Constructing captive ecology at the aquarium: Hierarchy, care, violence, and the limits of control

Mollie Holmberg
University of British Columbia, Canada

Abstract
In a time of accelerating ecological crises, captive care performed by zoos and aquariums increasingly plays a central and controversial role in attempts to resuscitate species and ecosystems rapidly disappearing from the planet. Here I use the Giant Pacific octopus (Enteroctopus dofleini) exhibit at the Vancouver Aquarium to examine practices involved in capture and captive care at a prominent Canadian institution. As I trace how octopuses come to the Aquarium and how people work to keep them alive and healthy in this environment, I examine the complex ways violence and domination interact with care practices. Centering octopuses and their material relations in this analysis thus allows me to connect everyday care practices to systems of governance and extraction that support captive ecologies and also generate the categories used in care. Through this investigation, I find that pastoral power organizes care practices at the Vancouver Aquarium and maintains anthropocentric order in this space. Slow violence here results from the imperfect replacement of lifegiving relations, and the nature of this harm is shaped by different beings’ relationships to anthropocentric order. Hierarchical categorizations structure care practices here, and when care directed at keeping animals healthy fails, slow violence often becomes acute. Elusiveness best characterizes how octopuses confound attempts to know and care for them within this anthropocentric power structure. The theoretical lens and language I offer seeks to describe moments of rupture in anthropocentric power without romanticizing animal endangerment as liberation or (conversely) accepting the logic that harm in captivity can only diminish if care improves. Through this work, I showcase both the violence and possibilities embedded in different ways of living and relating with ecological others amidst crisis.

Keywords
Violence, hierarchical social difference, zoos and aquariums, Giant Pacific octopus, pastoral power

Corresponding author:
Mollie Holmberg, Department of Geography, University of British Columbia, 1984 West Mall, Vancouver V6T 1Z2, British Columbia, Canada.
Email: mollieh@alumni.ubc.ca
Introduction

Here I detail the construction of captive ecology—how people produce it, how animals shape it, and the struggles involved in perfecting it. To do this, I use the Giant Pacific octopus (*Enteroctopus dofleini*—abbreviated as GPO) exhibit at the Vancouver Aquarium in British Columbia, Canada as a case study, drawing on expert interviews, document analysis and eight months of ethnographic observation as a volunteer gallery educator. I emphasize the material and political consequences of constructing this ecology in different ways by highlighting how care, violence, and domination influence octopus lives as these animals move into and through the Aquarium. By exploring how deeply unequal relations of care between people and octopuses both give life and generate harm in different contexts, I add to a growing literature that explores fraught intersections between violence, care, and conservation work (e.g., Collard, 2018; Hennessy, 2013; Hua and Ahuja, 2013; Isaacs, 2019; Nelson, 2017; Parreñas, 2018; Van Dooren, 2014). Similar to recent “more-than-human contact approaches” to multispecies ethnography (see Isaacs and Otruba, 2019), I aim to recenter nonhuman agency, highlight how particular constructions of environmental knowledge generate harm, and trouble deeply asymmetrical multispecies relations. Centering living animals and their material relations in this analysis allows me to connect everyday care practices to particular forms of governance and extraction and clarify why violence attends both the production and unraveling of care under these conditions. This work thus emerges from broader conversations within science and technology studies and political ecology about how the production, practice, and application of environmental knowledge interacts with power relations to generate unequal outcomes (e.g., Collard et al., 2018; Haraway, 1988; Rocheleau et al., 1996).

Following Maria Puig de la Bellacasa (2012), I understand care as a combination of affective and material labor that cultivates particular ways of living together. Feminist critiques of care have pointed out how care work frequently involves exploitation and domination through the nurturing of some lives and relations at the expense of others. Additionally, care often requires constant, grueling work from those who provide it. Understanding care as relational therefore makes clear how the same activities can produce both care and violence. In her work on shorebird banding, Jenny Isaacs (2019) emphasizes that actions motivated by care can nonetheless generate harm through the application of force that closes off possibilities, damages bodies, and renders subjects into objects. Although (building on Foucault) Isaacs distinguishes between violent relations where animals cannot reverse the application of force and “simply asymmetrical” relations where this possibility remains, in the Aquarium context this distinction would elide the many forms of damage that accompany both the successes and failures of force applied against animals. Here, I use violence to describe a broad range of activities that kill, injure, or damage the health of people, plants, animals, and their ecosystems. I thus link care and violence by understanding both relationally: if care is the nurturing of lifegiving relations, violence includes any action that damages them.

By examining how care and violence intersect at the Vancouver Aquarium, I aim to foreground how different ways of doing conservation produce particular ways of living together at the expense of others. Numerous scholars have outlined how care work for conservation often sacrifices certain animals to save others, reinforces anthropocentric hierarchies, and involves highly demanding labor conditions in cases spanning wildlife management (Crowley et al., 2018; Isaacs, 2019), animal rehabilitation (Collard, 2014, 2018; Parreñas, 2018), captive breeding (Hennessy, 2013; Parreñas, 2018; Van Dooren, 2014), and “retirement” from laboratory research (Hua and Ahuja, 2013; Nelson, 2017).
Cree scholar and poet Billy-Ray Belcourt (2015) explains how anthropocentric species relations and the production of animality as inferior to humanness requires moving animals into spaces like zoos, “empty” wilderness, and laboratories where they become intelligible to Euro-Western epistemologies. In places like British Columbia where people have long held non-anthropocentric relations with other species, this production of animality can only happen through the emptying of Indigenous lands and erasure of Indigenous bodies to generate spaces where animals can be encountered and made useful for settlers. Although Belcourt’s framing of animality emerges from a Canadian context where ongoing decolonial struggles make these relations more apparent, it clarifies how placing animals in particular spaces in order to know them as animals produces ideas about animality as inferior to humanness even in landscapes with different histories of interspecies relations and colonization. Captive care in spaces like the Vancouver Aquarium therefore requires and reproduces multiple forms of hierarchical social difference.

Foucault’s pastoral power provides a useful framework for thinking through how people deploy care to govern other species in contexts like the Aquarium where care and violence exist in tension but also entangle. Under this regime, a metaphorical shepherd or pastor deploys care to govern a population for its own salvation (and sacrifices others as necessary for the salvation of that population). Unlike biopower or sovereign power, pastoral power operates for the benefit of a population rather than a territory or state and concerns itself equally with saving a population and the individuals who comprise it. In her work on North American zoos, Irus Braverman (2013: 20) argues that pastoral power best describes how zoos govern animal populations “in the name of conservation, stewardship, and care”. Although Foucault and Braverman frame it as benevolent, other scholars have outlined how implementing this power involves multiple forms of violence (Mayes, 2010; Shukin, 2012; Taylor, 2013). This terrestrially grounded, agrarian theory aptly describes imperial fantasies of “benevolent” stewardship and dominion over both terrestrial and aquatic wilderness as well as the continuous, violent human intervention required to cultivate and maintain that wilderness as such in the context of settler colonial societies like Canada where the Vancouver Aquarium is situated (i.e., Cronon, 1995; Kim, 2015). As a framework, pastoral power also helps me focus my critique on the Aquarium as an institution and the power structures it serves rather than the individual staff members who come to work passionate about providing the best quality of life possible for animals under their care. This theorization of violence within regimes of pastoral power is thus very much not an indictment of individual staff members’ abilities or willingness to strive for optimal care within the constraints their job allows.

Taylor’s (2013) discussion of Foucauldian approaches to animal studies emphasizes how nonhumans interrupt the application of force against them, and she argues that this justifies their treatment as subjects (rather than passive objects) in captivity. This includes the deliberate subversion of human caretakers’ objectives by nonhumans as well as errors in the application of power, gaps and contradictions in how power operates, and forms of resistance that do not result in liberation. It is important to examine how power unravels or fails as people capture and keep octopuses in captivity because those moments often highlight where captivity becomes most damaging as well as where forces like public pressure, improvements in scientific knowledge, and animals’ unpredictability have already directed captivity to become different (but not necessarily less oppressive). Although Foucault and Taylor (2013) distinguish between domination—the application of force without any possibility of resistance—and power—the application of force with resistance—here I use the terms domination, power, and force interchangeably since distinguishing between them makes little sense in a context where humans, living and dead nonhumans, and so-called
objects like water and rocks can all interrupt the smooth application of power. At the Vancouver Aquarium, *elusiveness* best characterizes the many ways octopuses disrupt efforts to make them useful for captive display (even as it contributes heavily to their charisma). Elusiveness describes the difficulty of spotting or capturing creatures adept at hiding and escape as well as the difficulty of predicting their behavior or knowing them scientifically. When staff biologists call octopuses “wild animals”, they are referring to this elusiveness. Collectively, these behaviors and qualities disrupt care directed at maintaining anthropocentric order at the Aquarium. Octopuses’ elusiveness often results from deploying inappropriate, anthropocentric categories to know and care for them: although it helps explain how violence manifests in this space, it does not cause it. Under a regime of pastoral power, elusiveness describes what about animals this institution cannot fully capture as well as what it ultimately cannot protect or save. Institutions such as the Aquarium use these failures to justify maintaining and expanding the reach of their care.

Although many animals could have served as exemplary case studies for examining these topics at a prominent conservation organization, GPOs offer a particularly compelling entry point for studying captive care and its failures for several reasons. First, the prominence of GPOs in the Aquarium’s promotional materials indicates their importance to this institution’s mission even as the relative lack of public controversy over their display (relative to warm-blooded mammals) facilitated access to information about their care throughout the research process. Octopus and human biology differ profoundly, and this makes GPOs ideally suited for studying the effects of anthropocentrism in conservation. Thus, centering octopuses in this work also centers questions about how people can ethically relate to a creature radically different from *homo sapiens*.

At the Vancouver Aquarium, pastoral power structures relations between anthropocentrism, hierarchical social categories, and care. Here, I first outline why understanding this illustrates that: (1) this space cannot practice care without also causing injury or sickness and (2) the failures of control in this space often cause harm because they are also failures of care. I then argue that the relationship between anthropocentrism and how people categorize more-than-human others explains how harm manifests in this space. This relationship elucidates how GPOs’ ecology and morphology shape the specific ways captive care succeeds or fails as well as the kinds of injury octopuses experience in captivity. Rather than characterizing pastoral power as indiscriminately harmful, I aim to illustrate how hierarchical categorizations shape the conditions under which care causes injury as well as the severity of this harm. The relationship between pastoral power, anthropocentrism, and violence here helps explain why this power may appear more benevolent in relation to domesticated animals like sheep than animals like GPOs who have not evolved under human domination in the same ways. Finally, I explore how octopuses elude humans’ attempts to understand and regulate their behavior in captivity. Although this resistance can produce pleasant or liberatory outcomes for octopuses, when force directed at protecting captive animals unravels, this almost always involves acute violence.

**Pastoral power organizes care at the aquarium**

In the context of the Vancouver Aquarium, the goal of saving individuals and populations as a justification for exerting force under pastoral power resonates strongly with the institution’s goal of saving species and ecosystems—and exerting whatever power it deems necessary for their salvation. For this to operate effectively, members of the flock must submit to the authority of the shepherd (Taylor, 2013), which at the Aquarium means captive animals must alter their behavior to facilitate the care that will keep them alive and save
their ecosystems. This makes care integral to the deployment of pastoral power. Under its logic, populations driven from home require a shepherd to ensure they survive under unfamiliar and changing circumstances. This makes the severing of relations with home, sacrifice of lives that threaten the flock, and ongoing threat of violence against those who are excluded from (or leave) the flock integral to the formation and justification of this form of domination (Mayes, 2010; Shukin, 2012).

Building on this, I argue that care under pastoral power also deploys slow violence because of how it imperfectly replaces lifegiving relations that have been severed. Here I use slow violence to describe conditions that gradually attenuate health and well-being (in contrast to more rapid, dramatic forms of violence). For example, much of the harm that occurs during captive care operates through routine care activities and gradually degrades animals' health. In his work on the political challenges of combatting gradual environmental degradation, Rob Nixon (2011: 2) coins the term slow violence as that which occurs “gradually and out of sight” in intimate spaces and across long time scales—an “attritional violence” that is often “not viewed as violence at all”. Similarly, Rosemary Collard (2018: 923) explains how in the context of animal rehabilitation slow violence operates through a “life-preserving” but anthropocentric order. The mundane nature of this injury and the fact that it operates through the same relations that give life make it both more ubiquitous and less visible than acute violence. Building on recent work highlighting how animals participate in shaping spaces and ecologies they share with people (e.g., Barua, 2017, 2020; Hennessy, 2013; Srinivasan, 2019), I thus deploy pastoral power to place renewed emphasis on the role of violence and social difference in producing spaces people share with other species.

Enrolling octopuses in the salvation of their communities

The Vancouver Aquarium (n.d.) considers its mission “to inspire the global community to become Ocean Wise by increasing its understanding, wonder and appreciation for our oceans,” and GPOs feature prominently in the imagery and messaging it uses to promote the protection of local aquatic ecosystems. This mission explicitly centers responsible stewardship and care. Although GPOs are not endangered, the ecological communities they belong to in BC experience serious, ongoing threats including habitat destruction, industrial fishing practices, pollution, invasive species, and the joint effects of climate change and ocean acidification (Fisheries and Oceans Canada, 2017). Keeping individual octopuses at the Aquarium shelters them from these threats and according to the logics of this institution, also helps save their communities from this ongoing, systemic violence.

Effective captive care for octopuses requires cultivating desired habits and behaviors for display, feeding, and enrichment. At the Vancouver Aquarium, staff keep the octopus tank dark despite the trouble this creates for guests trying to locate the octopus in order to replicate light conditions at the depths GPOs prefer. However, a sliver of light shines down the back of the den, making it easier to spot the silhouette or tentacle of an octopus lurking there. The Association of Zoos and Aquariums (AZA) care manual advises backlighting an octopus’s den like this to encourage GPOs to emerge more often from hiding (AZA Aquatic Invertebrate Taxonomic Advisory Group (AZA AITAG), 2014). Octopuses in this exhibit used to also have access to a dark crevice at the bottom of the tank dubbed “the Cave” by volunteers, but the Aquarium closed this hard-to-view location recently because GPOs spent so much time there. In this way, the structure of the octopus exhibit accommodates octopuses’ need for places to hide and dim lighting while shaping their...
behavior in ways that help make them available for people to encounter—enrolling them as participants in their communities’ salvation.

Staff also enroll octopuses as participants in their own care. About once or twice a week, depending on how often an octopus displays foraging behavior, aquarists will attempt to coax it to the water’s surface to take fish and clams from the keeper’s hands. Staff I spoke with explain that this doubles as interactive “tactile enrichment” and allows them to check the octopus’s physical condition. During tactile enrichment, staff place their hands in the octopus tank and allow the octopus to come investigate while closely monitoring the interaction. As one biologist explained to me,

Sometimes the octopus wants to touch us more than we want them to be able to touch us. So it is trying to keep control of the situation . . . Basically, I don’t want to have the octopus completely grab onto me with six out of her eight arms or anything like that and pull my hand too far into her—cause, you know, they’re wild animals. I one hundred percent believe that if an octopus got a finger up close to its beak it would try to bite it, because why wouldn’t it?

Although staff carefully monitor these interactions to avoid letting the octopus bite them, as this testimony demonstrates, interactions with octopuses even in the confines of a tank are rife with uncertainty and can leave physical marks on keepers in the form of bites or “octopus hickeys”, “little circle marks where it [the octopus] just pulls so hard that it’s exactly the same as a hickey where the suction breaks some of the blood vessels in your skin.” Due to octopuses’ enormous strength, even coercive encounters with these animals often involve some degree of negotiation. However, this also illustrates how effective captive care requires encouraging desired interactions with human caretakers.

If the octopus refuses hand-feeding, staff may also drop food into the bottom of the tank so it can feed on its own. (All staff I spoke with stressed that they never force octopuses to come out for feeding if they choose not to and that octopuses receive food on schedule regardless of whether they swim to the surface for hand-feeding.) Although staff do not view coaxing octopuses to come to the surface as training, they do describe this as a way to teach octopuses that if they emerge from their den they may receive food sooner. Staff also emphasized the importance of teaching octopuses they will receive food regularly and therefore do not need to eat their tank mates. Most feeding occurs during the daytime outside regular visiting hours. In this way, captive care shifts both the mode and timing of these (otherwise nocturnal) animals’ feeding regimes to facilitate animal care when it is most convenient: during the day when human caretakers are most active, and outside times when guests crowd the galleries. Although proper feeding poses a challenge for many animals at the Aquarium, according to staff biologists, octopuses are voracious eaters who quickly acclimate to their new diet and feeding schedule at the Aquarium. Attempts to shape captive octopuses’ feeding habits illustrate one important way captive care involves cultivating “particular inclinations and dispositions” (Shukin, 2012: 154) in individuals rather than controlling populations or territories—a key aspect of pastoral power.

**Slow and acute violence in the service of anthropocentric order**

The Vancouver Aquarium obtains most of its octopuses through dive collection. This severs their relations with home that captive care must work to replace. Although regulations by Canada’s Department of Fisheries and Oceans ban particularly harmful collection practices for octopuses (i.e., using sharp objects or poisonous chemicals—Fisheries and Oceans Canada, 2011), this process retains the rapid violence which characterizes subjects’ enclosure
within regimes of pastoral power. Dive teams inject an irritating mixture of alcohol and cloves into the front entrance of the octopus’s den, flushing the animal out and stunning it so they can scoop the octopus into a plastic bag.

Once at the Aquarium, the institution organizes their care within an anthropocentric ecological order that enacts slow violence through how it imperfectly replaces their ecological relations. Frozen herring and capelin comprise most of an octopus’s diet here, and staff also sometimes feed them Atlantic surf clams. The Aquarium purchases animals frozen from approved seafood vendors that acquire its preferred octopus foods (herring, capelin, and surf clams) from throughout the globe (Albion Farms & Fisheries, 2018), and all of these animals—especially herring and surf clams—are popular for human consumption. This means that bringing octopuses into the Aquarium substantially changes their diet, largely disentangles them from local food webs, and embeds them in the same global socio-ecological networks that feed humans under capitalism. Embedding octopuses in the same ecological networks as their human caretakers embeds them in an anthropocentric ecological order because these relations are (primarily) designed to nourish people. In contrast, wild GPOs primarily eat other molluscs and crustaceans (especially crabs), which matters because octopuses’ digestive tracts lack emulsifiers (O’Dor et al., 1984), and octopuses therefore digest protein-rich foods like crustaceans much more efficiently than fatty alternatives like herring and capelin. Wild GPOs also never consume their prey thawed or frozen. The AZA care manual notes that vitamins degrade in frozen seafood, making frozen feed inherently less nutritious than live prey. Learning to eat frozen food is one of the main adjustments octopuses undergo while acclimating to their tank environment. In mature GPOs, the most noticeable effect of this new lipid-rich, thawed-from-frozen diet is a reduced growth rate, and insufficient nutrition from these sources likely plays a major role in humans’ failure to rear octopuses from hatchling to adult in captivity (AZA AITAG, 2014: 39–42).

At the Vancouver Aquarium, GPOs in the publicly facing Port Hardy exhibit inhabit a space of “approximately 4080 L” (about the size of a walk-in closet). This meets the AZA recommendation that institutions house GPOs in at least 1000 gallon volumes (just under 3800 liters) and far exceeds the minimum AZA requirement of 500 gallons (about 1900 liters, or just smaller than the average public washroom stall; AZA AITAG, 2014: 22). The AZA care manual contains very little justification of this minimum beyond one (unnamed) institution’s claim that “octopus behavior and responses to enrichment were unchanged when housed in a 500-gallon tank vs. a 1,500-gallon tank (with the same GPO)” (AZA AITAG, 2014: 22). Staff at Vancouver explained,

The one bone of contention that seems to come up though is how much space they actually physically need, right? So... that’s a tough one. It’s a tough one for a den-oriented animal—how much roaming around do they need? It’s hard to say. People find octopus(es] in the wild that are out walking around on the bottom usually at night or later at dinner times or whatever, darker water... but how much actual territory do they need? It’s hard to say.

Unlike many AZA guidelines which extensively cite peer-reviewed literature, the discussion of recommended GPO tank size only references anecdotes from keepers and a survey of common practices at AZA institutions to determine minimum and recommended standards. Although confining animals clearly impacts their ecological relations, using humans’ experiences of space to understand these impacts often misconstrues the effects of confinement on species whose interactions with space differ substantially from our own. Comments on octopus tank volume by staff at the Vancouver Aquarium and the ambivalence of the
AZA care manual on this topic reveal some of the problems with focusing on volume when assessing captivity’s effects on other species. Octopuses’ wild habitats clearly exceed the dimensions of an aquarium tank, but how far does an adult octopus actually wander during an average day or over the course of its lifetime—especially since octopuses spend much of their time inside the protective confines of a den?

The effects of confinement instead manifest through how the tank environment shapes octopus ecology. For example, what experiences, behaviors, and relationships does the physical structure of this space allow octopuses to have, which does it force upon them, and which does it disallow? Although octopuses at the Vancouver Aquarium no longer interact with many other creatures the way they would in the wild, they maintain connections to the ecosystems they come from through the Aquarium’s “open system” where water from outside cycles through their tank. However, the Aquarium controls the properties of this water through constant filtration and maintenance. Cleaning tanks and monitoring key water parameters consumes most of an aquarist’s time at an institution like the Vancouver Aquarium. Ammonia and nitrogenous chemicals accumulate more quickly in the tanks of “heavy-waste animals” like GPOs, acidifying the water. Water filtration systems and the energy needed to maintain them make captive octopuses dependent on the same energy networks that fuel human households and workspaces under capitalism. Collecting uneaten food is also important for maintaining good water chemistry since microorganisms feeding on the leftovers would poison the water chemistry in such a small space. Work by researchers at the National Resource Center for Cephalopods in Texas has also demonstrated that the skin of captive octopuses has more than one hundred times as much bacteria as that of wild octopuses (Oestmann et al., 1997). Human husbandry must replace the actions of currents, scavengers, and microorganisms which would (outside captivity) ferry this detritus and the nutrients it contains into local ecosystems. The physical components of captive ecology therefore resemble wild ones but with subtle alterations which bring octopuses into more frequent contact with people, make them dependent on (capitalist) human energy and waste systems, and filter even the chemical makeup of their environment through human care. Understanding pastoral power as an order-preserving power helps clarify how human care replaces octopuses’ wild ecology with less lifegiving relations that maintain anthropocentric order in this space.

Hierarchical categories and captive care

At the Vancouver Aquarium, hierarchical categories mediate animals’ relationship with anthropocentric order. They do this through how they shape care practices. The form violence takes under pastoral power thus depends on beings’ different relations to the kind of order that power serves, as determined by diverse categorizations. In the Aquarium context, these categories come from a mix of economic and other (de)valuations, legal and industry regulations, and Western science.

Economic and other (de)valuations

In rare cases, octopuses’ low value in local fisheries and comparatively high value as display animals can help the Vancouver Aquarium obtain octopuses from for-profit collectors who operate locally. In summer 2017, a GPO named *Mystique* came to the Aquarium via a collector who staff explained to me “basically operates a business where he’ll collect things and then he’ll sell them to aquariums,” especially fishermen’s bycatch that “is not commercially viable but is interesting for aquariums.” Fishermen frequently find GPOs in
their shrimp and crab gear, and this is how the Aquarium’s business contact obtained Mystique. Collectors from the Aquarium noticed this contact had four GPOs with him when he arrived to pick up animals that Aquarium staff were holding for him, and staff asked if they could have one. (The rest of the octopuses, presumably, went to other aquariums locally or across North America.) Mystique’s pathway to the Vancouver Aquarium via bycatch and a for-profit collector illustrates some of the less visible permeabilities between nonprofit conservation centers like the Aquarium and diverse forms of for-profit industry. Her status as “not commercially viable” to fishermen channeled her through a very different set of exchanges than the crustaceans she was hunting when the humans captured her. Money never changed hands as Mystique passed from the custody of fishermen to a private collector to Aquarium staff who “were able to take one [octopus] from him” even though she passed between people who buy and sell animals with each other. (Additionally, it’s important to distinguish what happened to Mystique from rescues the Aquarium conducts with wounded or stranded marine mammals because octopuses can usually survive immediate release into the wild after accidental capture by fishermen.) Mystique arrived at the Aquarium not out of necessity but because people perceived her as an animal who was peripheral to for-profit fishing but potentially valuable for display.

Diverse valuations also impact how animals do (or don’t) experience danger within the Aquarium’s walls, especially within the contexts of feeding and predation. Although the Vancouver Aquarium displays multiple species of endangered or threatened rockfish, it does not keep any of these in the octopus tank due to octopuses’ well-documented proclivity for feasting on tank mates. However, the Aquarium does consider interspecies interactions important for keeping octopuses stimulated—it currently houses over half a dozen species of fish and invertebrates with its GPO.\(^\text{10}\) On multiple occasions, I have witnessed rockfish stray too close to an octopus who decided to grope it with her tentacle, curling around the unsuspecting animal before it dashed away in alarm. Past GPOs at the Vancouver Aquarium have occasionally eaten their rockfish tank mates regardless of how much the aquarists fed them. Thus, how people categorize animals—as too expensive to sacrifice, endangered, or neither—differentially exposes them to and protects them from injury in captivity.

Despite some tolerance for some unintended predation in the octopus tank and other exhibits,\(^\text{11}\) octopuses are one of the few predators allowed live prey as part of their scheduled feeding. (The green anacondas, for example, eat only frozen rabbits and rodents.) Collectors from the Aquarium have permits to harvest a limited number of red rock and dungeness crabs from local ecosystems for this purpose, taking only males so the females remain to breed as well as only animals above a particular size (although staff also sometimes purchase the crabs from seafood suppliers). Live hunts therefore further illustrate ways that anthropocentric values shape allowable violence against animals here: female crabs and young crabs cannot be harvested because of their importance for reproducing economically and recreationally valuable populations, and terrestrial mammals cannot be killed in front of visitors while cold-blooded aquatic animals like fish and crabs can.

**Legal and industry regulations**

Very little formal regulation impacts an octopus’s life once it enters the Aquarium. Instead, regulations written and enforced by industry groups like Canada’s Accredited Zoos and Aquariums (CAZA) and the AZA contain the most detailed and species-specific instructions for proper animal care. Here octopuses’ elusiveness manifests as the difficulty of accounting for their needs using regulations, which results from the reliance of these regulations on
anthropocentric categories and population-level generalizations that octopuses inevitably elude. What little regulation exists for captive octopus care has often been designed to cover broad groups of animals or adapted from guidelines designed for very different types of organisms. Limits to scientific knowledge have also limited the capacity for regulations to protect octopuses’ specific needs in captivity. Legal and industry regulations therefore protect captive GPOs in only minimal ways. However, gaps in regulations designed using population-level categories like species also provide leeway for caretakers to better customize their care for individual octopuses, creatures known for their distinct personalities and idiosyncrasies. These silences and gaps in captive care regulations thus have the potential to facilitate both harm and better, more customized captive care.

Formally, only general animal cruelty laws such as sections 444 through 447 of the Criminal Code of Canada still apply once octopuses enter captivity, and for GPOs at the Aquarium this legally allows anything short of torture and neglect.12 Canadian Council on Animal Care (CCAC) guidelines for scientific uses of animals cover cephalopods but do not include specific provisions for cephalopods separate from the other animal taxa they protect (CCAC, 2019b).13 These guidelines detail best practices for nearly every aspect of animal care in laboratories, including housing, food, water, enrichment, human handling, record keeping, and monitoring animal health. This also includes separate sections with extensive guidelines for controlling animal pain, anesthesia, and euthanasia (CCAC, 1993). However, although the University of British Columbia (which has faculty and graduate students affiliated with the Aquarium) holds a CCAC certificate, the Vancouver Aquarium is not publicly listed among CCAC certificate holders (CCAC, 2019a). The CCAC website notes that many institutions which hold certificates may not appear on this list, but it seems unlikely—given how prominently the Vancouver Aquarium displays its other certifications on its website (Vancouver Aquarium, n.d.)14—that the Vancouver Aquarium would hold a CCAC certification without posting this information publicly.15

Industry regulations laid out by CAZA and the AZA contain detailed guidelines for octopus care but still leave many aspects of it to caretakers’ discretion. These groups inspect the Aquarium during regular re-accreditations and impose stricter animal care standards than formal legislation16 in Vancouver, British Columbia, or Canada in almost all cases.17 The AZA and CAZA are both nonprofits staffed by personnel from the same organizations they accredit—for example, Vancouver Aquarium Chief Operating Officer Clint Wright spent many years as the president of CAZA while also holding his position in Vancouver (CAZA, n.d.; Charbonneau, 2016). Although the AZA and CAZA therefore lack the independence of the CCAC, like the CCAC, AZA, and CAZA standards outline best practices for specific aspects of animal husbandry like physical environment, nutrition, enrichment, and veterinary care. The AZA manages GPO care through its Aquatic Invertebrate Taxonomic Advisory Group (AITAG). This governing body is responsible for drafting guidelines for all aquatic invertebrates under the care of AZA-accredited institutions—a group scattered throughout the different families of invertebrates, which comprise approximately 97% of all animal species (May, 1988) and span many times the diversity of all vertebrates combined.18

The AZA’s official care manual for GPOs drafted by the AITAG frequently discusses how poorly many standards written with terrestrial vertebrate husbandry in mind apply to Giant Pacific octopuses. For example, it explains how

The nutritional requirements of aquatic animals (excepting marine mammals) have traditionally not received nearly the same attention as the feeding of larger terrestrial animals within the AZA. Aquatic animals are radically different from most terrestrial species whose diets are
well-understood. The diversity of feeding niches exploited by the animals under the purview of the Aquatic Invertebrate TAG is likely the widest any animal management group is likely to encounter. As such, there is no established framework or guidelines for the nutritional requirements of Giant Pacific octopus, *Enteroctopus dofleini*, though there is a good amount of growth and metabolic information in the literature.

This passage on nutritional requirements for GPOs exemplifies how protections for zoo animals codify anthropocentric species hierarchies by differentially exposing less “human” animals like octopuses to less appropriate care. It explicitly describes how these regulations have prioritized proper care for other mammals, other vertebrates, and species that share our terrestrial spaces. The GPO care manual describes similar difficulties applying AZA standards designed for terrestrial animals and vertebrates to octopuses when considering noise stress, health assessments, proper veterinary care, captive breeding, and enrichment needs (AZA, 2014). Furthermore, staff explained to me that the AZA care manual for GPOs is better described as a guide developed based on general AZA standards for animal care and industry knowledge about GPOs’ specific needs rather than as a set of strict regulations. Even members of the industry note that CAZA and AZA regulations fall short. Staff I spoke with at the Vancouver Aquarium took pride in often far exceeding standards required by the AZA or CAZA, at times seeming perplexed at (for example) how little space the industry recommends as a minimum for GPOs. Whenever they expressed skepticism about these standards however, staff quickly qualified it with assertions that even minimal standards were better than none at all: the care standards imposed by both industry governing bodies far exceed anything covered by Canadian criminal code as it applies to GPOs. However, this lack of formal regulation may be in part due to efforts by the zoo and aquarium industry—Irus Braverman (2013) documents how the AZA and its member institutions have vigorously resisted government regulations for captive animal care in the United States. These industry efforts to resist interference combined with the difficulty of fitting Giant Pacific octopuses into anthropocentric categorizations—as they are neither vertebrates nor like most other invertebrates—have made it more difficult to develop regulations that effectively protect captive octopuses from harm.

**Western science**

Examining octopus health care at the Aquarium illuminates how anthropocentric hierarchies shape the scientific knowledge deployed to care for these animals. Although veterinary staff at the Vancouver Aquarium have treated octopuses for a variety of conditions, scientific and industry literature reveal substantial uncertainty in proper medical treatments for cephalopods which also raise troubling questions about violence in this context. The AZA care manual contains a full 22-page section on veterinary care for GPOs, but most of this details how little humans understand about cephalopod disease. It explains how much veterinary care for cephalopods like GPOs has been adapted from fish husbandry—animals scarcely closer to octopuses in physiology or evolutionary time than human beings. (Fish and humans, in fact, share a more recent common ancestor than octopuses do with either because humans and fish are both vertebrates.) For example, work by Roland Anderson (1996) at the Seattle Aquarium shows that common fish anesthetics cause pain in octopuses. Until 2018, scientists also had “no evidence that agents believed to act as anesthetics [in cephalopods] produce effects beyond immobility” (Butler-Struben et al., 2018: 1). Three of five general anesthetics tested by Butler-Struben et al. (2018) failed to effectively block pain signaling in cuttlefish and octopuses. This work—the first study to explicitly test whether
cephalopod anesthetics stopped pain signaling or merely induced paralysis—helpfully resolves a major source of uncertainty in ethical cephalopod care but also reveals that invasive surgeries had likely been performed on immobilized, fully conscious octopuses in laboratories and aquariums. Writing on octopus anesthesia provides a particularly horrifying example of care intended to improve animals’ well-being instead resulting in situations comparable to torture.

Most octopus veterinary care at the Vancouver Aquarium involves administering drugs for infections, injuries, and skin lesions rather than surgery. Veterinarians can administer most drugs by simply adding them to seawater and putting the octopus in a small tank with the medicated solution. Although wild octopuses would not depend on veterinary care for survival, the high concentration of bacteria and other microorganisms in even the cleanest aquarium tank relative to outside environments makes continual monitoring of injuries for infections essential—and also renders the choice not to treat octopuses potentially violent. Aquarium veterinarians expressed confidence that antibiotics, antifungals, and other drugs which work effectively in animals like fish and marine mammals also work well in octopuses even as care staff outside the veterinarian team expressed confusion about the relevance of questions about veterinary care for octopuses given how rarely they could recall treating these animals for serious ailments. Despite recent improvements in cephalopod science, the uncertainty and disagreement expressed by different caretakers and scientific and industry sources on proper cephalopod veterinary care therefore raises questions about the violence (and therefore the ethics) of keeping animals in captivity whom humans still understand so little about. This again highlights how anthropocentric species hierarchies which manifest through scientific ignorance differentially expose animals like octopuses to less specialized and potentially more harmful care.

**Eluding capture and control**

“…the history of evolution is that life escapes all barriers. Life breaks free. Life expands to new territories. Painfully, perhaps even dangerously. But life finds a way.”

– Dr Ian Malcolm, Jurassic Park

As previous sections have indicated, octopuses and other animals continuously elude complete capture and control within the Aquarium, and this elusiveness frequently—but not necessarily—has damaging outcomes because these failures of control are also often failures of care. Deleterious outcomes of elusiveness are often used to justify the maintenance or expansion of care at the Aquarium. While downplaying this violence would risk underestimating its importance for maintaining anthropocentric order, failing to account for the indeterminacy of moments when octopuses elude full capture or control would also risk objectifying them. Even when elusiveness does not result in liberation, it can temper the Aquarium’s mastery over octopuses and result in pleasant or neutral rather than harmful outcomes.

Variations in individual octopus behavior complicate straightforward, science-based assessments of octopus well-being in captivity. This makes assessing what counts as “normal” behavior and what indicates stress difficult. Ceph, the Vancouver Aquarium’s latest display animal during my fieldwork, quickly gained a reputation as a particularly reclusive octopus. Aquarists can struggle to determine whether an octopus stays in its den “because it just … wants to stay in its den all the time” or whether “it is staying in its den all
the time because something’s wrong” (Vancouver Aquarium staff member, 2019, personal communication). It therefore remains difficult to interpret Ceph’s elusiveness. One biologist speculated that keeping Ceph’s predecessor Mystique behind the scenes for several months before rotating her onto display helped her acclimate more easily to captive life and feel more comfortable spending time exposed in the Port Hardy exhibit. However, they emphasized the importance of personality differences between individuals and avoiding sweeping judgments about the effects of time spent off exhibit on octopus behavior based on observing a few animals. In this way, octopuses’ individuality renders generalizations about their behavior elusive and forces caretakers to do away with anthropocentric understandings of other species as homogenous populations and instead grapple with octopuses as beings with their own lifeworlds and intentions. Responsible captive care for octopuses must negotiate substantial scientific uncertainty about how to interpret octopus behavior paired with substantive evidence (both scientific and otherwise) that individual octopuses have different needs and preferences. This makes it likely that caretakers miss some signs of octopus stress but also forces them to constantly reflect on how their octopuses might experience captivity in order to provide the best possible care for individuals.

Interspecies interactions are where staff at aquariums report the most mishaps in octopus care. One biologist at the Vancouver Aquarium described the challenges posed by a notorious octopus named Voldemort who “one hundred percent lived up to his name” by killing all five dogfish sharks in the Strait of Georgia exhibit. The motivation behind these attacks remains unclear: staff speculated that “it was probably that the dogfish sharks just got close enough to grab” since the octopus would bite the sharks’ bellies and leave the rest uneaten for staff to find the following morning. When describing this incident, staff emphasized that “You can’t help it if they’re curious and they just want to be wild animals. They are [wild animals].” Other aquariums such as the Seattle Aquarium have reported GPOs attacking dogfish sharks as well (Montgomery, 2015), and another biologist at Vancouver explained to me that they no longer rotate GPOs into the massive Strait of Georgia tank since the octopuses often “tend to go after . . . cartilaginous fishes” such as sharks in that exhibit. The AZA care manual for GPOs contains over half a dozen warnings about the species’ proclivity for feasting on tank mates. At one unnamed institution, the manual (AZA AITAG, 2014: 25) describes how a tank was mandated to be a ‘multi-species’ tank, to hold wolf eels, rockfish, and sculpins along with various invertebrates, in spite of the staff’s caution that GPOs would eat the fish. The octopuses did eat some of the fish, which horrified the interpreters, but provided enrichment to the GPOs. The octopuses also forced the wolf eels from their dens into the small cylinder where they looked out-of-place.

Unlike many zoo environments which house fewer species of animals together, aquariums like the one in Vancouver will often display upwards of half a dozen species together in their tanks. This matters because humans can do very little beyond providing abundant shelter and food or occasionally removing individuals once they release many different kinds of animals into a tank together. Although single- and mixed-species enclosures both subject other animals to human control, the mixed-species environments normal at aquariums temper the level of mastery staff can expect to have over animal life in most tanks.

When staff describe GPOs as “wild” animals who may bite a human or kill a shark given the opportunity, they are discussing a different form of “wildness” than what they want (and also need) the public to perceive through naturalistic enclosures and exhibit panels with facts about non-captive animals’ biology. This form of “wildness” describes the multitude of ways
octopuses confound caretakers’ expectations and elude control. Casual visitors to zoos and aquariums usually miss genuine signs of animal behaviors that are not controlled or anticipated by these institutions. Instead, these stories about octopus mishaps illustrate how octopuses’ elusiveness forces a recognition from people who work with them face-to-face—or, more accurately, hand-to-tentacle—of real limits on human control over other species even in this deeply unequal environment. Similarly, the anecdote from the AZA care manual suggests appreciation for an incident that “provided enrichment to the GPOs” even though it “horrified the [human] interpreters” (AZA AITAG, 2014: 25). Not only do aquarium staff recognize limits over their control in multi-species tanks, but they openly express a willingness to relinquish some control so other animals can participate in behaviors they enjoy but some humans may find unpalatable. This also illustrates one way the unraveling or relinquishing of human control in captivity often produces injury—in this case, against animals who octopuses choose to harass and kill.

Octopuses kept in tanks throughout the world have long developed reputations for other forms of mischief as well, illustrating the widely varying and indeterminate consequences of octopuses’ elusiveness in captivity. At the Vancouver Aquarium, several staff members recounted an octopus who pulled the plug out from the bottom of its tank, draining much of the water and endangering both the octopus and its tank mates. A heavy boulder now sits atop the tank plug in the Port Hardy exhibit. Similarly, GPOs’ enormous strength and ability to squeeze through any opening larger than their teacup-sized beak and the slim cartilaginous plate between their eyes makes preventing escape an ongoing challenge. A thick coat of mucus allows octopuses to survive outside water for brief periods of time without drying out, and in the wild some use this ability to crawl between different tide pools to feed (Montgomery, 2015). However, at aquariums escape usually spells death for octopuses who dry out on the floor long before they locate another body of water (AZA AITAG, 2014). To prevent escapes, the Vancouver Aquarium employs barrier gates and locked hinges on all its octopus tanks. Even after deploying strategies like this though, numerous institutions have at times struggled to contain their GPOs. Footage from 2015 at the Seattle Aquarium shows one octopus crawling over the edge of its tank during the middle of the day in front of guests (CBC News, 2015), and at one New Zealand Aquarium in 2016, an octopus named Inky navigated a complex pipe system to crawl from his exhibit back into the Pacific Ocean (CBC News, 2016). In these cases, octopus elusiveness takes on a much more literal meaning. Other mishaps detailed in the AZA care manual include an octopus who electrically shocked itself and a keeper by grabbing a power strip placed near the tank (citation: “B. Christie, personal observation”) and another octopus who blasted jets of water at a nighttime employee carrying a bright flashlight it disliked. Thus, the difficulty of knowing octopuses, predicting their behavior, and physically containing them all produce a myriad of different outcomes.

Conclusions: Exposing and eluding anthropocentrism in captive care

Keeping octopuses in captivity—in the name of saving local ecosystems—requires constructing an ecology that embeds them in energy and food systems originally built to nourish people under global capitalism. The Aquarium deploys pastoral power for both the salvation of individual animals like octopuses and the aquatic communities they belong to by cultivating desirable habits and behaviors in individuals. To do this in the context of octopus display, the institution uses feeding practices and exhibit structures that encourage GPOs to cooperate with caretakers and spend more time visible to the public. Bringing octopuses into this regime of care through dive capture entails rapid violence, but within the
Aquarium captive care quietly produces and maintains damaged relations in the service of anthropocentric order. The conditions and severity of violence here emerge from how hierarchical categorizations mediate relations between particular bodies and the social order pastoral power serves. In this context, anthropocentric valuations shape everything from how people bring octopuses into this space (channeling animals away from the danger of becoming prey and towards the slow violence of captivity) to how GPOs feed and the quality of their scientifically informed care. Thus, the Aquarium deploys care in ways that reify anthropocentric order, and octopuses’ elusiveness—here, the difficulty of customizing care for their needs—results directly from the deployment of anthropocentric categories to know and care for them. Moments when octopuses confound institutional control often highlight a key feature of domination under pastoral power: the continuous threat of harm to those who leave or are excluded from the flock. However, the varied outcomes of these ruptures trouble institutional logics because they reveal that leaving the flock or upsetting its carefully maintained order (although dangerous) does not necessarily hurt subjects of care. Attending to the alarming violence, effervescent wildness, and other possibilities that emerge when pastoral power frays serves as a chilling reminder that anthropocentric domination relies on very real forms of danger to justify its order-preserving care but that other outcomes can coexist with or supersede this danger.

Understanding how institutions like the Aquarium deploy pastoral power can thus help reveal harm as integral (rather than incidental) to certain kinds of care and explain why the same care practices that appear benign or necessary in some situations generate alarming forms of violence in others. This work thus highlights how captive care at the Aquarium both relies upon and operates in tension with violence because it seeks to save other species through force directed at maintaining the supremacy of our own. Numerous scholars have outlined how anthropocentrism acts in tandem with other hierarchical social orders like ableism, white supremacy, patriarchy, and colonialism (i.e., Belcourt, 2015; Kim, 2015; Plumwood, 1993; Taylor, 2017). This underscores the importance of attending to how diverse care practices might serve different hierarchical social orders to avoid misconstruing integral forms of violence as incidental. The aquarists I interviewed often expressed deep affection for their octopus charges and a desire to take innovative approaches to improving life for aquatic animals within and outside their institution. How, then, might care workers entangled within hierarchical social orders cultivate practices that do not serve these structures?

By using the term *elusiveness* to describe moments when attempts to capture, control, and know octopuses fail, I offer a situated methodology (Haraway, 1988) for studying and describing the fraught moments when pastoral power ruptures. Elusiveness offers a language that neither romanticizes animal endangerment as liberation nor accepts the logic that threats can only diminish if care improves. However, I also want to caution against reading elusiveness as merely a synonym for more-than-human agency—and more generally against the impulse to theorize agency from the perspective of more-than-human others who researchers relate to across acutely unequal planes of social difference. In its many connotations, *elusiveness* always implies the existence of someone or something that is being eluded. Theorizing octopuses’ elusiveness is theorizing from my perspective as a person watching captive animals outside the glass or through a camera lens, who is also complicit in their capture and display for conservation at the Vancouver Aquarium. Elusiveness describes moments when octopuses express power and identity in ways people cannot grasp, but octopuses also express these capabilities in many ways that have nothing to do with people trying to capture, control, or know them. Thus, thinking with elusiveness offers a way to study and describe one specific facet of more-than-human agency: agency in
relation to anthropocentric projects of control. By using theoretical language situated within my particular positionality, I also resist the impulse to colonize or subsume more-than-human subjectivities by seeing or writing “from the eyes of the other”. Elusiveness thus offers a language for recognizing more-than-human agency without demanding to know (and possess/dominating) these others from inside. As theory, it is simultaneously a situated form of reading, writing, and relational practice for confounding the impulses of anthropocentrism.

**Highlights**

- Pastoral power organizes care practices at the Vancouver Aquarium and maintains anthropocentric order in this space.
- Care practices in this space are shaped by hierarchical categorizations.
- Violence in this space is slow until pastoral power directed at keeping animals healthy fails, and then violence becomes acute.
- Slow violence results from the imperfect replacement of lifegiving relations under pastoral power.
- *Elusiveness* best characterizes how octopuses confound attempts to know and care for them within anthropocentric frameworks.

**Acknowledgements**

This work would not have been possible without the insights and support of many. The author is indebted to the Vancouver Aquarium and its staff who generously allowed the author to conduct this project and shared their time, expertise, and passion for the work they do. This manuscript has also benefitted from generative and incisive comments at various stages from Jessica Dempsey, Rosemary Collard, and Luke Bergmann as well as two anonymous reviewers. Any errors are the author’s sole responsibility.

**Data availability statement**

Research data are not shared in order to protect research participants’ confidentiality.

**Declaration of conflicting interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

**Funding**

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The author thanks the University of British Columbia, R. Howard Webster Foundation, and Vanier Canada Graduate Scholarship program for financial research support.

**ORCID iD**

Mollie Holmberg [https://orcid.org/0000-0002-8259-4847](https://orcid.org/0000-0002-8259-4847)

**Notes**

1. This resembles—although is not reducible to—how capital enrolls animals as active participants in the production of capitalist value in other contexts (Barua, 2017, 2020).
2. For example, see: Dracott (2018); Penny (2018); Vancouver Aquarium (2017). Staff I spoke with emphasized the importance of displaying GPOs because many members of the public expect to see this distinctive, charismatic local species and classic aquarium animal on display.

3. Web page archived at http://web.archive.org/web/20200908023214/ https://www.dfo-mpo.gc.ca/oceans/publications/mpabc-cbzm/page10-eng.html

4. GPOs in the north Pacific have been documented at more than 182 m deep (Scheel, 2002).

5. Alcohol is also a commonly used cephalopod anesthetic (Butler-Struben et al., 2018).

6. Primarily the north Atlantic and Pacific.

7. However, wild GPOs display enormous diet variability (Scheel and Anderson, 2012).

8. Size estimate from Vancouver Aquarium staff member during participant observation research.

9. “… A survey of 33 public aquaria keeping GPOs in 2012 revealed that 33.3% of institutions had exhibits between 1000–1500 gallons, 26.7% under 1000 gallons, and 20.0% had exhibits between 1500–4000 gallons. Four of the surveyed institutions (13.33%) have GPO exhibits in excess of 4000 gallons” (AZA AITAG, 2014: 22).

10. Note that none of these animals include crustaceans or other molluscs, octopuses’ preferred prey items.

11. Even well-satiated predators will occasionally eat their tank mates, and many exhibits at the Aquarium house predator and prey species together. Predators kept with animals they occasionally eat or attack include sharks, caiman, sturgeon, red perch, hermit crabs, and (of course) octopuses.

12. These sections of Canadian criminal code specifically prohibit behavior which injures or endangers animals, causes “unnecessary” suffering, or fails “to exercise reasonable care” (SC 2008, c. 12).

13. CCAC guidelines cover all non-human vertebrates and cephalopods (CCAC, 2017).

14. Web page archived at https://web.archive.org/web/20200224174157/https://www.vanaqua.org/about.

15. Vancouver Aquarium staff also did not respond to inquiries about the status of their CCAC certification.

16. Braverman (2013) details this extensively in her work on the legal geography of zoos in North America.

17. Cetacean captivity bans passed by the Vancouver Park Board and Canadian government are arguably a major exception to this, but this legislation does not directly impact GPOs.

18. Unlike vertebrates, invertebrates are not a distinct taxonomic group — they include groups that split from each other before and after vertebrates became a distinct taxon, so grouping all invertebrates together (separate from vertebrates) is the taxonomic equivalent of grouping your sibling and first cousin together in a family that excludes yourself. For example, humans are more closely related to echinoderms like sea stars than either sea stars or humans are to octopuses, but echinoderms and cephalopods are both invertebrates.

19. The authors focus on the two general anesthetics confirmed to be effective without reflecting extensively on past uses of those which failed to block pain signaling (Butler-Struben et al., 2018).

20. For example, while I was volunteering staff decided to remove a particularly murderous hermit crab from the Stanley Park Shores exhibit after he killed a nematode and injured numerous Pacific sandfish.

References
Albion Farms & Fisheries (2018) About us. Available at: https://albion.ca/about-us/ (accessed 8 February 2019).
Anderson RC (1996) Sedating & euthanizing octopuses. Drum and Croaker (27): 7–8.
AZA Aquatic Invertebrate Taxonomic Advisory Group (AZA AITAG) (2014) Giant Pacific Octopus (Enteroctopus dofleini) care manual. Report, Associations of Zoos and Aquariums. Available at: https://www.speakcdn.com/assets/2332/giant_pacific_octopus_care_manual_final_9514.pdf (accessed 6 February 2019).
Barua M (2017) Nonhuman labour, encounter value, spectacular accumulation: The geographies of a lively commodity. *Transactions of the Institute of British Geographers* 42(2): 274–288.

Barua M (2020) Affective economies, pandas, and the atmospheric politics of lively capital. *Transactions of the Institute of British Geographers* 45(3): 678–692.

Belcourt B-R (2015) Animal bodies, colonial subjects: (Re)Locating animality in decolonial thought. *Societies* 5(1): 1–11.

Braverman I (2013) *Zooland: The Institution of Captivity*. Stanford, CA: Stanford Law Books, an imprint of Stanford University Press.

Butler-Struben HM, Brophy SM, Johnson NA, et al. (2018) In vivo recording of neural and behavioral correlates of anesthesia induction, reversal, and euthanasia in cephalopod molluscs. *Frontiers in Physiology* 9: 1–18.

Canada’s Accredited Zoos and Aquariums (CAZA) (n.d.) Board of Directors. Available at: http://caza.ca/fr/board-of-directors/ (accessed 6 February 2019).

Canadian Council on Animal Care (CCAC) (1993) *Guide to the care and use of experimental animals*. Vol. 1, 2nd ed. Report, Canadian Council on Animal Care. Available at: https://www.ccac.ca/Documents/Standards/Guidelines/Experimental_Animals_Vol1.pdf (accessed 7 February 2019).

Canadian Council on Animal Care (CCAC) (2017) CCAC programs. Available at: http://www.ccac.ca/Documents/Standards/Policies/The_Scope_of_CCAC_Programs.pdf (accessed 6 February 2019).

Canadian Council on Animal Care (CCAC) (2019a) Certified institutions. Available at: https://www.ccac.ca/en/certification/certified-institutions.html (accessed 6 February 2019).

Canadian Council on Animal Care (CCAC) (2019b) Types of animals. Available at: https://www.ccac.ca/en/standards/guidelines/types-of-animals.html (accessed 19 February 2019).

*CBC News* (2015) Giant octopus tries to escape Seattle Aquarium. *CBC News*, 6 March. Available at: https://www.cbc.ca/news/trending/giant-octopus-tries-to-escape-seattle-aquarium-1.2984204 (accessed 22 February 2019).

*CBC News* (2016) Octopus makes daring escape from aquarium to Pacific Ocean. *CBC News*, 13 April. Available at: https://www.cbc.ca/news/trending/finding-inky-1.3534784 (accessed 22 February 2019).

Charbonneau G (2016) Vancouver aquarium uncovered. Available at: www.vancouveraquariumuncovered.com (accessed 19 February 2019).

Collard R-C (2014) Putting animals back together, taking commodities apart. *Annals of the Association of American Geographers* 104(1): 151–165.

Collard R-C (2018) Disaster capitalism and the quick, quick, Ssow unravelling of animal life. *Antipode* 50(4): 910–928.

Collard R-C, Harris LM, Heynen N, et al. (2018) The antinomies of nature and space. *Environment and Planning E: Nature and Space* 1(1–2): 3–24.

Cronon W (1995) The trouble with wilderness; or, getting back to the wrong nature. In: W Cronon (ed.) *Uncommon Ground: Toward Reinventing Nature*. New York, NY / London: W. W. Norton & Company, pp. 69–90.

Crowley SL, Hinchcliffe S and McDonald RA (2018) Killing squirrels: Exploring motivations and practices of lethal wildlife management. *Environment and Planning E: Nature and Space* 1(1–2): 120–143.

Dracott E (2018) Seth Rogen joyous after octopus is named Ceph Rogen in his honour. *Independent.ie*, 9 November. Available at: https://www.independent.ie/entertainment/movies/seth-rogen-joyous-after-octopus-is-named-ceph-rogen-in-his-honour-37512953.html (accessed 12 February 2019).

Fisheries and Oceans Canada (2011) *Pacific region exploratory fishery guidelines: Octopus by dive August 1, 2011 to July 31, 2012*. Report, Fisheries and Oceans Canada. Available at: http://www.dfo-mpo.gc.ca/Library/344562.pdf (accessed 6 February 2019).
Fisheries and Oceans Canada (30 October 2017) Canada-British Columbia marine protected area network strategy: Appendix 1. Marine Ecosystem Stressors in the North East Pacific. Available at: https://www.dfo-mpo.gc.ca/oceans/publications/mpabc-cbzpm/page10-eng.html (accessed 5 February 2019).

Haraway D (1988) Situated knowledges: The science question in feminism and the privilege of partial perspective. Feminist Studies 14(3): 575–599.

Hennessy E (2013) Producing ‘prehistoric’ life: Conservation breeding and the remaking of wildlife genealogies. Geoforum 49: 71–80.

Hua J and Ahuja N (2013) Chimpanzee sanctuary: “Surplus” life and the politics of transspecies care. American Quarterly 65(3): 619–637.

Isaacs JR (2019) The “bander’s grip”: Reading zones of human–shorebird contact. Environment and Planning E: Nature and Space 2(4): 732–760.

Isaacs JR and Otruba A (2019) Guest introduction: More-than-human contact zones. Environment and Planning E: Nature and Space 2(4): 697–711.

Kim CJ (2015) Dangerous Crossings: “Race, Species, and Nature in a Multicultural Age”. New York, NY: Cambridge University Press, pp. 205–252.

May RM (1988) How many species are there on earth? Science 241(4872): 1441–1449.

Mayes C (2010) The violence of care: An analysis of Foucault’s Pastor. Journal for Cultural and Religious Theory 11(1): 111–126.

Montgomery S (2015) The Soul of an Octopus: A Surprising Exploration into the Wonder of Consciousness. New York, NY: Atria Paperback.

Nelson IL (2017) Interspecies care and aging in a gorilla 2.0 world. Geoforum 79: 144–152.

Nixon R (2011) Slow Violence and the Environmentalism of the Poor. Cambridge, MA: Harvard University Press.

O’Dor RK, Mangold K, Boucher-Rodoni R, et al. (1984) Nutrient absorption, storage and remobilization in octopus vulgaris. Marine and Freshwater Behaviour and Physiology 11(3): 239–258.

Oestmann DJ, Scimeca JM, Forsythe J, et al. (1997) Special considerations for keeping cephalopods in laboratory facilities. Journal of the American Association for Laboratory Animal Science 36(2): 89–93.

Parreñas JS (2018) Decolonizing Extinction: The Work of Care in Orangutan Rehabilitation. Durham, NC: Duke University Press.

Penny A (2018) Vancouver aquarium transfers Giant Pacific Octopus to ocean. Available at: https://ocean.org/media-releases/vancouver-aquarium-transfers-giant-pacific-octopus-ocean/ (accessed 7 February 2019).

Plumwood V (1993) Feminism and the Mastery of Nature. London / New York, NY: Routledge.

Puig de la Bellacasa M (2012) ‘Nothing Comes Without Its World’: Thinking with care. The Sociological Review 60(2): 197–216.

Rocheleau D, Thomas-Slayter B and Wangari E (1996) Feminist Political Ecology: Global Issues and Local Experiences. New York, NY: Routledge.

Srinivasan K (2019) Remaking more-than-human society: Thought experiments on street dogs as “nature”. Transactions of the Institute of British Geographers 44(2): 376–391.

Taylor C (2013) Foucault and critical animal studies: Genealogies of agricultural power. Philosophy Compass 8(6): 539–551.
Taylor S (2017) Beasts of Burden: Animal and Disability Liberation. New York, NY / London: The New Press.

Vancouver Aquarium (n.d.) About the Vancouver Aquarium. Available at: https://www.vanaqua.org/about (accessed 6 February 2019).

Vancouver Aquarium (2017) Below the surface. Available at: https://www.youtube.com/watch?v=bsLdQryW9w4 (accessed 21 January 2019).

Van Dooren T (2014) Flight Ways: Life and Loss at the Edge of Extinction. New York, NY: Columbia University Press.