handle would be vastly more rewarding than the guilt of keeping a wild animal captive purely for the sake of Instagram pictures and neighborhood awe. For the exotic pet collectors that do not get the same thrill from donating to wildlife preservation efforts as they do from physically owning and controlling a wild animal, they will just have to make the sacrifice of not being part of the exotic pet trade.

Conclusion

In the ultra-connected world of communication and entertainment we reside in today, it's difficult not to partake in the enjoyment and sharing of intriguing news articles, tasteless memes, and endearing animal pictures. Participating in animal internet culture does not necessary implicate one in animal suffering or environmental ruin. We are allowed to enjoy these activities, but must stay aware of how such interactions can indirectly perpetuate destructive actions. Spreading misleading media and inaccurate information about wild animals can induce more directly harmful activity such as shady online transactions that increase otter hunting demand and give way to animal cruelty. Purposefully participating in these dark ventures by way of actively engaging in harmful areas of the exotic pet trade is a matter of higher stakes. Any level of contribution to this culture carries potentially irreversible consequences.

We have entered a new epoch known as the Anthropocene; a time when the human species has become the greatest geological and ecological influence on the Earth. Intentionally or not, the activities that human society engages in today can tremendously affect the longevity of our species and that of other organisms. The reality of the Anthropocene also unveils the dangers of the anthropocentrism that motivates us to make societal decisions that benefit humans above the rest of the ecosystem. Choosing to evaluate ecological and otherwise ethical decisions through only a human lens will

inevitably lead to irreversible shifts in the environment, such as the eradication of key species, that may carry dire future consequences. Yet if humans can manage to extend beyond this anthropocentrism, we can use this influence to shift the planet's systems in a way that could be more beneficial for more species. Anthropologist Anna Tsing attempts to unpack the concept of the Anthropocene in *Earth Stalked by Man* by examining "machines of replication," which she describes as sorts of "life world plantations" that are designed to create biological future assets. An example she offers of a fauna machine of replication is the reproductive mechanics of a pig farm; what is typically a natural process of mate selection, sexual reproduction, and birth is interrupted by the strict breeding program orchestrated by the farm. Every step of this piglet production is planned out and painstakingly monitored. This same line of thinking could be applied to otter breeding operations, or even other human-imposed plantations that affect the surrounding habitats, such as the imposition of farmland into otter territory. The disruption of machines of replication has the ability to go in uncontrolled directions that the humans who have set them up did not intend; seemingly benign systems of captive otter breeding or kelp harvesting could have drastic inadvertent repercussions of environmental calamity. In *Staying with the Trouble: Anthropocene, Capitalocene, Cthulucene*, Donna Haraway comments on Tsing's argument, noting that much of the state of the Anthropocene is, in her view, "the kind that can no longer promise progress but can and does extend devastation and make precarity the name of our systematicity," (Haraway 2016: 41). She goes on to explain the highly entangled relationship between human lives and nature; we are not simply simultaneously existing with other species, but rather there is a deeply rooted

interconnection that helps elucidate the inevitable impacts that human pursuits have on other organisms. As we acknowledge the unmatched effect that humans have on the world at this time, it is imperative to understand how easily the activities we try to control can lead to destruction and disrupt ecologies at ruinous magnitudes. To effectively coexist with the other species we share our planet with, it is essential for us to analyze the most pressing issues faced by the ecosystem as a whole and implement strategies that constructively serve humans and other animals.

Unfortunately, positive intentions are not always sufficient enough in correctly navigating the labyrinthine path of wildlife protection and its related issues. We must take care not to become so enamored with the rhapsody of participation in advocacy that we engage in seemingly supportive activities that may actually be harmful. Historian William Beinart discusses in “The Renaturing of African Animals: Film and Literature in the 1950s and 1960s” how visual media of African wildlife rose in popularity during this period in Britain as more people became invested in conservation and nature appreciation. While the films, photographs, and literature created during this time may have helped spread conservation messages, this movement was also problematic in how the people involved would often insert themselves into wildlife narrative. Wild animals, especially large African mammals, were kept as pets and the relationship between these animals and the “advocates” that kept them was highly romanticized. Beinart describes one notable case where game warden George Adamson shot and killed a lioness with three newborn cubs (Beinart 2001). What may have been considered a tragic event was spun into an

exceedingly publicised story of Adamson's wife Joy adopting one of the cubs and raising her as a pet. Instances like this are problematic because the important messages of preserving nature are lost in the glamor of exotic pet ownership; crucial issues such as the orphaning of three infant lions and the questions of how and if they can successfully live in the wild are minimized in favor of narratives depicting wild animals as suitable pets and the people who take them in as sort of wildlife heroes instead of the very people perpetuating wildlife issues. In this way, attempting to get involved with conservation work or discussions is challenging, as it becomes more clear that actions in this area often come with unintended consequences. Activity at any level involving wildlife requires special attention to possible injurious effects, be they well-intended or not.

Situating oneself in a way that is conscious of issues in exotic animal trade requires both restriction and passive consideration. A comprehensive understanding of the issues at hand is challenging to master as the international exotic pet trade encompasses so many different and complex subjects, each with their own politics and implications. In terms of the otter pet trade and other controversial animal trades, one must not only grapple with the clearly-connected subjects of wildlife exploitation, animal abuse, anthropocentrism, and cybercrime. There are very divisive regional debates about the politics of choosing to designate a species as protected, as not every government, culture, or individual will agree about the ethical and otherwise harmful implications of animal trade. Tracing otter culture back to the remarkable influence of social media, careful consideration is now necessary of how impressionable the audience of the internet is, especially children browsing the web

unsupervised, and how digital influence governs real-world decisions. The root of exotic pet keeping is pet keeping itself; our study of the emotional incentives behind the practice of exotic pet keeping and its consequences stems from problematic pet keeping in general and where we should draw the line of acceptable animal captivity. Analyzing the consequences of exotic animal trade goes beyond decades-long population declines and probable shifts in marine food webs; along with these important components are crucial considerations of animal welfare and what protections we afford to individual creatures. Policies focused on otter trade specifically serve to regulate the treatment of these animals but they also have the power to set a precedent for pivotal protections and immunities for other vulnerable species.

In the beginning of this paper we followed the journey of 27 Asian small-clawed otters in Thailand; most of them died in their first year as per a normal infant mortality rate, some died from human-inflicted causes, and a few were seized by poachers for trading purposes. These hypothetical grim fates may be indicative of how a wild otter population, as a whole or the individuals themselves, can be negatively impacted by the otter pet trade, yet there is still hope for the surviving otters. In spite of poaching attempts and other environmental hazards, four otters have survived infancy and will carry on to hunt, play, and eventually propagate. It will be more difficult for the population of otters in this swamp to maintain healthy numbers, but not impossible. New generations may even adapt in due course to increased threats by developing new strategies to decrease their mortality rates.

The ecological hardships currently faced by all otter species are undeniably concerning but by no means beyond rectification.

One of our otters did die soon after being caught by poachers, but another two have made it out of Thailand. The otter transported to a breeding operation in the United States may not have the greatest quality of life; however, we do not know this for sure, and there may very well be otter breeders willing to invest the time, money, and research into providing a secure upbringing for their exotic pets. And the otter in Japan, even when his physical needs were not being completely met with his first family, was always cared for and loved the same as an especially needy cat or dog. We cannot guarantee that otters involved with the pet trade would have been happier and healthier in the wild. Between the otters still in our swamp and the two others traded as pets, this otter lineage will continue, just in some ways more unconventional than others.

As more data becomes available on otter trade numbers, relevant ecosystem damage from environmental destruction, and a perhaps moral consensus on appropriate treatment of otters, there will hopefully be more satisfactory solutions in the future to best serve vulnerable species while appeasing the adventurous animal collector. There have been many benign and undoubtedly beneficial acts of pet keeping, exotic animal trade, and participation in otter culture that are hard to condemn, but also difficult to celebrate in juxtaposition with all of the problematic implications discussed here. Just be mindful next time you share a video on Facebook of some peculiar species doing a fancy trick, or

someone around you expresses their desire to have an otter or another exotic pet of their own. You could be validating dodgy wildlife treatment practices without even realizing it.

Works Cited

- Berta, Annalisa, et al. *Marine Mammals: Evolutionary Biology*. Elsevier, 2015.
- “Biology of the Southern Sea Otter.” *The Otter Project*, www.otterproject.org/.
- Brown, Stephen, and Sharon Ponsonby-McCabe. *Brand Mascots: And Other Marketing Animals*. Routledge, 2014.
- Colléony, Agathe, et al. “Human Preferences for Species Conservation: Animal Charisma Trumps Endangered Status.” *Biological Conservation*, vol. 206, 2017, pp. 263–269., doi:10.1016/j.biocon.2016.11.035.
- Deering, Catherine Gray. “A Cognitive Developmental Approach to Understanding How Children Cope With Disasters.” *Journal of Child and Adolescent Psychiatric Nursing*, vol. 13, no. 1, 2000, pp. 7–16., doi:10.1111/j.1744-6171.2000.tb00070.x.
- Dobson, F. Stephen, and Pierre Jouventin. “The Trade-off of Reproduction and Survival in Slow-Breeding Seabirds.” *Canadian Journal of Zoology*, vol. 88, no. 9, 2010, pp. 889–899., doi:10.1139/z10-054.
- Foltz, Richard. “Zoroastrian Attitudes toward Animals.” *Society & Animals*, vol. 18, no. 4, 2010, pp. 367–378., doi:10.1163/156853010x524325.
- Foster, Michael Dylan. *The Book of Yōkai Mysterious Creatures of Japanese Folklore*. University of California Press, 2015.

- Gibson, James R. *Otter Skins, Boston Ships, and China Goods The Maritime Fur Trade of the Northwest Coast, 1785-1841*. McGill-Queen's University Press, 2014.
- Hall, Richard J., et al. "Endangering the Endangered: The Effects of Perceived Rarity on Species Exploitation." *Conservation Letters*, vol. 1, no. 2, 2008, pp. 75–81., doi:10.1111/j.1755-263x.2008.00013.x.
- Haraway, Donna Jeanne. *Staying with the Trouble: Anthropocene, Capitolocene, Chthulucene*. Duke University Press, 2016.
- Haraway, Donna. "Animal Sociology and a Natural Economy of the Body Politic, Part II: The Past Is the Contested Zone: Human Nature and Theories of Production and Reproduction in Primate Behavior Studies." *Signs: Journal of Women in Culture and Society*, vol. 4, no. 1, 1978, pp. 37–60., doi:10.1086/493568.
- Kendrick, Heather M.N. "Autonomy, Slavery, and Companion Animals." *Between the Species: A Journal for the Study of Philosophy and Animals*, 4 Nov. 2018, doi:10.15417/1881.
- Laufer, Peter. *Forbidden Creatures; Inside the World of Animal Smuggling and Exotic Pets*. Globe Pequot Press, The, 2011.
- Regan, Tom. *The Case for Animal Rights*. University of California Press, 1983.
- Reijnders, Peter. "Marine Mammal Life Histories." *Marine and Fisheries Ecology*, 2015, agustincapriati.com/wp-content/uploads/2015/09/Lecture-C2_2013_Mar_Mamm_Life_Histories.pdf.
- Sanders, Rex. "The Dark Side of California Sea Otters." *Out of the Fog: Emerging Science from California's Central Coast*, 19 Nov. 2014, outfog.com/2014/11/19/dark-side-california-sea-otters/.

Smith, Jerry. "Native American Legends-How the Bear Lost His Tail." *Using Native American Legends to Teach Mathematics*,

www.uwosh.edu/coehs/cmagent/ethnomath/legend/legend5.htm.

"Southeast Asia's High Appetite for Pet Otters Supplied Online." *WWF*,

wwf.panda.org/wwf_news/?329094%2FSoutheast-Asias-high-appetite-for-pet-otters-supplied-online.

"The Otter Project." *Go to The Otter Project*,

www.otterproject.org/about-sea-otters/natural-history/.

Tsing, Anna. "Earth Stalked by Man." *The Cambridge Journal of Anthropology*, vol. 34, no. 1, 2016, doi:10.3167/ca.2016.340102.

Tuan, Yi-Fu. *Dominance and Affection: The Making of Pets*. Yale University Press, 1984.

Walsh, Froma. "Human-Animal Bonds I: The Relational Significance of Companion

Animals." *Family Process*, vol. 48, no. 4, 2009, pp. 462–480.,

doi:10.1111/j.1545-5300.2009.01296.x.