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Zoo Animals, Livestock, and Pets, Oh MY! An Exploration of the Ethics of Captive Breeding

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Zoo Animals, Livestock, and Pets, Oh MY!

An Exploration of the Ethics of Captive Breeding

Colleen McArdle

2015

Sponsor: Professor Vanessa Fox

Committee: Professor Jennifer Everett, Professor Kevin Moore, & Professor Dana Dudle
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Chapter 1: Introduction

**What is captive breeding?** Captive breeding is a mode of breeding in which humans decide which animals will be parents and arrange reproduction for purposes that we define. Zoos have used it as a conservation strategy in the United States since the 1960’s, but it is also used to breed animals for food, produce pets for companionship, and create lab animals for research institutions (“Captive Breeding Success”). While some of our goals for breeding in captivity may be laudable, such as breeding animals for conservation purposes or producing pets that we will treat as members of the family, some of the methods employed in captive breeding are ethically questionable.

**Why should we care?** As an avid animal lover and aspiring veterinarian, I am passionate about preventing animal suffering. However, I am also a proponent of zoos, I love my milkshakes and hamburgers, I have owned more pets than I can count on my fingers, and I take drugs every day that have been tested on animals. Based upon the way that I have lived my life thus far, it would seem that captive breeding is a necessary practice to produce animals for my benefit.

My awakening to the issues associated with captive breeding occurred when I heard about Marius the giraffe, shown in the photo on the left below (“Young”). On February 9th, 2014, Marius, a healthy, two-year old giraffe was euthanized at the Copenhagen Zoo for fear of inbreeding because he had been bred with every other female giraffe in surrounding zoos (Schwartz). Despite a hefty offer from a Beverly Hills billionaire to purchase Marius for $682,000, the zoo made the difficult decision to kill Marius, implying that he was only useful for his reproductive capabilities (Schwartz). The zoo also performed a public autopsy of Marius’s
body, in front of children, as shown in the photo on the right below ("Young"). Unsurprisingly, the public was outraged both by the killing and the public autopsy ("Young").

While many animal lovers resent the Copenhagen zoo, it is important to ask ourselves a difficult question: were there any realistic alternatives to killing Marius? According to the zoo’s scientific director Ben Holst, forcing Marius to live alone would be cruel, due to giraffes’ social nature (Schwartz). Additionally, Marius’ enclosure housed another male and female giraffe, and the zookeepers were nervous about the social dynamics between two males and one female ("Young"). Although it seemed unlikely that Marius would remain in the zoo, one might pose the question, what would have happened if Marius was reintroduced to the wild? The zoo staff believed that because Marius was born in captivity and spent two years without the predators, he would have lacked certain survival skills and would not be successful in the wild ("Young"). Marius’s case illuminates several of the issues associated with captive breeding in zoos, including killing healthy animals, causing animals to lose survival instincts, possibly inbreeding, and denying mate selection.

Of these issues, the lack of mate selection is one of the most ethically confounding. Many species, from mammals and birds to fish and insects exhibit mate choice (Howard 32). Charles Darwin first described this concept when he published *Selection in Relation to Sex* in 1871.
According to Jules Howard in *Sex on Earth: A Celebration of Animal Reproduction*, Darwin was “arguably the first to see that females could drive the evolution of male traits, through choice” (31). Darwin proposed the theory of sexual selection, “a form of evolution capable of skewing behaviors and body shapes towards wild exaggeration, driven by reproductive success, rather than simply survival” (31). However, the idea of females picking their mates in the 1800s was unconventional, and some still questioned the idea when captive breeding projects began in the 1960s and ‘70s (32).

Research demonstrates that in some species, mate selection directly affects the success of reproduction, “including offspring production, survival, and fecundity” (Martin 1). In a study entitled, "The Role of Familiarity and Preference in Reproductive Success in *Ex Situ* Breeding Programs," Martin and Sheperdson separated an endangered rabbit species called Columbia Basin pygmy rabbits into two groups: one in which the rabbits selected their mates, and another in which the researchers selected the mates, which is also known as artificial selection. The scientists discovered that when the rabbits selected their mates, they had greater reproductive success than those that were artificially selected (1). When mate selection is allowed, there tends to be more offspring, healthier offspring, and greater maternal care (2).

Based on the importance of mate selection to offspring, it would seem like a behavior worth protecting. However, sometimes mate selection is sacrificed to preserve the genetic diversity in zoo animals. In livestock, it is often sacrificed to provide meat and dairy products at low prices, and in pets, it is sacrificed to protect breed purity. Do animals have a right to select who they mate, and does reproductive autonomy in animals hold inherent value? What are the problems that can arise when we deny animals mate selection? Do the benefits of breeding in
captivity the way we do outweigh the costs of sacrificing mate selection? These are some of the questions I plan on answering.

In Chapter 2, I introduce three important ethical viewpoints that are relevant to captive breeding. Although there are other ethical viewpoints related to animals, these three are the ones I believe are paramount to understanding the complexity of captive breeding. In Chapter 3, I address the issue of captive breeding in zoos by discussing why it is necessary, why it is ethically problematic, and how we could potentially solve the problems associated with it based on different ethical viewpoints. I follow this same format when discussing livestock in Chapter 4 and pets in Chapter 5. While lab animals provide an interesting application of captive breeding, the goals of research often completely hinder the animals’ ability to select their mates, and there is no potential in them eventually being able to express mate selection, so I will not address them. In Chapter 6, I discuss my conclusions.
Chapter 2: Three Ethical Perspectives

What are the main ethical viewpoints concerning captive breeding? In my opinion, the three ethical perspectives that best apply to the issue of captive breeding are the animal rights view, animal welfare view, and environmental view. These views involve several morally relevant considerations, including the following: the animals we breed are beings that have interests; many of them have mental and psychological lives; and they are beings that can suffer. Beyond individual animals, there are populations at stake. It is important to think through these considerations when addressing captive breeding, as it is a complicated issue, and viewing it from these three ethical lenses complicates it further.

Animal Rights View

Those who ascribe to the animal rights view tend to believe that animals deserve rights as individuals and that captive breeding is ethically questionable because it violates individual freedoms. Gary L. Francione and Tom Regan are the most prominent scholars that promote the animal rights view. Francione’s book, *Animals as Persons: Essays on the Abolition of Animal Exploitation* explains that the problem with issues like captive breeding is not “how we use animals, but THAT we use them” (10). While Francione does not address captive breeding directly, applying his argument to the practice shows that breeding animals for human purposes is ethically questionable.

Regan argues in *The Case for Animal Rights* that animals deserve rights because of the concept of inherent value (54). He states that an animal is “an experiencing subject of a life” and because it can experience things, it has value that is worth protecting (54). While the inherent value argument can clearly denounce breeding farm animals and pets, breeding zoo animals for conservation goals is somewhat convoluted, because the value is often placed on species rather
than individuals. Regan argues that the rights view does not “grant species survival” (360). Yet, he believes that endangered species have a “fundamental right to be treated with respect,” and so the rights view supports conservation efforts because endangered animals “are equal in value to all who have inherent value” (360). He also believes that favoring individuals can be cohesive with conservation goals: “Were we to show proper respect for the rights of individuals who make up the biotic community, would not the community be preserved? And is not that what the more holistic systems-minded environmentalists want?” (Gruen 202). Regan would find captive breeding overall morally plausible if the rights of the individuals are placed before the good of the species, which oftentimes is not the case.

Mate selection is consistent with animal rights theory, because this theory states that if beings have inherent value, then they deserve rights, which would include reproductive rights. Regan explains that animals have these types of rights “independently of considerations about the value of the consequences that would flow from recognizing that they have them” (145). Thus, disregarding the issues that arise when animals are denied mate selection, the animal rights view supports mate selection because animals’ reproductive autonomy has value in itself.

**Animal Welfare View**

The American Veterinary Medical Association defines animal welfare as “how an animal is coping with the conditions in which it lives” and further explains that an animal is coping well if it is “healthy, comfortable, well nourished, safe, able to express innate behavior, and if it is not suffering from unpleasant states such as pain, fear, and distress” (“Animal”). Those that ascribe to the welfare view generally believe that animals can be used for human purposes only if we minimize their suffering and treat them with respect.
However, the welfare view splits into two factions: egalitarian welfarists and inegalitarian welfarists. Egalitarian welfarists award all species – humans and non-human animals – equal consideration, whereas inegalitarian welfarists “subordinate animal welfare to the interests of human beings” (Donaldson 5). Egalitarian welfarists are also sometimes called consistent utilitarians or animal liberationists (“Egalitarianism”). Consistent utilitarians evaluate the amount of benefit or harm that would arise from a situation and argue that our actions should benefit the most or harm the least amount of those affected (Singer 5). Peter Singer, a famous utilitarian, published *Animal Liberation* in 1975 which sparked the liberation movement. *Animal Liberation* was ground-breaking because it introduced the concept of sentience, the ability to feel pain, as the only qualifier for a being to have rights. Singer believes the best solution for solving issues like captive breeding is to “bring nonhuman animals within our sphere of moral concern and cease to treat their lives as expendable for whatever trivial purposes we have” (20).

Inegalitarian welfarists, on the other hand, are often critiqued by rightists because they believe that these welfarists “protect animal interests only to the extent that we derive economic benefit from doing so” (Francione 62). To counteract this statement, Carl Cohen, professor of philosophy at University of Michigan, argues that not all living beings deserve rights, and “the assertion that all animals, only because they are alive and have interests, also possess the ‘right to life’ is an abuse of that phrase, and wholly without warrant” (Clemmitt). Although Francione criticizes this welfare view, he claims that it is the “only realistic strategy that we can pursue, given that animal use will not be abolished anytime soon” (Francione 16).

In terms of mate selection, the egalitarian welfare view would argue that animals should be awarded mate choice in some cases. They believe that animals have interests that are worth protecting, and in some instances they may outweigh the benefits that humans would have from
denying them mate selection. However, the inegalitarian welfare view may not always support mate choice. Inegalitarians favor human interests over animal interests, so if our reasons for denying mate selection benefit us, then they would not support the practice. However, there are some cases that mate selection benefits both us and them (which I address in the following chapters), and in those cases inegalitarians may support the practice.

**Environmental View**

As opposed to the rights view, the environmental view focuses on the “health of the ecosystem rather than its individuals” (Donaldson 5). Aldo Leopold is a famous environmental ethicist who describes the “land ethic” in his book, *A Sand County Almanac*. He claims that the “land ethic changes the role of *Homo sapiens* from conqueror of the land-community to plain member and citizen of it” (Leopold 224). He further explains that “A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise” (Harrington 487). From his point of view, animals would have a “right to exist apart from human interests” (Donovan 6).

Edward Norton, another environmentalist, points out a contradiction in his book, *Ethics on the Ark*, that “so many human beings agonize over the well-being of an individual animal yet ignore the millions daily brutalized by the destruction of their environments” (1). According to Norton, we have a “moral duty to restore what we have damaged and degraded” (166). In the same vein, environmental ethicist Eugene Hargrove argues that efforts should be focused on preserving species even if it violates some individual rights (15). He believes that conservation efforts should require “only the protection of enough individual animals to keep the species classification active” (15).
Environmentalists could be divided on the issue of mate selection. In terms of zoo animals, likely they would be against mate selection, as it initially tends to favor individuals rather than species. However, the practice helps ensure that mothers teach their offspring vital survival skills, which is an important component of captive breeding and reintroduction projects. In livestock and pets, they may differ in their opinions, as some view domesticated animals as unnatural, because they were created largely by humans rather than adaptive evolution.

**My View**

I am somewhat of an inegalitarian welfarist, because I believe that we can use animals for our purposes, but it is wrong to use them blindly and without considering their welfare. While I sympathize with certain aspects of the rights view, and I recognize the importance of species preservation, my goal is to find ways that we can use animals while minimizing their suffering. A part of ensuring their welfare is, as the American Veterinary Medical Association defines it, allowing animals to “express innate behavior.” Captive breeding largely repudiates animals’ innate reproductive autonomy. Therefore, I want to present the problems associated with denying animals’ mate selection, evaluate if our reasons for doing so are justified, and explore if there are practical solutions that enable animals to express this natural behavior.
Chapter 3: Captive Breeding in Zoos

Why is it necessary to breed zoo animals in captivity? Due to human expansion, habitat destruction and poaching have threatened biodiversity and are endangering certain animal populations. Because humans cause these problems, it is our responsibility to help restore dwindling populations. Captive breeding has become one strategy to remedy this issue.

Habitat Destruction

Over the last century, habitat destruction due to human expansion has affected 90% of the world’s animals (Freeman 1112). According to the Scott Freeman, author of the textbook, *Biological Science*, “modern rates of extinction are 100 to 1000 times greater than average, or the background rate recorded in the fossil record over the past 550 million years” (1110). Many biologists believe that the “sixth mass extinction in the history of multicellular life is occurring,” and they predict that “between the time you are reading this and the time your great-grandchildren are grown, human impacts on the planet promise to equal or exceed those of the gigantic asteroid that smashed into earth 65 million years ago” (1110).

According to Christine L. Garcia in the book, *Sister Species: Women, Animals, and Social Justice*, “Humans are pushing other animals into smaller and smaller patches of the earth’s terrain, which is reminiscent of the treatment of native Americans, who were ‘escorted’ to barren reservations” (Kemmerer 141). The bonobo, a primate endemic to the forests in the Democratic Republic of the Congo is an example of a species being pushed into “small, isolated pockets” (Orlans 167). When a species’ range becomes fragmented in this way, the species is at a greater risk of extinction due to lower population numbers in each area, which increases the chance of inbreeding and creating less viable populations. According to Orlans, “Adaptive
evolutionary change requires heritable genetic variation, of which there is much less in small populations, and they are also more at risk to be wiped out due to disease” (167). The problem with bonobos is not only felt in the wild but also in zoos – there are only around 100 bonobos living in zoos, and this small population renders it difficult to preserve genetic diversity (167). Habitat destruction is one of the major problems that necessitate conservation strategies like captive breeding.

**Poaching**

In addition to habitat fragmentation, poaching is a threat to population numbers, largely for cultural reasons. For instance, during the 1970s, the illegal slaughter of rhinos unintentionally escalated because of the OPEC oil embargo. When the price of oil increased, so did the income across many Arab nations. Poaching increased in this area because Yemenis could afford more expensive “jambiyas” or ceremonial daggers that are made from rhino horn (Wilson 85). However, the poaching of rhinos unfortunately did not end in the ‘70s. Rhino poaching today is often motivated by practitioners of traditional Chinese medicine who still use rhinoceros horns, as they believe that they can cure many afflictions (85). Further, this type of horn can be sold for $20,000 on the black market because some people in Southeast Asia use white rhino horn to make a recreational drug (Kolbert). If the demand for these animal products continues to be high, then likely poaching will continue to be an issue that threatens population numbers.

This problem is also prevalent in the United States. Despite outlawing poaching and wildlife tracking, the United States is considered the world’s second largest market for illegal animal products (Knights). However, the government is making strides to reduce poaching. For instance, in 2014 the Obama administration initiated a “National Strategy for Combating Wildlife” to be implemented this year (Knights). The government plans on spending millions of
dollars on regulating poaching; however, the strategy fails to include a plan for reducing the demand for wildlife products (Knights). Reducing demand is a vital part of making a long-term change in the illegal animal trade.

Humans have driven other species to extinction through habitat destruction and poaching. Because of this, many believe that it is our responsibility to preserve the species we still have before it is too late. To assess the ethics of captive breeding in zoos, let us further examine the methods used for breeding in zoos and then analyze the problems associated with these breeding methods.

What are the methods used to breed animals in zoos? Zookeepers artificially select which animals to mate, meaning that by choosing which animals will reproduce, humans take the place of natural selection. While letting nature take its course and allowing animals to maximize mate choice in zoos is the ideal option, sometimes it is unrealistic due to the small number of animals kept in zoos. Either some animals may inbreed, or others may never breed at all. Therefore, zoos have implemented a number of reproductive technologies such as artificial insemination, cross-species surrogacy, and stem cells and cloning to help struggling populations.

Artificial Selection

Those who support the use of artificial selection argue that controlling breeding in this way maximizes genetic diversity and can help produce a stable population (Martin 2). To maximize genetic diversity in struggling populations, zoos follow Species Survival Plans, which according to the American Association of Zoos and Aquariums, “cooperatively manage specific, and typically threatened or endangered species populations within AZA-accredited Zoos and Aquariums, Certified Related Facilities, and Sustainability Partners” (“Species”). Over 490 species survival plans exist, and each has a “Taxon Advisory Group” that ensures that the plan
for the species will promote genetic diversity (“Species”). The goal of Species Survival Plans is to preserve 90% of genetic variation in a population over 100 years (“Species”). While choosing which animals to breed for the purpose of maximizing genetic diversity will benefit the species as a whole, it violates the individuals’ ability to select their own mates.

Due to the ever-growing popularity of artificial insemination, now there are “frozen zoos” that are collections of DNA, embryos, eggs, and semen from different species that can be utilized during artificial insemination. In 1976, the first lab to freeze genetic material for this purpose was established (Malamud 265). Initially, the lab froze genetic material for the purpose of studying chromosomes, but then they realized its potential for aiding in species preservation. Today, the most famous frozen zoo, located at the San Diego Zoo, stores the genetic material of over 3200 mammals, consisting of 335 species. They also grow fibroblast cell cultures from various exotic species that could be used for researching how stem cells could help save endangered species (265). The frozen zoo is groundbreaking because it enables the transport of genetic material to various breeding operations without having to transport the actual animals.

However, two problems arise with the use of the frozen zoo and artificial insemination: the lack of mate choice, and the potential of the genetic material becoming obsolete over time. Female animals are denied mate selection when they are inseminated artificially. When the female gives birth to offspring, the potential exists that she will not recognize the offspring as her own and will not teach them the lessons they need to learn in order to survive. Furthermore, if we intend to use that semen hundreds of years from now, those genes may become obsolete if the populations undergo changes. The frozen zoo does not foster genetic change and adaptations, thus utilizing old gametes may be counteractive to conservation efforts.
Cross-Species Surrogacy

With the use of artificial insemination and embryo transfer, some captive breeding programs have utilized cross-species surrogacy, which is when a female from a different species or subspecies serves as the surrogate to help produce a rare or endangered species. How this works is scientists artificially inseminate a mother from the endangered species, harvest the embryos she produces, and transfer them to the surrogate mother who is from a similar species. While this sounds like something straight out of a sci-fi novel, cross-species surrogacy has had success in zoos. It was first successfully implemented in the 1980s when an Eland antelope birthed a Bongo, a highly endangered ungulate, at the Cincinnati Zoo (“Sex”). Cross-species surrogacy also produced a rare Indian desert cat, and you’ll never guess what the mother species was – a domesticated cat. Yes, you read that correctly. Now cross-species surrogacy is commonly used in birds, such as the black robin, which was close to extinction without this surrogacy effort (“Chatham”). Sometimes the mother species helps raise the surrogate offspring, but the problem with this is that the offspring will have a life without social tradition, because a domestic cat cannot teach a desert cat how to survive in the wild (“Sex”).

Stem Cells and Cloning

Research into stem cells has proven that it could potentially help save endangered species. Stem cells have been transformed from cells in the northern white rhino and the drill monkey to potentially help foster the growth of their endangered populations (Callaway). These stem cells, in theory are capable of producing practically any type of body tissue or cells – including sperm cells that could be utilized for captive breeding. While stem cells provide a potentially useful tool for captive breeding efforts, more research needs to be conducted to
ensure the safety and wellbeing of the animals involved. If zoos utilize stem cells to propagate populations, they need to ensure that the offspring are raised by parents in their species. But with the absence of mate choice, it is unclear if the mothers would recognize offspring generated by stem cells as their own.

The authors of the paper, “Wildlife Conservation and Reproductive Cloning,” believe that cloning has the potential to “be targeted at recovering lost or under-represented genetic lines; these could then contribute to the future fitness of the population” (Holt 317). They propose that if cloning was 100% successful, they would clone each individual and “allow the offspring to mature and breed naturally” so that the risk of diminishing genetic diversity would be lowered (317). They claim that in this situation, “individuals are effectively induced to reproduce asexually…thereby improving the long-term fitness of the species through the retention of genetic diversity” (317). However, cloning has low success rates, rendering the practice impractical. Once again, the issue of mate choice is at stake.

**Why is captive breeding in zoos ethically problematic?** Controlling breeding in captivity using the technologies just described creates several issues, including maternal deprivation and loss of survival skills, inbreeding, culling of surplus animals. Additionally, zoos have limited resources, making it difficult for them to remedy these issues.

**Maternal Deprivation**

A study entitled, “The impact of atypical early histories on pet or performer chimpanzees” supports the importance of mate selection from a different perspective. The scientists in this study were interested in assessing the behavioral differences between chimpanzees that were orphaned and raised by zookeepers, and those raised by other chimps. Using a Chimp-Human Index, the scientists measured the amount of time that chimps in the
different groups spent with humans, and they found a significant difference between the groups in terms of grooming and sexual behaviors (Freeman). The chimps raised by humans behaved abnormally around other chimps, which indirectly resulted from maternal deprivation (Freeman).

The mother’s role in the animal kingdom not only consists of bringing new life into the world, but often includes training her young to survive, especially in mammal species. Therefore, the deprivation of maternal care has negative implications for offspring. According to Martin, “The potential consequence of reducing or eliminating mate choice in captivity is altering female investment in offspring. When a female’s ability to choose is constrained, females may not provide as much parental care to offspring” (2). Whether you ascribe to the animal rights view, environmentalism, animal welfare, or none of the above, most could agree that the loss of parental care to offspring in species that need to learn survival skills is problematic.

**Loss of Survival Skills**

In some reintroduction projects, the animals die immediately after being reintroduced into the wild. This is because during their time in captivity, they have lost certain survival instincts, because “they don’t have the opportunity to learn [how to survive in the wild] when everything is given to them in zoos” (Masci 6). How could this be if thousands of years of evolution have developed these instinctual skills? Some of these skills are innate to animals, whereas parents in some species must teach their offspring to forage for food and evade predators (Griffin 1319). If mate selection is denied in these animals, then it is possible that the offspring will not learn these vital survival skills.

For example, after a few years of breeding the endangered black-footed ferret in captivity in the United States, the kits released into the wild did not exhibit any signs of being fearful towards predators like hawks (DeBlieu 158). Scientists attribute this loss of innate fear to the fact
that the kits’ mothers were raised in captivity and never introduced to predators (158). Because of this, they never learned to make calls to their kits when a predator was imminent. Thus the “if you don’t use it, you lose it” rule applies to survival instincts.

Some studies show a correlation between the number of generations a species has spent in captivity and the ability to survive in the wild upon release (Griffin). Some attribute this loss of survival skills to epigenetic changes that could occur during captivity (DeBlieu 148). Epigenetics is the study of how genes can be controlled by factors outside of someone’s DNA (Simmons). These epigenetic changes can modify genes and regulate which proteins are transcribed, and they are passed to offspring (Simmons). Although large changes in behavior and physiology must be sculpted by years of evolution, smaller epigenetic changes can occur in just a few generations that can still make a significant impact (Moalem 12).

For example, Table 1 below extracted from the article, "Minimizing Genetic Adaptation in Captive Breeding Programs: A Review," shows several traits that were altered in a number of different species from spending several generations in captivity (Williams 2390). It includes both genetic and behavioral changes, the combination of which may be detrimental for a species. However, it is slightly unclear if these changes were due to maternal deprivation or due to captive conditions, and either one has the potential to create these results.

<table>
<thead>
<tr>
<th>Class</th>
<th>Order</th>
<th>Species</th>
<th>Number of generations</th>
<th>Trait</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphibia</td>
<td>Anura</td>
<td>Alopex macacus</td>
<td>9–12 Generations</td>
<td>Predator defenses (morphology)</td>
<td>Kraaijeveld-Smit et al. (2006)</td>
</tr>
<tr>
<td>Aves</td>
<td>Gruiformes</td>
<td>Erythrophalus hornshoferi</td>
<td>Simulation based on pedigree</td>
<td>Founder genome equivalents (degree of genetic change from source population)</td>
<td>Earnhardt (1999)</td>
</tr>
<tr>
<td>Insecta</td>
<td>Lepidoptera</td>
<td>Peris brassicae</td>
<td>100–150 Generations</td>
<td>Size and number of eggs (reproductive success)</td>
<td>Lewis and Thomas (2001)</td>
</tr>
<tr>
<td>Mammalia</td>
<td>Carnivora</td>
<td>Chrysocyon brachyrus</td>
<td>Simulation based on pedigree</td>
<td>Founder genome equivalents (degree of genetic change from source population)</td>
<td>Earnhardt (1999)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Canis lupus leucyi</td>
<td>Simulation based on pedigree</td>
<td>Founder genome equivalents (degree of genetic change from source population)</td>
<td>Earnhardt (1999)</td>
</tr>
</tbody>
</table>
Inbreeding

Through the use of Species Survival Plans, zoos aim to ameliorate inbreeding by maintaining genetic diversity. Preserving genetic diversity promotes disease resistance and can safeguard a species in the case of a natural disaster fragmenting a population. However, when population numbers dwindle in the wild, and there are few founders, it can potentially make “deleterious alleles become homozygous and lead to inbreeding depression” (Witzenberger 1). While inbreeding prevents animals from producing healthy offspring, it can also decrease fertility. According to DeBlieu, “very low concentrations of sperm…are a common phenomenon in inbred species” (262). Additionally, there is often a “high incidence of cryptorchidism, where only one testicle descends properly during sexual development” associated with inbreeding (262).

The risk of inbreeding increases when zoos only have a few members of each species in captivity. Zoos must decide if the benefits of saving a species outweigh the cost of creating inbred offspring. An example of this tradeoff is the case of the Sumatran rhino - a rare, endangered species whose population dwindled to a mere 100 individuals in the wild (Kolbert). Desperate times call for desperate measures, and in July, 2013, the Cincinnati Zoo made a controversial decision to breed sibling rhinos to produce a new bloodline (Kolbert). In their effort to save the Sumatran rhino, they risk creating an inbred population with potential health and fertility problems.

Other zoos have struggled to breed the Sumatran rhino in captivity. While the Sumatran government plans to move rhinos to preserved land, the Bornean government is removing their
rhinos from the wild to breed them in captivity (Kolbert). But the latter is an expensive enterprise, according to the NOVA film, *Sex and the Single Rhino*. In one instance, it cost over one million dollars to capture two rhinos and transport them from Indonesia to London, and they never bred (“Sex”). Additionally, when the Sumatran rhino project expanded to other zoos, they lost 30% of the rhinos in the process of capturing and transporting them (“Sex”), which questions the success of a project that kills so many animals at the onset.

**Culling of Surplus Animals**

Sometimes captive breeding programs produce more animals than they can care for, so these animals are then deemed “surplus.” According to an article by the BBC called, “How Many Healthy Animals Do Zoos Put Down?” written in response to the controversy with Marius, sometimes surplus animals are killed because they have been bred so frequently that continuing to breed them would increase the risk of inbreeding (Barnes). The Copenhagen Zoo reported that they kill an average of 20-30 healthy animals each year. The executive director of the European Association of Zoos and Aquariums (EAZA), Lesly Dickie, believes “somewhere between 3,000 and 5,000 are management-euthanized every year” in European zoos (Barnes).

Interestingly, the culling of surplus animals is illegal in several countries, including Germany, Austria, and Switzerland. All three countries ban the killing of vertebrates “without reasonable cause” (Barnes). The EAZA advises that euthanasia should only be considered when an animal “poses a threat to human safety…is suffering from a disease…or would otherwise be transferred to a substandard accommodation” (Barnes). While some deem the practice deplorable, European zoos still use it as a strategy to maintain stable animal populations.

To illustrate another example of surplus animals besides Marius, we turn again to the Copenhagen Zoo. In March 2014, after the public uproar about Marius, the zoo again had to
euthanize animals – only this time, they were lions. To make room for a new male lion joining the zoo, they euthanized two adult female lions and two cubs (“Danish”). Zoo officials claimed this was necessary “because of the pride of lions’ natural structure and behavior” as the cubs were “not old enough to fend for themselves” (“Danish”).

While at first the zoo’s decision may seem cruel, analyzing lions’ social structure provides clarity for the zoo’s motivations. Lions are one of the many mammal species that undergoes the Bruce-Parkes effect (Sapolsky 140). When new males join a pride, they will kill any cubs belonging to other males, and even a pregnant lioness will miscarry because of the scent of the new male (140). At first this may not make sense, but her body will recognize that it should avoid channeling calories towards a futile pregnancy that will result in her cubs being killed anyway (140). The death of a female lion’s cubs causes her to go into heat, so “infanticide ensures that any cubs born subsequently will be the offspring of the new males” (“Social”). Apparently, the female lions in question were related to the male lion being introduced, so the zoo staff was worried about inbreeding (“Danish”).

Some defend the idea of killing or “culling” surplus animals, as it “frees resources that would otherwise be used to maintain that animal, allowing those resources to be used for the benefit of other animals” (Norton 189). Still others who responded to the Copenhagen Zoo’s decision wondered if the animals could have been transferred to another zoo or even a wild animal sanctuary. After all, according to Robert Lacy, former chair of the International Union for Conservation of Nature, “an animal identified as surplus in one context can still fill an important role elsewhere” (Norton 193). While the preservation of species is the main goal of captive breeding, if the animals are seen as “dispensable” once they have reproduced, then this violates their welfare (Norton 70).
Limited Resources in Zoos

The issue of culling is just one example of the many that illustrates how zoos have limited resources. Keeping wild animals in captivity incurs astronomical costs for zoos. In addition to raising money for conservation, zoos also have to support themselves. Despite their best efforts, it is impossible to preserve all species through captive breeding. How do zoos choose which species to breed? Some critics, like People for the Ethical Treatment of Animals (PETA), would argue that the only species zoos are worried about breeding are the “cuddly” ones, large mammals that would draw many people to the zoo (“Zoos”).

In “Designing the Ark: Setting Priorities for Captive Breeding,” Andrew Balmford presents a controversial tactic that relates to PETA’s claim. He argues that zoos should channel their resources into saving species that “raise awareness and support for field-based initiatives” (719). So for China, it would be the panda, and for the rest of the world, any other species that could serve as an “ambassador” to the public. Balmford recognizes that to continue running, zoos must place profitability as a priority in addition to conservation. For this reason, he claims that zoos must make a compromise between breeding species that are rare and endangered and breeding those that will attract tourists to the zoo. He also advises that zoos should only have a minimum number of exhibits of the larger “money-making” animals, and then they can focus the rest of their resources on smaller-bodied species in need of rescue, as “there is as yet no evidence to indicate that addressing conservation goals by shifting to smaller animals would necessarily conflict with need for zoos to operate profitably” (723).

Clearly, there are several issues associated with our current breeding practices in zoos. These issues not only violate the welfare of individual animals by denying their reproductive autonomy, but they have implications that could affect species as a whole. Let us further
examine these problems through the lens of the three ethical perspectives to try to decipher if captive breeding in zoos is morally acceptable.

**How do the three ethical perspectives apply to the role zoos should play in captive breeding?** Although there has been some success with captive breeding, due to the risks involved with reintroduction projects, it is questionable as to whether we should continue the practice. The three ethical perspectives introduced in Chapter 2 provide different lenses in which to consider the issues associated with captive breeding.

For instance, welfarists’ support of the practice would likely be conditional. Some welfarists who understand the limits of breeding in zoos believe it would be more economical and effective to channel funds into *in situ* or “on-site” conservation efforts like saving rainforests and other habitats from being destroyed (Masci 3). Moreover, Mark Bekoff, an ethologist at the University of Colorado, Boulder, believes that "these programs have been going on long enough that we should see more progress made. It's almost like: Breed and pray that something works out" (Dell’Amore). Some egalitarian welfarists may believe that the issues affecting individual animals are too great to justify captive breeding, especially since many do not attribute inherent value to species (Minteer). However, inegalitarian welfarists may believe that captive breeding is ethical because it suits human interests of conservation education and entertainment. There are some in both groups who can see the value in captive breeding to prevent extinction and maintain genetic diversity in populations, so they would be in support of the practice as long as the individual animals’ welfare is considered (Minteer).

Animal rightists would argue that captive breeding, while benefitting species, incurs costs to the individual animals that are too great to continue with the practice. They argue that it is unethical to breed animals in such a way that results in harming them. Because captive breeding
efforts deny their reproductive autonomy, and in European zoos, may result in their death, animal rightists are largely opposed to the practice. As Francione argues, animals may not experience life how we do, “but this doesn’t mean that they have no interest in continuing to exist, that they are not self-aware and indifferent to whether we use and kill them for our purposes, or that death is any less a harm to them than it is to us” (10). Because animals have intrinsic value as individuals, rightists believe that denying mate selection is wrong. Based upon current breeding practices used in zoos, animal rightists would likely be against captive breeding, despite being able to see the value in saving endangered species (Minteer).

Environmentalists argue that extinction is evil, and the need to boost animal populations and maintain genetic diversity within them is our responsibility (Cafaro). According to the editorial article, “Species Extinction is a Great Moral Wrong,” “humanity could extinguish one out of every three species on Earth during the next several centuries, if we continue on our current habitat-destroying, resource monopolizing path,” and for this reason, environmental ethicists see captive breeding as an essential component to slowing extinction (1). The ideology of environmentalists differs from that of rightists in that environmentalists place intrinsic value in species rather than individuals. While some individual freedoms like mate selection may be sacrificed in the process of captive breeding, many environmentalists argue that it is necessary for maintaining genetic diversity in species and preventing extinction (Minteer).

Some environmentalists believe that in addition to breeding for genetic diversity, zoos need to maintain meta-populations of animals in order to educate the public about conservation. Zoos and wildlife sanctuaries in North America receive an average of 143 million visitors annually (Virga 12). Learning about these animals can inspire people to contribute to the conservation effort monetarily or otherwise, and zoos provide the public with opportunities to
experience animals that they normally could only see in books or on television (Allendorf 453). Norton argues that because “zoo animals serve the useful purpose of public education…for this reason we owe them the best possible quality of life” (Norton 29).

As environmentalist Valerius Geist argues, “Captive propagation is the only hope for a significant part of the flora and fauna to be safeguarded till a new recolonization of earth’s damaged surface by the biota may begin” (Norton 97). However, still other environmentalists point out the issue that if reintroduction is included in a Species Survival Plan, it may not be possible to carry out due to limited habitat. Zoos are oftentimes described as arks that can safeguard animals until they are ready to be released to the wild. But releasing these animals into the wild is becoming rare, because as Valerie Martin explains in The Great Divorce, “Habitats are shrinking by the minute…Zoos operated as arks, holding animals for the future, but it was a future that would never come” (Malamud 45).

In my opinion, zoos should maintain small populations that will not be released into the wild but will serve to educate the public on the importance of biodiversity and conservation. Perhaps the animals kept in zoos should be ones that are injured or would not be successful in the wild. However, the majority of breeding programs should focus on producing animals that not only contribute to the genetic diversity of the species but also have a hope of being reintroduced to the wild, so as not to produce surplus animals. But this goal is somewhat contradictory to the goal of mate selection. Is it possible to do both? This question will be addressed in the following section.

**How do we solve the problems associated with captive breeding?** The problems associated with breeding zoo animals in captivity are varied and complex and may require different solutions. Some of the proposed solutions including ending breeding in zoos and
relocating animals to wildlife sanctuaries, training animals for survival success, and avoiding non-essential births.

Wildlife Sanctuaries

What would happen if we stopped breeding all animals in zoos and moved them to wildlife sanctuaries? To address this question, let me begin with the story of two elephants named Winky and Wanda who lived at the Detroit Zoological Institute. For many years they seemed to be living happy lives, but in May 2004, the zoologists decided that the zoo conditions were jeopardizing Winky and Wanda’s health (107). Oftentimes elephants in zoos must be kept in enclosures with concrete floors, which over time can cause foot and joint problems (114). The Detroit zoo staff wanted to move the elephants to a sanctuary where they felt the elephants would live in more natural conditions, but because the Detroit Zoo is accredited by the American Zoo Association (AZA), they had to request permission. The AZA would not allow them to send the elephants to a non-accredited location and instead suggested relocating them to the Columbus Zoo (107).

Under current regulations by the AZA and EAZA, it is impossible to relocate zoo animals to wildlife sanctuaries. However, this may ultimately benefit the animals, because the AZA requires that zoos be inspected at least once in every five years by zoo experts to ensure that they are following strict regulations, while oftentimes sanctuaries lack such regulations (Norton 22). This also means that breeding at the sanctuaries would not be regulated. While animals may have more freedom to select their mates, some sanctuaries may produce surplus animals and end up culling them as a result.
Sanctuaries also may not be located in the type of environment best suited for the animals. For instance, if there was a wildlife sanctuary in Alaska that gave Winky and Wanda more room to roam, but still exposed them to inclement weather, would it be a better habitat than what the Detroit Zoo could provide for them? Without increased regulation, sanctuaries cannot currently be a realistic solution for these animals.

And what would happen if we completely stopped ex situ captive breeding projects to move animals to sanctuaries? Some species would go extinct, and according to environmentalists, extinction is the greatest evil. It seems that even animal welfarists could see how allowing species to go extinct is ethically problematic. Therefore, this solution is unrealistic because of the ethical wrongs associated with it.

**Training Animals for the Wild**

When zoos deny mate selection, often the mothers fail to teach their offspring vital survival skills. To ameliorate this problem, we should minimize the number of generations that animals bred for reintroduction programs spend in captivity, because this reduces the amount of behavioral changes that can occur. Additionally, making mate selection a priority in captive breeding programs could encourage mothers to teach their offspring important survival skills.

While some animal rightists may think it cruel, many animal behaviorists believe that animals should endure some stress in captive conditions similar to what they would experience in the wild, as this would ease their transition into the wild. Scientists have found that moderate amounts of stress can aid in animals’ transition to the wild (Bekoff 94). Oftentimes zoos now incorporate a system where animals have to work for their food, are exposed to potential predators without the risk of being eaten for lunch, and are also exposed to weather changes (“Sex”).
This “pre-conditioning” prior to reintroduction was successfully implemented in the Black-Footed Ferret Project. While the National Black-Footed Ferret Conservation Center in Colorado initially had difficulty with kits not recognizing predators, the center has improved kits’ hunting and predator avoidance skills through pre-conditioning. Pre-conditioning entails placing the kits in outdoor pens for at least 30 days prior to release. In the pens, the kits socialize with other kits, and their “dams” or mothers teach them how to use burrow systems to avoid predators and hunt prey like prairie dogs. Since the implementation of this pen program in 1996, approximately 4,500 ferrets have been released into the wild. The center estimates that about 2,800 ferrets are living in their recovery sites, which is a testament to the success of the pre-conditioning program (“Black-Footed”).

These “pre-conditioning” programs are time-consuming and require experts who understand how to train the animals for success in the wild. But if zoos can implement these training programs, they could solve the problem of animals losing survival instincts while in captivity. Additionally, if zoos absolutely cannot incorporate mate selection into their breeding programs, then pre-conditioning is essential if the animals’ Species Survival Plans incorporate reintroduction to ensure that offspring will be successful in the wild.

**Avoiding Non-Essential Births**

One of the most calamitous problems involving captive breeding is the surplus problem, because it kills animals that could potentially serve a purpose elsewhere. European zoos appear to be the only ones that kill surplus animals, because in the United States animals not being used for breeding projects in Species Survival Plans are placed on contraceptives to prevent non-essential births (“The Shocking”). Zoos must maintain a certain number of animals in their zoos to maintain genetic diversity within species. But if the Species Survival Plan includes
reintroductions, then zoos must account for those numbers as well. For this purpose, one can devise a mathematical model. In his article, “Better Off in the Wild? Evaluating a Captive Breeding and Release Program for the Recovery of an Endangered Rodent,” McCleary suggests using a “matrix population model” which can measure population dynamics and help zoos decide how many animals they can take from the wild and how many they can keep in zoos (McCleary 198). Developing such a model could help prevent non-essential births.

Not all of these solutions are equally feasible. For instance, the United States will not be relocating the animals to wildlife sanctuaries any time soon. However, pre-conditioning and avoiding producing surplus animals are realistic solutions for many zoos. These solutions, while effective for solving the problems of loss of survival skills and culling of surplus animals, do not incorporate mate selection. While mate selection is a behavior that is worth protecting, it is questionable if it can realistically be incorporated into zoos’ captive breeding programs.

Can we realistically incorporate mate choice into captive breeding programs? Many of the reproductive technologies used in zoos address the problem of animals not breeding naturally. While zoos using artificial insemination rely on studbooks and Species Survival Plans to determine the best genetic matches for breeding, perhaps they are not always the best behavioral matches. Can animals decide which mates will provide the genetics to make the most successful offspring? Some species clearly exhibit mate selection, and in the wild they

\[
N_{t+1} = A_t N_t + \begin{bmatrix}
-c_t & c_t - r_t \\
r_t & 0
\end{bmatrix}
\]

1 “\(N_t\) and \(N_{t+1}\) are population vectors at time \(t\) and \(t+1\), respectively. \(A_t\) is the population projection matrix at time \(t\), \(c_t\) is the number of individuals transferred from the wild to the zoo population in time step \(t\), and \(r_t\) is the number of individuals released from the zoo to the wild population in time step \(t\)” (McCleary 198). This equation shows how it is possible for zoos to evaluate how many animals should stay in zoos, how many should be released, and how many could potentially be removed from the wild for captive breeding projects.
typically choose good genetic matches. But when populations are fragmented, sometimes they have no choice but to choose mates that will not benefit genetic diversity.

I foresee this problem also occurring if zoos incorporate mate selection into Species Survival Plans. If zoos do not transfer animals between them, then each zoo will have a very small sub-population to breed, and even if the animals exhibit mate selection, they may encounter issues with genetic diversity. Therefore, in the current state of zoos, it may not be possible to implement mate selection.

One solution to this issue that I devised would be to divide different types of species among zoos; for example, perhaps the Cincinnati Zoo would be the only zoo in the world to house rhinos, and by having all of the rhinos in the same place, there is a better chance that allowing the rhinos to mate naturally would yield good genetic results. However, there are several problems with this idea. To continue with the rhino example, this zoo would need much more land for the rhinos to roam on without having territorial issues with each other, as males cannot be housed too closely together or else they will fight (Gibson). Additionally, this would require zoologists with expertise in each species’ breeding behavior, as some species prefer to mate with members of the opposite sex with whom they are familiar, like with the pygmy rabbits, while others like cheetahs cannot be housed together and prefer mating with someone more mysterious (Leeds). Some zoo visitors may be disinclined to visit this type of “single-species” zoo if the zoo only houses one type of animals, so they would be less likely to learn about conservation and donate to the cause. Additionally, zoos are collections of many different types of animals, so a “single-species” zoo defies the very definition of the institution.

A different option would be modifying Taxon Advisory Groups that oversee Species Survival Plans. Zoos could require each group to have a member who is educated about mate
selection and also is an expert about the breeding behavior of the animal in question. Perhaps the presence of a person in the group representing the interests of the individual animal could make others in the taxon advisory group think about the implications of their breeding plans.

Taxon Advisory Groups must perform cost-benefit analysis to decide if the benefits of captive breeding outweigh the costs of denying mate selection. While mate choice should be a consideration in captive breeding programs, oftentimes the individual freedoms of the animals are disregarded because of the overarching goal for the benefit of the species. While denying mate selection can have negative unintended consequences, according to the International Union on Conservation of Nature, there have been over 100 successful captive breeding and reintroduction projects since the 1970s (“Re-introductions”). Based upon this number, many would argue that captive breeding in zoos is a worthy enterprise, one that may be worth sacrificing certain individual liberties like reproductive autonomy. Ideally, if zoos could integrate mate selection into captive breeding programs, not only would it maintain genetic diversity in species, but it would benefit the individual animals and their offspring. But zoos’ infrastructure renders mate selection largely unrealistic.

**How can we prevent the future need for captive breeding?** While captive breeding serves as a useful mechanism for “ex-situ” or “off-site” conservation, it “does not address deep cultural beliefs about killing animals and destroying habitats” (DeBlieu 7). The key to reducing the need for captive breeding is educating others about how poaching and habitat destruction threaten species and how small, everyday decisions like recycling can reduce our impact on the environment. By increasing conservation education, my hope is that the public will develop compassion for wild animals and try to improve their circumstances. As Eudy claims in *Ethics on the Ark*, “zoos have a responsibility to raise [the public’s] awareness and eradicate their
apathy” (Norton 149). Over time, hopefully humans can learn how to better coexist with animals. As Christine L. Garcia explains in *Sister Species*, “Animals’ needs are modest – they only want to ‘be.’ They just need food, water, shelter, and the freedom to build whatever relationships they choose” (Kemmerer 142).
Chapter 4: Captive Breeding on Farms

Why is breeding farm animals necessary? We breed livestock for food, for animal products like leather and wool, and for companionship. However, of all of these purposes, breeding livestock for food causes the most controversy. Today, we kill well over 10 billion animals for food annually in the United States (Baur 12). According to Bailey Norwood in Compassion by the Pound: The Economics of Farm Animal Welfare, 98% of Americans eat meat, and he claims that “the consumption of meat, dairy, and eggs in our Western society is part of a longstanding tradition [which] owes its existence to the fact that consumption of animal foods helped past generations thrive” (67). Humans have always been omnivores, and some studies suggest that humans’ brain size grew once they learned to cook meat, a practice that “increases the nutrient availability of meat” (67). Yet, Norwood points out that today people can obtain many nutrients from non-animal sources, which questions just how necessary consuming animal foods is to surviving and thriving (67).

Although only 2% of Americans are vegetarian, according to Peter Sandøe in Ethics of Animal Use, “It is well documented that those in the west who live on vegetarian or vegan diets live longer than average” (83). However, he also points out that perhaps these people make healthier choices in general (83). Additionally, some studies suggest that eating a vegetarian diet can be more environmentally friendly and less energetically costly than consuming meat, because “when meat is produced from farm animals such as cattle and pigs, many of the calories consumed by the animals are lost during the metabolic processes that convert feed to meat” (Sandøe 83). While people will likely continue debating over meat eating and vegetarianism, the truth is that many meat-eating Americans are uneducated about the realities of where their food
originates. Educating them on the issues facing animals bred in the factory farm system and how their individual choices can make a difference will perhaps decrease our dependence on factory farms.

**What are the methods used to breed livestock in captivity?** Driving past vast farmlands full of freely-roaming livestock is but a distant memory. Norwood blames this on the fact that “technological innovation and economies of scale made large numbers of farms unsustainable” (40). In the 1960s, “market forces caused producers to adopt technologies that produce food cheaply. Adoption of the technologies required less farm labor, fewer farms, and eventually, larger farms” (45). Greater demand for food after the Second World War caused banks to get involved with farms, and they “tended to provide loans only if you adopted the latest technology and intensified operations,” so even Mennonite and Amish farmers adopted the use of small battery or cell-like cages for confining egg-laying hens (21). Thus, the factory farming system was born, which is a “system of rearing livestock using intensive methods, by which poultry, pigs, or cattle are confined indoors under strictly controlled conditions” (“Factory”).

The factory farming system forces reproductive stress on livestock. Since 1959, the number of egg farms has decreased from over 800,000 to fewer than 100,000, while the number of hens used for eggs has dropped by at least 10 million, meaning that each hen must work harder to produce eggs to meet the high demand for them (Baur 11). The main methods used to breed farm animals on factory farms are artificial insemination and the manipulation of the female animals’ cycles, embryo transfer, occasionally cloning, and on non-factory farms, sometimes mate selection or natural breeding is allowed.

**Artificial Insemination and Control of the Female Cycle**
Since 1936, commercial farmers have primarily used artificial insemination to breed their livestock (Mason 44). Proponents of the practice argue that it “offers producers much greater control over genetic selection and the timing of births; it also eliminates the burden and expense of keeping quality breeding males” (44). However, now factory farmers can control the female cycle to aid in artificial insemination, using hormonal control of estrus and superovulation (Turner X). Farmers often inject their cows with progesterone to synchronize their estrus periods (34). Additionally, farmers utilize hormonal injections to make their female animals produce more eggs than normal, known as “superovulation” (45).

**Embryo Transfer**

In addition to using artificial insemination and control of the female cycle, farmers can perform embryo transfer, in which embryos are extracted from one animal to another to give birth (45). This method was employed in cross-species surrogacy with zoo animals, but farmers only do this with members of the same species. This way, a farmer can choose which cow has the best genetics and which cow has the best likelihood of yielding a good birth and use embryo transfer to aid in that process. However, embryo transfer, artificial insemination and control of the female cycle manipulate reproduction in the animals and inhibits them from selecting their own mates.

**Cloning**

Farmers have also dabbled in cloning animals to meet the demand for meat and dairy. Cloning cows especially has “become a reality and is much quicker than conventional breeding” according to Arlene Klotzko in her anthology, *The Cloning Sourcebook* (7). Some scientists believe that we could channel our cloning technology towards genetically modified animals with
better disease resistance (170). While this goal is laudable, the ends may not justify the means given that it deprives animals of mate choice.

Cloning also causes health problems in some livestock. For example, in cows carrying cloned calves, many have had to undergo cesarean sections because the calves “grow too big too quickly” (Dawkins 37). Additionally, cloning in livestock typically yields low success rates of 3-5%, and many livestock encounter problems during birthing such as “placental abnormalities, prolonged gestation, and stillbirth” (Sandøe 145). The offspring may also experience health problems, including “hypoxia, respiratory failure and circulatory problems, malformations in the urogenital tract, malformations in the liver and brain, immune dysfunction, lymphoid hypoplasia, anemia, and bacterial infections” (145). Given the numerous pitfalls of cloning livestock, its use will likely be limited until scientists modify it so that it does not jeopardize the animals’ health (Klotzko 167).

**Mate Selection**

Only about 1% of farms today are traditional in allowing animals to roam in pastures and breed using mate selection (“Ending”). Some are organic farms while others raise their animals in pastures. However, it is very difficult for these farms to survive without selling their products at higher prices than those used in the factory farming system, making them less marketable to consumers who are uneducated about animal welfare issues (“Ending”).

**What are the problems associated with captive breeding of livestock?** The main issues facing livestock bred in captivity include health issues, reproductive problems, and maternal deprivation. Ultimately, these problems reduce the farmers’ profitability because when the animals are not healthy, they generally cannot produce as much. Today, livestock breeders have narrow breeding objectives which limit the gene pool of the animals and can cause health
problems (Turner 19). For instance, 80% of our milk comes from only 54 of the 217 dairy cow breeds (Sandøe 317). Proponents of the factory farm system claim that farmers used to raise breeds that were less productive, so now raising fewer breeds that are more productive is ultimately more efficient (Paladino 3). But what the proponents fail to point out is that they also did not suffer from as many ailments as livestock do today, partially due to the fact that they were more genetically diverse (3). Farmers now must be more cautious about the spread of diseases because according to Gene Baur, author of Farm Sanctuary: Changing Hearts and Minds about Animals and Food, farm animals “have little genetic diversity and are crowded so closely together indoors, their natural resistance to infections has been eroded” (92).

After breeding shifted towards mass production, another change in breeding goals occurred: now farmers intend to select for animals that survive well in captivity, such as breeding pigs for “even toes and other features that will hold up better under factory conditions” (Mason 44). What is so wrong about this breeding practice? As animal behaviorist Temple Grandin explains in Animals in Translation, instead of the environment inducing changes to wild animal populations through natural selection, for farm animals “we are the environment,” and “when you over-select for a single trait, you get warped evolution” that can often lead to health problems (70).

**Health Problems**

Inbreeding and artificially selecting for traits in animals that maximize production often results in unintended consequences that sacrifice the health of the animals. For instance, farmers have bred broiler chickens for rapid growth to produce as much meat as possible. For example, “in 1925, it took 4.7 pounds of feed for a broiler to gain one pound,” while today it only requires 1.95 pounds of feed for the same result (Mason 128). Farmers breed these birds specifically for
fast muscle growth, but they are beginning to grow too fast for their own good. For females, this is particularly problematic, because they grow too quickly to be able to produce eggs at the right time. D’Silva ponders in *The Future of Animal Farming*, “How can their built-in fast-track growth rate be curbed? The answer is simple – they are semi-starved” (36).

In addition to starvation issues, broilers suffer from numerous health problems, including weak legs and an illness called “flip-over disease” caused by heart weakness (Grandin 70). Their legs experience problems because their wing and breast muscles have grown so large that they cannot handle their own weight, and according to Grandin, they are “probably in constant pain” (70). Oftentimes they experience broken legs, like the broiler chicken in the picture below (White). Further, the strain of rapid weight gain can affect their heart health and has led to a phenomenon in which they spontaneously suffer from a heart attack and “flip over” (D’Silva 70).

The pressures of rapid growth do not solely affect chickens. Ducks and geese also become victims to these issues when they are produced for patê de foie gras. Chef Dan Barber explains in his TED talk, “A Foie Gras Parable,” that foie gras is a delicacy of fattened goose liver that was invented by an ancient population of Jewish people in the Fertile Crescent (Barber). They noticed that in the fall, the geese gained weight because food was plentiful, and their engorged livers produced an unforgettable flavor. However, when the inventors of foie gras
McArdle 41

introduced it to a pharaoh in Egypt around 2500 BC, he found it irresistible and simply could not get enough. They could not make their geese grow quickly enough to produce enough liver to please the Pharaoh, so they invented the idea of “gavage” or force-feeding the geese to plump their livers (Barber).

Today, approximately 24 million ducks in the United States are bred for rapid weight gain, force-fed prior to butchering, and then devoured every year (Baur 202). Foie gras retailers in California estimate that they sell about 7,000 livers per week (“Foie Gras in”). However, many object to the idea of force-feeding animals, and in fact, foie gras was outlawed in California in 2004 and Chicago in 2006, but these laws were both overruled, because the federal government argued that federal law superseded the state laws (Fox).

In addition to the issue of force-feeding itself, ducks and geese undergo similar issues to broiler chickens in terms of rapid weight gain. The average duck liver weighs 50 grams, but for the liver to be suitable for foie gras, it has to weigh at least 300 grams (“What”). The photo below shows the difference between a normal duck liver, on the right, compared with a foie gras liver, on the left (“What”). The ducks and geese typically have difficulty walking, standing, and sometimes breathing, “as their engorged livers crowd their other internal organs” (Baur 202). For this reason, nearly 15,000 ducks and geese die each year prior to being butchered, which is one of the highest mortality rates in the factory farm industry (“Foie Gras: Delicacy”). Many animal rights and animal welfare advocates doubt that there is any humane way of producing foie gras (Baur 203).
Some of the suffering that chickens, ducks, and geese undergo also affect cows. For instance, breeding dairy cows solely for high milk production has resulted in unintentionally reinforcing leg weakness. Some estimate that as many as 30% of U.S. dairy cows are chronically lame (Rollin 12). To intensify the problem, recombinant bovine growth hormone (rBGH), an artificial hormone administered to cows to stimulate milk production, also greatly increases the cows’ chance of getting a hoof disorder called laminitis, which makes it difficult for them to stand (Baur 117).

Beef cattle also experience health problems resulting from selective breeding for size, but they do not suffer quite as badly as their dairy counterparts. What differentiates beef cattle is that they are often allowed to roam outside, as according to Rollin, “the most economically efficient way to produce cattle is to raise the mother and calf on grass…cattle have the ability to take grass and convert the energy to meat” (151). While the term “grass-fed beef” persuades consumers to believe that the cattle were treated ethically prior to butchering, Rollin points out that “most cattle eat grass at some point in their life,” and even those fed with grass may be subjected to some of the issues associated with factory farming (155).

Veal calves are also bred for rapid growth, and they suffer as a result. As Harrison explains, farmers often restrict veal calves’ movement as “food energy all goes into weight gain and none is lost in frisking or exercise of any sort” (91). Additionally, veal meat is supposed to be white, so to achieve this, farmers intentionally raise their calves so that they are anemic (94). Harrison further explains that when veal calves are born, they should have enough iron in their
livers until six weeks of age, after which a veal calf is “completely reliant on what it receives” (101). Some may argue that veal calves do not live long enough for the deprivation of a vital nutrient to matter, but from an ethical perspective, keeping these calves anemic is wrong.

On the other hand, the issues facing pigs are largely the opposite of those that chickens and cows encounter, because now consumers prefer leaner pork and bacon. What is wrong with breeding animals that are leaner and maintain a seemingly healthier weight? These pigs are much more high-strung, and scientists infer that an unintended consequence of breeding pigs for lower weight is nerve demyelination (Grandin 101). Nerve demyelination means that nerves are stripped of their myelin sheath, a fatty layer that intermittently coats the neurons to accelerate the transfer of signals from one neuron to the next. Scientists believe that this has made pigs more neurotic because it is interfering specifically with inhibitory signals – the ones that essentially calm you down (101). Additionally, Mason and Singer describe in Animal Factories how these pigs are predisposed to stress which can lead to “shock” where pigs “may literally drop dead from stress when they are weaned, moved to a new pen, mixed with strange pigs, or shipped to market” (24). This condition is aptly named “Porcine Stress Syndrome” (Baur 141).

**Reproductive Problems**

Breeding livestock in captivity not only threatens their health in terms of genetics, but it deprives them of mate choice. DeBlieu points out how “breeding is a delicate process” and “infertility can be caused as much by stress as by some physical malfunction” (105). So if using breeding techniques that violate mate choice decrease fertility, these techniques normally used to expedite the breeding process could ultimately prove to be less effective.

For instance, breeding roosters for rapid weight gain has unintended consequences. One such consequence is the deletion of the “courtship program” in nearly half of all roosters
(Grandin 69). This courtship entails performing a dance to woo the hen (69). If impressed, she will assume a position ideal for mating, but if the roosters fail to perform the dance, she will not be receptive (69). Many of the roosters are not performing the dance but still have the instinct to mate, so many of them force copulation (70). Sometimes in these struggles, the female is killed (70). Grandin emphasizes how breeders seem to forget the “basic fact of life” that if roosters killed hens in nature, there would be no more chickens (70). This serves as an example of the “warped evolution” that she describes that violates the welfare of hens.

Female livestock also suffer during artificial insemination. In general, farmers inseminate their female livestock as early as possible after the females have given birth to their offspring. In cows, farmers use a device called a “rape rack,” where the cow has her “uterus positioned via an arm up the rectum,” and then the semen can be inserted (Gruen 163). Some preliminary studies suggest that fertility actually decreases when this type of breeding occurs, which could potentially be due to the fact that it violates mate choice (69). Additionally, sometimes physical insertion of semen can permanently damage the female anatomy if performed incorrectly (Turner 40).

While some argue that this system can prevent a farm from having to own males, sometimes male animals are necessary for farmers to “detect exactly when the female is in estrus” or in heat (Sandøre 145). For some animals like pigs, this period may only last for a few minutes, so for artificial insemination to be successful, the semen must be administered during that short window. Keeping males in the vicinity can alert farmers to exactly when this is happening, as their behavior will change (145). However, if males must be present anyway, one could argue that there is no need for artificial insemination in animals that could reproduce naturally. Artificial insemination also potentially limits biodiversity if, for example, one bull is
fathering all of the calves on several farms, it will be difficult to breed those in the next generation without encountering inbreeding issues (145).

Many pigs have lost their sex drive altogether, or are too bulky to engage at all. Baur describes encountering a hog with Porcine Stress Syndrome during his schooling that was so muscular he was named “Arnold Schwarzenegger” (141). Arnold was “so high-strung that he would nearly pass out from the stress of mating,” which brings up another troubling side effect of this type of breeding (141). Grandin describes how these new lean pigs are becoming less sexual, which is alarming as sex is one of the most basic, instinctual behaviors known to animals (101). The cherry on top is that pigs are now almost entirely kept indoors which can act as a stressor and further decrease their sex drive, so oftentimes artificial insemination is the only option for breeding them (Mason 10).

**Maternal Deprivation**

While farmers can employ several methods to expedite the breeding process, oftentimes they simply do so by “separating calves, lambs, and pigs from their mothers much earlier than nature would” (Turner 47). While mammalian mothers nurse their young, they release the hormone prolactin, which also prevents ovulation (Sapolsky 132). In mammals, separating the mother from her offspring enables her to resume her normal estrus cycle because she will no longer be nursing. However, this separation from the mother can cause health problems in the young livestock just as it can with their wild counterparts. Specifically, early separation in pigs and poultry has been known to “affect the physiology of the neurotransmitters dopamine and serotonin” which are vital for regulating stress and mood (100).

Factory farming often confines sows to farrowing crates while they nurse their piglets, like the one shown in the photograph below (“Pig”). Farrowing crates prevent sows from
expressing normal behaviors like nuzzling their piglets; they are restricted to eating and nursing (Mason 11). Additionally, sows that are allowed more room typically spend much of their time during the weeks leading up to birth building a “nest” for their offspring, and they are deprived of this natural behavior when kept in farrowing crates (Baur 127). Keeping animals in these claustrophobic conditions can cause stress that “disrupt[s] normal patterns of behavior between parents and offspring” according to Mason, and may result in such problems as a sow not recognizing her piglet’s squeal and accidentally stepping on it (24). Approximately 15% of piglets in the factory farm system die, many by the unintentional foot of their own mothers (Grandin 132). Additionally, “stress and stimulus confusion can also cause mothers to abandon their offspring and to refuse to accept their suckling, or the same conditions can make the young animals unable to seek out their mothers” (Mason 24).

Calves are also particularly prone to this early separation because oftentimes the farmers want to preserve the mother cows’ milk for human consumption. Separating the calves from their mothers too early deprives them of colostrum, a special milk that cows produce for only a few hours after birth, which provides the calves with much of the immunity that they will need to
survive. Farmers feed calves a milk-like substitute, but depriving them of colostrum will predispose them to having difficulties fighting off infections later in life (Armstrong 178).

**Reduced Profitability for Farmers**

Several of these health and sexual issues actually decrease profitability for farmers. For instance, dairy cows often suffer from udder infections and lactation burnout which decrease both milk production and profitability. These cows sometimes experience mastitis, a painful and sometimes fatal infection of the mammary gland (Rollin 13). Oftentimes mastitis reduces the cows’ fertility, and they can only produce milk if they birth calves, so this reduces profitability for farmers (Baur 116). Instead of breeding healthy cows, many factory farmers dock the cows’ tails without anesthesia to try to minimize the udders’ exposure to potentially infectious manure (Rollin 13). Beyond mastitis, dairy cows often suffer from metabolic disorders like milk fever, which is caused by insufficient calcium in the blood, and ketosis, from consuming an unbalanced diet and solely high energy feed (Baur 116). The risk of these metabolic disorders increases when farmers inject the cows with rBGH, the artificial hormone that stimulates milk production (116). If a cow suffers from a metabolic disorder for too long, then this will actually prevent her from lactating. Prior to factory farming, a milk cow would produce milk for anywhere between 10 and 15 years, but today some cows experience burnout after only two lactations (Rollin 13).

Not only are these practices unhealthy for the cows, but they are economically inefficient for farmers.

Livestock bred in the factory farm system often experience health, reproductive, and parenting problems, and these issues reduce profitability for farmers. While it seems logical that farmers would make changes in their breeding habits to increase profitability, it is possible that they, like their consumers, are not as well educated on these topics as they could be. The
empirical evidence shows that livestock experience issues when forced to copulate and denied mate selection. Analyzing these issues from the three ethical lenses: the animal rights view, animal welfare view, and environmental view could provide more clarity on whether the benefits of breeding livestock in the factory farm system outweigh the costs to the individual animals.

**How do ethical viewpoints apply to captive breeding of livestock?** Many of us meat-eaters rarely stop chewing to think about where our food originates. Harrison argues that if people are not “ignorant of the processes by which food reaches their table…they find it more comfortable to forget” (36).

While many consumers lack knowledge on factory farming processes, there are others who may have misconceptions about legislation regulating farming, believing that it protects livestock more than it does. While even the Massachusetts Bay colony provided an anti-cruelty clause in “The Body of Liberties” of 1641, legislation has changed over time to make it easier to exploit farm animals (Baur 186). For a long time, the Humane Slaughter Act of 1958 was the only federal law that regulated the suffering of farm animals; however, it conveniently excluded chickens (43). Then in 1966, the federal government enacted the Animal Welfare Act to protect animals from cruelty, but farm animals were “specifically excluded” (187). Many meat-consumers may be surprised to learn about the paucity of protection awarded to farm animals.

I was stunned to recently discover that my home state of Indiana recently tried to make factory farming a constitutional right. According to the *Indy Star* article, “Is ‘right to farm’ amendment in Indiana ‘right to harm?’” all states provide some protection for the right to farm, making it difficult for animal welfare groups to sue factory farmers on the grounds of animal cruelty. This February, a group within the Indiana state senate drafted Senate Joint Resolution 12, a constitutional amendment that would further protect factory farmers by preventing the
government from restricting the types of technology farmers are allowed to use. This legislation should be known as “Right to Harm” instead of “Right to Farm” because it enables factory farmers to continue breeding unhealthy animals. The constitutional amendment was not passed, but it caused uproar among animal welfare groups (Sabalow).

Additionally, even for those who are aware of the issues facing livestock and lack of legal protections therein, some view these animals as “mere inputs” into the factory farming system (Norwood 38). For instance, the Animal Agriculture Alliance, an organization that takes an inegalitarian stand, believes that while “man has the moral obligation to avoid cruelty in dealing with all animals in all situations,” animals should not be awarded the same rights as humans as this is an “anthropomorphism” (Armstrong 191). On the other hand, Singer, an egalitarian welfarist, discusses how “81% of Americans believe farm animals have the same ability to feel pain and discomfort as humans, should we not then grant animals equal consideration as humans?” (Norwood 173). As Baur explains, “our subjective intentions regarding animals versus the objective cruelty they’re exposed to determine whether or not they are provided any humane protection,” thus oftentimes pets receive more humane care than livestock because of our relationships with the animals (189).

Animal rightists believe that livestock should not be exploited for their reproductive capabilities because there is “no benefit [that] can justify the violation of the rights of an individual” (Sandøe 24). Francione argues that it is “impossible for humans to hold animals as property and for those animals not to suffer,” so not only is breeding livestock for food wrong because of how we do it, but animal rights advocates believe there are moral wrongs inherent in the practice itself (Norwood 189). Harrison adds that “the greatest condemnation of intensive methods of animal rearing is that the animals do not live before they die, they only exist” (180).
Environmentalists also object to rapid breeding in factory farms for several reasons relating to the environment. The creation of so many animals in one location often produces incredible amounts of pollution. Estimates say that in the United States, factory farms produce over 1 million tons of manure each day (“Factory Farms”). The waste from these farms is not very well-regulated, and in fact, the waste is often stored in “huge, open-air lagoons, often as big as several football fields” (“Factory Farms”). These waste lagoons are vulnerable to leaks and spills, and in 2011, a hog farm in Illinois spilled 200,000 gallons of waste into a nearby creek, which killed over 100,000 fish (“Factory Farms”).

On the issue of mate selection specifically, some environmentalists would support it because denying reproductive autonomy negatively impacts livestock species in addition to individual animals. Current breeding practices limit genetic diversity within these livestock species, so environmentalists may actually support mate selection, even though it is a concept that typically favors individuals. However, there are others who believe that domesticating animals for pets as well as livestock is abominable because when humans exercise their power to domesticate animals it denies natural selection and evolution (Gruen 158).

My opinion is that the exploitation of livestock reproduction is ethically questionable because they are denied mate selection, a behavior that is imperative to their welfare. Because livestock express mate selection, they should be awarded reproductive autonomy. Additionally, forced copulation can result in decreased health for the animals and reduced profitability for farmers.

But do the benefits of having abundant food at low prices outweigh the costs of denying mate selection to the animals? Because animals have interests that are worth protecting, and there are numerous abhorrent outcomes that result from denying mate selection, I believe that we
should pay more to promote animal welfare and decrease our dependence on factory farms. But how much will consumers be willing to pay to ensure that animals have reproductive autonomy? The answer to that question may determine the future of the livestock industry.

**How can we solve the problems associated with breeding animals for food?**

As Mason states in *Animal Factories*, “There can be no immediate end to factory methods; it will take a patient struggle to bring sanity and humanity to farming” (129). However, by taking small steps, we can make animal farming more ethical, and through consumerism, we can reduce the need for factory farms altogether. The solutions that I see for reducing livestock suffering include outbreeding to reduce inbred health problems, possibly relying more on the pasture system or self-sustaining farming system, and sending a message through consumer choices.

**Outbreeding**

The solution to the health problems facing many farm animals is right in front of us, if we know where to look. Grandin emphasizes that “if genetic selection has produced animal welfare problems, it can also be the solution, provided that we promote the selection of good animal welfare traits alongside production traits” (85). Using genetic analysis, scientists can pinpoint which selected genes lead to unfortunate side effects. Therefore, farmers can use this information to “outbreed” rather than inbreed and choose parents that lack potentially damaging genes. For instance, scientists have found it possible through genetic selection to decrease the incidence of mastitis, so farmers can use this knowledge to minimize their cows’ risk for infection (Sandøe 323). Ultimately, this will enable farmers to profit since their cows will be able to produce ample milk without risk of infected udders (Sandøe 323). Outbreeding and genetics should be used to maximize the welfare of the animals. However, these tactics still do not generally promote mate
selection. If we can outbreed while encouraging livestock to select their own mates, this would be a compromise between solving health problems while enabling their behavioral expression.

**Pasture System**

Could a revival of the pasture system be the key to ending livestock suffering? Norwood points out that chickens kept in cage-free systems are overall healthier, but birds in the cage-system are overall more productive. Therefore, he believes that “if farm productivity served as the sole proxy for animal welfare, the cage system would appear to be a more humane egg production system” (99). However, he also explains that animal welfare “cannot be measured by the productivity and profitability of the animal alone” and other factors must be considered (103). On the surface, a reversal to the pasture system where animals have freedom to roam and select their mates sounds ideal.

But there are drawbacks to a cage-free or pasture system. For example, with all that space, farmers might put 50 chickens in the same area. This could potentially be problematic because it would be too large to establish a pecking order, as chickens usually prefer to be with a maximum of 30 for such social groups (Norwood 95). While some argue that a cage-free system would lengthen the lifespan of both broiler and egg-laying chickens, Mason argues that if we did not allow chickens to grow as much, without anything else changing, we would probably just kill more of them (5). Sandøe also provides an interesting comparison to assess whether or not the pasture system would be a good idea: “Consider which situation is worse: to miss opportunities to express normal behavior but be free from aggressive group-housed mates; or to be able to express at least some normal behavior but also be exposed to some aggression from other sows” (44).
In addition to potential issues with animal behavior, the environment would suffer. Mason argues that reverting to the pasture system “would sharply extend the deforestation, overgrazing, desertification, erosion, and other environmental damage now being caused by these livestock production methods” (Mason 136). Additionally, raising broilers without leg problems “requires utilizing less efficient birds, which means that more corn must be harvested for each pound of meat consumed, and thus more natural gas to produce more nitrogen fertilizer to apply to increased corn plantings” (200). Switching to cage-free eggs is also more expensive, and “is expected to increase the cost of retail egg production by $.35 per dozen” (Norwood 359). For this reason and many others, economists argue that alternatives to factory farming are not realistic if consumers want “comparable levels of output at similar costs” (131).

**Self-Sustaining Farms**

Numerous farms worldwide are becoming “self-sustaining,” meaning that they are breeding healthy animals and choosing mothers that have the best offspring-rearing characteristics (Turner 86). These self-sustaining farmers hope that by beginning to breed in this way, they can eventually allow animals to select their own mates, and they will be good genetic and behavioral matches (86). However, this is unrealistic in broiler chickens because “there are no existing breeds anywhere in the world which would combine production and welfare traits sufficiently well,” so for these birds breeders may have to resort to other methods to improve their welfare (90).

In his TED talk, Dan Barber provides an example of a successful self-sustaining farm that produces foie gras in Spain. He visited the farm and interviewed its owner, Eduardo, who allows his geese ample space to roam and plenty of food from the trees that grow on his land. The geese naturally consume more during the fall when vegetables are abundant, so he does not have to
force-feed them. While Barber was visiting, the geese on the farm called to a flock of wild geese flying over them. Barber was astonished to witness the wild flock land on the farm, and Eduardo explained to him that wild geese join the captive ones, breed with them, and feast on the plentiful food on the farm. Thus, his incredible flock of foie-gras geese is self-sustaining, which proves that such a system is possible. Barber poignantly ends his talk by saying, “The most ecological choice for food is the most ethical choice for food, and it’s also almost always the most delicious choice” (Barber).

**Consumer Choices**

Current livestock breeding practices pose ethical issues, and one of the ways to combat these issues is to reduce the demand for animal products. Many people in the United States who learn about factory farming promote vegetarianism both for animal welfare and environmental reasons. But as Kathy Rudy argues in *Loving Animals: Toward a New Animal Advocacy*, “by sanctioning a plant-only lifestyle…animal rightists are not only endorsing a world without animals, they are forcing farmers to use chemical fertilizers to replace manure for soil nutrition” (100). While vegetarianism at first seems like an excellent environmental choice, there may be some drawbacks inherent in the practice.

Additionally, if you are like me, you feel torn because you enjoy consuming animal products but want to protect the animals’ welfare. You can do so without cutting out animal products completely, as many non-vegetarians are eating less meat through “Meatless Mondays” or becoming “Week-Day Vegetarians.” If you cannot cut out meat or dairy at all, then you can become a “locavore” by shopping at local food markets where you know exactly where your
animal products originate. Further, there is a private organization called Animal Welfare Approved that labels food products only produced in humane ways (“Animal”). They have the strictest guidelines of any food program in the United States, including qualifications like requiring animals to be raised on a pasture and prohibiting products from animals that were cloned or bred using embryo transfer (“Animal”). Additionally, the program excludes farms that have overselected animals for certain traits (“Animal”). However, they allow artificial insemination, and they do not mention mate selection (“Animal”). Is it possible to develop a similar system that also incentivizes farmers to give their livestock greater reproductive autonomy?

The Good Breeding Seal of Approval

Norwood advocates for letting the market “control how farm animals are raised” through your purchases (5). If, for instance, more consumers buy cage-free eggs than the other eggs, “the grocery stores will respond by asking farmers to supply more cage-free eggs” (47). How can we ensure that we are making ethical food choices? While it would be ideal for everyone to become “locavores,” some consumers simply do not have that option. Additionally, is there any way for consumers to know if their food products come from farms that allowed their livestock to select their mates?

One option would be to rely on referrals from a private organization for grocery stores, farmer’s markets, and butcher shops that obtain their animal products from farms that breed animals ethically. Based on the concept of the “Good Housekeeping Seal of Approval,” collaborative advisory committees of veterinarians, scientists, and farmers could refer consumers to businesses that sell animal products only produced by ethical breeders. These advisory
committees could develop expertise different kinds of animal products and only endorse breeders who create healthy animals. The organization could also give a “Gold Star” rating to farmers that allow their animals to select their mates. The advisory teams could create a website like Angie’s List to interact with consumers. The combination of an advisory group and increased education for breeders and consumers alike could help improve the welfare of the animals being produced for meat and dairy.

Overall, progress is being made. Baur points out that the supply of eggs has exceeded demand, which caused the egg industry to “provide layer hens with more space” (194). Legislation is also changing. For example, Baur explains that “in 1996, the New Jersey state legislature amended [their] anticruelty statue to require the state department of agriculture to draft and adopt humane standards for the treatment of domestic livestock” (201). Consumers are clearly making a statement through their choices, as the “locavore” movement is gaining momentum (Rudy 74). Essential to this forward progression is the continued awareness of the ethical issues facing livestock and how individual choices can help define standards for farming. Baur offers a useful sentiment for thinking about eating: “Learn from cows: chew your food carefully, ruminate, and experience what you’re eating” (220). Doing so may make you think differently about your food choices.
Chapter 5: Captive Breeding of Domesticated Pets

What is the history of breeding pets in captivity, and why is the practice necessary? While original estimates claimed that dogs have been domesticated for 12,000 years, recent canid mitochondrial DNA shows that there may have been “a more distant split between ancestral wolves and dogs…as long as 145,000 years ago” (Gruen 10). Cats, on the other hand, were domesticated more recently. Ancient Egyptian hieroglyphs suggest that cats became domesticated around 5,000 years ago (“Science of Cats”). With both species, they must have adapted a “fear threshold,” giving them the courage to approach humans, and then humans saw the potential benefit of using them for herding, guarding, hunting, pest control, and for companionship (Gruen 11). In fact, anthropologist Pat Shipman has proposed a theory explaining why early humans prevailed and Neanderthals became extinction: humans used dogs as tools to help in their daily lives, while Neanderthals did not (Lester 3).
Today, we commonly breed dogs and cats for companionship, to provide services like guiding the blind, and also for show (Gruen 11). The American Pet Products Association estimates that 68% of American households have pets, including over 83 million dogs and 95 million cats (2). While pet ownership has expanded beyond just dogs and cats, in my opinion, they are the most relevant in the discussion of captive breeding because of our obsession with pedigrees. For instance, 80% of the canine breeds that exist today were not in existence 130 years ago, and similar estimates exist for cats (“Science of Dogs”). During the 19th century, creating breeds became a hobby for middle class civilians, which explains this growth in the number of breeds (“Science of Dogs”). Breeding clubs formed, such as the American Kennel Club for dogs and the Cat Fanciers Association for cats. These organizations established “breed standards,” detailing how each breed should appear and behave.

Since then, keeping pets has become a way of life for many Americans. As Kathy Rudy says in *Loving Animals: Toward a New Animal Advocacy*, “Many of us who live with [pets] as central parts of our lives would largely agree that we don’t ‘own’ [them] in any traditional sense” (31). For many of us, our pets are a part of our family.

People keep pets for a variety of reasons, including entertainment, but also to help raise children and teach them responsibility, and sometimes for assistance if they are blind, disabled, or suffer from post-traumatic stress disorder (123). Recently, research has explored the human-animal bond, which has important implications for the health and wellbeing of both humans and pets (“Human”). Animal rightists, animal welfarists, and environmentalists will likely disagree on the ethics of keeping animals as pets, but because we have domesticated them, there is no hope for liberating them. Our pets depend on us, and often, we depend on them.
**What are the methods used to breed pets?** The spectrum of pet breeders ranges from responsible breeders to backyard breeders and puppy millers. While most cat and dog breeders allow their animals to mate in the “traditional way,” the breeders often decide who will parent offspring, which violates mate choice. However, occasionally breeders employ artificial insemination and cloning.

**Responsible Breeders**

Responsible breeders keep track of their animals’ genetic histories, educate themselves on pets’ natural sexual behavior, and find responsible owners for their litters (Rudy 54). However, often responsible breeders select which animals to breed based on the “breed standard” established by the American Kennel Club (AKC) and Cat Fancier’s Association (CFA). Unfortunately, sometimes even the more responsible breeders inbreed their pets to achieve the standard.

**Puppy Mills**

Puppy mills are “breeding facilities where sometimes hundreds of dogs are kept in small cages; these dogs literally live in their own waste their entire lives and are forced to produce litter after litter of puppies to be sold in stores or over the internet” (Rudy 53). The American Society for the Prevention of Cruelty to Animals characterizes these facilities as ones that breed multiple types of dogs and do not screen potential buyers (“Puppy”). Oftentimes the dogs are kept in squalor, are completely inbred, and are ridden with illnesses (“Puppy”). The exact number of puppy mills in the United States is a mystery, because they often fail to register with
the government, which is required by law (Hamilton). However, each year the government reports hundreds of violations to the Animal Welfare Act committed by puppy mills (Hamilton).

Oftentimes consumers shopping at pet stores are unaware that their dog or cat came from a puppy mill. According to Ed Sayres, former president of the American Society for the Prevention of Cruelty to Animals, “No pet store will tell you that its puppies come from a puppy mill, but these animals are commercially exploited to generate the highest amount of profit at the lowest possible cost” (Hamilton). The main difference between breeding in puppy mills and individual breeders is that the last thing on puppy mill breeders’ mind is the welfare of the dogs they are breeding.

**Backyard Breeders**

Backyard breeders are typically looking to make money, so they do so by breeding their pets (55). However, sometimes backyard breeders unintentionally breed their pets by failing to spay or neuter them and allowing them to find mates when they go outside. While this is a great exercise of mate selection, if the breeders cannot find good homes for the animals, then this can be ethically problematic. The public does not typically view backyard breeders with the same malice as puppy millers, but these breeders oftentimes are uninformed about the genetics of the animals they are breeding or about how to breed safely and humanely.

Some dog breeders even use artificial insemination to produce purebreds, and their excuse is that it is necessary to improve the gene pool of inbred pets (Turner 123). Not only is this practice preventing their pets from expressing mate selection, but in some cases it may be deadly. For instance, Turner describes a female Bulldog who was artificially inseminated. During the process, she struggled, so the breeders further restrained her, and she suffocated to death (14). The AKC encourages the use of artificial insemination, providing tips for breeders
like “holding the bitch in the proper position by her legs” or using straps and “assisting” males (Adams 14). This greater breeding control sacrifices the health and violates the mate selection of the pets involved.

**Cloning?**

A few pet owners have successfully produced animals using cloning. The Genetics Savings and Clone will clone your pets, for the right price. Currently, the price of cloning a pet is $250,000 (Klotzko 170). A famous pet cloning case is the “Missyplicity Project,” in which a dog named Missy was cloned because her owners wanted to create a new Missy when the old one died (170). However, as Klotzko emphasizes in *The Cloning Sourcebook*, “cloning cannot bring back a lost dog” (170). While Missy’s family created a dog with the same genome as their previous pet, she may not have had the same personality (170). Some people question the ethics of the Missyplicity project, and Klotzko outlines a paradox intrinsic in the concept: “Its rich benefactor has asked that scientist employ a technique that many see as a threat to uniqueness in a futile quest to perpetuate a unique life by reconstructing a new dog” (171).

**What are the problems associated with breeding dogs and cats in captivity?**

Two of the main issues associated with breeding pets are the breed-specific disorders that they often inherit and the lack of mate selection in breeding purebreds. While responsible breeders keep track of their pets’ genetic histories, sometimes they commit these problems when conforming to breed standards. As Gruen describes in *The Ethics of Captivity*, “those breed members unlucky enough to be the genetic inheritors of these conditions are held captive by their own bodies. Humans have enabled this unfortunate circumstance” (13). Breeders often unintentionally sacrifice the health and wellbeing of their pets to meet breed standards.

**Health Problems**
According to Turner, mating of “first cousin” and “half sibling” dogs and cats has become the norm, and this inbreeding can lead to the magnification of negative genetic traits, especially breed-specific disorders (117). In the 1990s, it was estimated that 1 in 4 dogs had an inherited disorder (127). While the number of dogs and cats with these disorders has likely decreased in the last 25 years, the problem still prevails in certain breeds. Humans increased the likelihood of their pets inheriting these disorders when inbreeding and only focusing on certain physical and behavioral traits. Originally, this occurred when breeding pets for show, but many companion animals carry the same disorders because those breeding animals for companions often have used the same single-trait selective breeding techniques. Such disorders include joint problems, eye and skin maladies, and breathing issues. For instance, the Bulldog is known as a brachycephalic dog, meaning that it was bred for a short skull. These dogs have difficulty breathing as a result of the short skull that was selected over several generations of breeding. The graphic below compares the Bulldog of today with the Bulldog of the 1800s and how breeding has magnified deformations (“Blackskull”).
Cats also suffer from breed-specific disorders. For example, the ever-popular Siamese cat is extremely prone to eye issues, especially glaucoma; the Persian is predisposed for kidney disease, and the Maine Coon is likely to inherit hemophilia (142). Hairless Sphynx cats like the one seen below are vulnerable to skin ailments and must be kept indoors (“Inbreeding”). Because it required so much inbreeding to make them hairless, more inherited disorders are being discovered in these cats (“Inbreeding”). These issues can occur naturally in these animals, but humans have increased the chances of their pets inheriting these disorders.

![Sphynx cat](image)

**Violation of Mate Selection**

Do pets exhibit mate choice? According to Turner, “little is known about the natural mating behavior of dogs, but it has definitely been bred out of them” (117). However, wild dogs clearly exhibit mate selection, and if allowed, domestic dogs will too (Cafazzo 1). For example, my friend Megan’s family wanted to breed their Labrador retriever, Sadie, with a champion male, so they left them alone together on several occasions. However, one day Megan’s mother was watching a neighbor’s male Lab and had to leave him with Sadie briefly. A few weeks later,
the family discovered that Sadie was pregnant. When she gave birth, some of the puppies were chocolate labs, which the family knew that the champion male could not sire, so they had to genetically test each puppy to ensure who was the father for each. It turned out that the friends’ dog was the father of each puppy, and Sadie exhibited mate selection.

Domesticated cats also exhibit mate selection, which can be seen in outdoor cats. However, in one study, even female indoor cats exhibited mate selection in a pattern that the scientists interpreted as “incest avoidance,” contrary to how we have bred them (Liberg 1). Scientists have noted that female felines tend to mate with males that are larger, although it is unclear if this is because the females favor larger males or if these males have a more conducive stature for copulation (1). Additionally, they tend to choose males with whom they are familiar (1). It would therefore appear as if natural mate selection in cats tends towards outbreeding rather than inbreeding which humans have commonly used to maintain breed standards.

The issues facing breeding cats and dogs are similar to those seen in breeding livestock. Because of our obsession with pedigrees, many breeders have utilized single-trait selective breeding, choosing animals to breed only based on appearance or behavior. Sometimes this leads to inbreeding, which increases the animals’ vulnerability to hereditary disorders. Additionally, breeding dogs and cats in the last century has largely denied these animals’ reproductive autonomy. Examining these issues from the three ethical perspectives introduced in Chapter 2 helps assess the ethics of captive breeding of pets.

**How do the three ethical viewpoints apply to captive breeding of pets?** The ethical viewpoints outlined in Chapter 2 offer somewhat contrasting views on the ethics of breeding pets in captivity. According to the animal welfare view, humans should be able to breed and use pets for our purposes, but animals should have their “interests satisfied,” including their
health and wellbeing (Gruen 146). However, according to inegalitarian welfarists, “there might be good reason to be conscious about breeding dogs that carry heritable diseases if these diseases will, in the end, have a negative effect on dog owners in terms of emotional, practical, or financial burden” (Sandøe 148). This view points out that continuously breeding dogs with inherited diseases may render them unmarketable, and they may ultimately just be given to shelters. On the other hand, from an egalitarian welfarist perspective, there is “nothing inherently problematic about breeding or engineering animals as long as this is done with a view to maintaining or enhancing welfare” (149). These views converge on the fact that continuously breeding animals with inherited disorders is clearly problematic, but for different reasons.

Alternatively, the animal rights view often proposes that keeping pets is problematic because they are “forced to conform to our practices” and are intentionally bred to depend on us (Gruen 156). Francione, an avid rightist, believes that because domesticated animals have been bred to have “characteristics that are actually harmful to them but are pleasing to us,” and domesticated animals should eventually be “phased out of existence” (162). Other animal rights advocates perpetuate the motto: “Don’t breed or buy while millions die,” referring to the millions of pets kept in animal shelters, often who have to be euthanized due to lack of space and resources (Rudy 51).

Interestingly, Sue Donaldson and Will Kymlicka have devised a politically-based animal rights view in their book, Zoopolis. They disagree with the mainstream view of animal rights because they think they “invoke incorrect, or overly narrow basis for categorizing human-animal relationships” and believe that pets should be “awarded rights of citizenship” because of how “they have been bred over generations for interdependence with humans” (Donaldson 6-7). The rights of citizenship extend beyond rights awarded to sentient beings, and such rights include
avoiding creating animals through “harmful” breeding practices that result in health conditions or behavioral issues (175). Through this point of view, humans can continue breeding pets if they allow for more mate selection and try to improve the health of the offspring by avoiding mating carriers of disorders.

Conversely, some environmentalists argue that domesticated animals are “unnatural, lack integrity, and should be eliminated” because they violate the ideas of evolution and natural selection (Gruen 158). Through the domestication process, humans have “transformed natural entities into artifacts,” so some believe that breeding of domesticated animals should be eradicated (158). However, there are some environmentalists that do not ascribe to such extreme views. For instance, environmentalist Stephen Budiansky believes that it is possible that “domestication involved a cooperative evolution of our species in a mutual strategy for survival” (159). Some animals are opportunistic and may have sought out human civilizations for better chances of surviving. Based on this view, domestication was not a “process dominated by humans and imposed upon animals. Rather the process of neotenization began quite naturally because of evolutionary pressures, and has been furthered through selective breeding by humans” (160). However, we have now taken this process into our own hands and oftentimes violate our pets’ health and wellbeing with our current breeding practices.

As a proponent of pet ownership, my view is that for a short period of time, our focus should be on eliminating or at least minimizing breed specific disorders, because continuously breeding defective animals is wrong. After we have accomplished that goal, our next objective should be increasing pets’ reproductive autonomy, because in my opinion it is a natural behavior that we have denied. However, there are issues with this concept that I will elaborate on in the next section.
Examining various ethical perspectives on captive breeding makes me ponder, would it be ethical to domesticate other wild canine or feline species to produce more pets? For instance, the National Geographic article, “Taming the Wild,” describes a domestication project involving foxes. The project began during World War II in Russia, although at the time it was underground and secretive (Ratliff 41). Biologist Dmitry Belyaev is currently the director of the project at the Institute of Cytology and Genetics, and he explains that the project is designed to study the domestication process that wolves underwent to become dogs. The scientists involved in the process have selected the friendliest foxes and bred them over several generations, producing incredibly outgoing foxes that exhibit behaviors like “whining and wagging their tails – traits not naturally attributed to foxes” (42).

Additionally, after only nine generations, the domestication process has physically manifested itself in the form of floppy ears and curly tails – traits that are much more dog-like than what wolves and foxes have (42). Scientists are currently searching for the genes that control the changes that occur during the domestication process, and this study with foxes provides great insight into that endeavor (45). Some progress has been made in that regard, as one scientist named Leif Andersson found a mutation in chickens called TSHR that is not found in wild fowl (51). Andersson predicts that this mutation controls hens’ reproductive cycles, enabling them to breed more frequently than their wild counterparts – “a trait early farmers would have been eager to perpetuate” (52). It turns out that this same type of mutation is found in dogs (53).

For the sake of science, the project provides greater insight into the history and process of domesticating wild animals. However, the three main ethical perspectives introduced in Chapter 2 would agree that the project should probably end there. Capturing wild animals for pets or
trying to commercially domesticate foxes would cause many ethical issues, such as lack of mate choice and removing more animals from the wild, which could contribute to the dwindling populations discussed in Chapter 3.

**How can we ameliorate the ethical issues associated with captive breeding in pets?** Inherited disorders and mate selection are the main issues affecting pets bred in captivity. While solutions to these problems exist, they are somewhat conflicting, because initially breeding purebreds for better health may require sacrificing mate selection. Increasing the education of breeders and either requiring licensure or developing breeding advisory committees could potentially ameliorate some of the issues associated with the captive breeding of pets.

**Short-Term Selective Breeding**

Since we have divided domesticated pets into breeds and know so much about their genetics, it is easier to identify a faulty gene, so the problem we have created in increasing our animals’ vulnerability to inherited disorders may actually contribute to the solution (“Science of Dogs”). According to Turner, ideally, the solution to inherited disorders would be selective outbreeding to “remove genetic problems and anatomical deformities” (144). Selective breeding would entail breeding only individuals that do not carry genetic disorders or outbreeding by crossing different breeds (147). This would require testing all parental dogs for disorders and would also limit the number of dogs and cats that could be bred (145). However, many breeders may object to these ideas since they would potentially violate breed purity. But, “breeds exist for the benefit of humans, not animals,” so in the animals’ best interest, it is better to outbreed and sacrifice that breed purity for a few generations (149).

Thus far, this method has proven successful in several breeds, but particularly in Dalmatians. As Genevieve Rajewski describes in "Doggone DNA - Inherited Health Problems in
Pets,” some Dalmatians carry an abnormal gene that renders them unable to metabolize uric acid, which if left untreated can lead to painful bladder stones (Rajewski 12). The gene that controls Dalmatians’ spots resides near that faulty gene (12). Eventually, “the Dalmatian completely lost the normal version of the gene responsible for uric acid metabolism” so during the 1970s, the Dalmatian Club of America mated a Dalmatian with a Pointer to reintroduce the normal gene to Dalmatians. “The spots of the first generation were poor, but now, after more than 10 generations of mating their offspring with Dalmatians, the breed has perfect spots and can once again metabolize uric acid” (13). These Dalmatians serve an example of how selective breeding can be used to eradicate unwanted mutations. However, while this type of breeding is great for improving the genetics of the breed, it still does not enable the animals to exhibit their natural sexual behavior.

**Increasing Reproductive Autonomy**

If humans never inhibited their pets’ reproductive autonomy, perhaps many of the disorders encountered today could have been prevented. However, many of the breeds of dogs and cats we have today would not exist, if any breeds would exist at all. There is certainly going to be a tradeoff between selecting animals to breed to reduce the likelihood of passing on inherited disorders and enabling the animals to exhibit their natural sexual behavior.

However, I predict that there would be some objections to enabling dogs and cats to breed freely, as this would eventually eradicate breeds and solely produce mixed breeds, and there may be so many pets produced that even more animals must enter shelters. Do the benefits of owning purebreds outweigh the costs to the individual animals that are often forced to breed to produce those pedigrees? To phrase the question slightly differently, I would ask, what would happen if the world was full of mixed breed dogs and cats? These animals would have a much
lower risk of inheriting a genetic disorder due to the fact that their parents were different breeds. But in modern society, many pet owners crave the predictability in temperament that breeds grant us. By the sheer fact that many pet owners prefer purebred animals, allowing dogs and cats to be able to choose their mates may not be practical. Then there is the issue of rampant animal copulation producing dozens of puppies and kittens. Would there be enough homes for them? Currently, animal shelters in the United States take in at least 6 million animals annually, so if dogs and cats bred at will, then perhaps this number would increase (Turner 194).

For pet owners who do not want the additional responsibility of owning and raising puppies and kittens, they could spay and neuter their pets. However, the concept of neutering violates mate selection by completely removing an animal’s ability to reproduce. As Gruen argues in *The Ethics of Captivity*, spaying and neutering “reflects not only a national policy to prevent unwanted animal births but also a national aversion to dog sexual practices” (17). However, the welfare view argues that it is ethical because it prevents unwanted behaviors that may make owners move their animals to a shelter and prevents the creation of more animals that also may end up in shelters (Sandoe 113). After all, the colloquial term for the surgery is “fixing,” so one way to fix the problem of excess pets in shelters would be through neutering. Therefore, neutering likely will continue to be a common practice, and one that will hopefully keep pets off of the streets.

Spaying and neutering can also reduce the risk of pets developing sex-related diseases later in life. Female cats and dogs that are not spayed may experience breast cancer, and the incidence of pyometra, a uterine infection, “approaches 66% in older unspayed females” (“Pediatric”). Male pets have an increased risk of testicular cancer and prostate issues if they are not neutered (“Why”). Additionally, many pet owners often prefer spayed and neutered animals
to prevent behavioral issues like males marking their territory and females attracting other neighborhood pets (Rudy 51).

Scientists are making strides in better understanding breed-specific disorders, trying to eliminate and prevent them. Both breeders and pet owners alike need to be more educated about these disorders and about breeding habits in pets in general. But the tactics we currently use to minimize the spread of these disorders violate mate selection. However, if we allow pets to exhibit their natural behavior, we may create many mixed breed animals, which may not be as marketable. Some owners would not like them if they prefer the behavioral predictability associated with purebreds. For those that do not care as much about breeds, adopting mixed breeds from shelters is a great option. Millions of animals are living in shelters waiting for a suitable home, and focusing on finding homes for them before breeding more pets will likely help some of the problems discussed here. By minimizing the risk of spreading inherited disorders, maximizing our pets’ ability to select their mates, and adopting from shelters, we will optimize the welfare of our pets.

**Licensing Breeders**

Nearly anyone can breed dogs and cats. The United States federal government and many state legislatures have laws pertaining to certification of pet sellers, but many of these are vague or may not be fully enforced. While the goal of these laws is often to prevent puppy mills from subjecting animals to cruel conditions, they fail to address how individual breeders can harm animals through inbreeding. It is also useful to discuss the American Kennel Club’s requirements for licensure as a comparison.

The Animal and Plant Health Inspection Service (APHIS) under the USDA performs unannounced inspections on breeding operations that sell their animals to pet stores or research
facilities. In order for these facilities to be able to sell their animals, they need to be licensed. The qualifications for a breeding facility to gain licensure are rather vague, however. The USDA’s goal is to bring all of these breeders under the Animal Welfare Act in order to protect the animals they breed. However, the USDA’s jurisdiction under the Animal Welfare Act is somewhat limited, because according to the APHIS’s 2014 fact sheet, “the Animal Welfare Act does not cover all animals in all situations, including household pets sold face-to-face at retail, pets owned by individuals, and pets housed in shelters or pounds.” APHIS explains on its website that breeding facilities must follow the Animal Welfare Act in order to gain licensure and the regulations cover “areas such as housing, sanitation, food, water, and protection against extremes of weather and temperature” (“Questions”). There is no mention about specific breeding practices or inbreeding.

Each year, the American Kennel Club and the Cat Fanciers Association register well over a million pets whose breeders can genetically verify that their animals meet a breed standard (Hamilton). While they often use DNA profiles for this purpose, the profiles are solely used to prove that the animal is purebred, not for diagnosing breed-specific disorders (“DNA”). While the American Kennel Club encourages breeders to educate themselves on the breed standard, the majority of their education is self-learning. The AKC advocates “breeding for improvement” which is a vague concept that essentially means choosing mates that complement each other and do not carry hereditary disorders (“DNA”). The AKC provides tips for breeders who will be using “natural” breeding and artificial selection (“DNA”). However, on their website they do not mention what “natural” breeding entails, nor do they prohibit breeders from inbreeding to maintain the breed standard.
State regulations on pet breeders vary. In the state of Indiana, laws only apply to larger breeding operations containing at least 20 females that have not been spayed, but do not apply to “humane societies, rescue groups, certain service and hunting dog breeders, foster homes or hobby breeders” (“Commercial”). The laws they mandate for large breeding operations include things like housing and exercise requirements. However, it does not mention specific breeding techniques or breeder education.

If the government required licensure for all breeders, regardless of size of the breeding operation, and increased education was a requirement for licensure, would dogs and cats experience fewer issues related to breeding? It definitely could reduce some of the issues associated with breeding pets. If more breeders were educated on how to make healthy animals and what their breeding behavior entails, perhaps more breeders would allow mate selection. If we educate pet owners on these issues, then perhaps they will only purchase animals from reliable, licensed breeders who produce healthy animals. However, there may be some issues with government licensure of breeders. Licensing breeders could potentially restrict competition between breeders and increase prices for pets. If this trend continued, eventually fewer people would own pets.

**The Good Breeding Seal of Approval, Revisited**

A different option for solving some of the problems associated with breeding pets would be to rely on The Good Breeding Seal of Approval advisory teams, like with livestock, rather than relying on government licensure. There could be a sector of the organization that would consist of veterinarians, scientists, and breed experts who would refer potential pet owners to breeders who only use ethical breeding techniques. These advisory committees could develop a reputation for expertise for different kinds of pets and enable consumers to only transact with
appropriately educated breeders. Similar to the livestock sector of the organization, the pet sector could also incentivize breeders to encourage mate selection by awarding breeders a “Gold Star” rating for their efforts.

The advisory committees could also potentially eradicate puppy mills and similar unethical breeding institutions by promoting ethical consumer choices. If a puppy mill does not receive the Good Breeding Seal of Approval, then fewer consumers will purchase their pets there. Same goes for pet shops that receive their animals from puppy mills.

The AKC and CFA have a similar concept to The Good Breeding Seal of Approval called a referral club. If a potential pet owner is interested in purchasing a particular breed of dog or cat, the AKC or CFA can refer them to a specific breeder who registers purebreds within that breed. However, the AKC and CFA’s referral websites do not specify any more qualifications for what qualifications those breeders must meet. My concern is that some breeders in the directories may be inbreeding their animals in order to maintain the breed standard. The Good Breeding Seal of Approval would avoid this issue by having experts who can recognize breeders that do such things.

While the various solutions proposed in this section are all somewhat realistic, they are not all equally feasible. For instance, solving the problem of the incidence of hereditary disorders is quite feasible. Scientists possess the genetics knowledge to be able to outbreed animals for better health and decreased risk of genetic disorders. If commercial breeders learn about this issue and how to ameliorate it, then they can adopt those practices as well.

However, increasing reproductive autonomy in general is not as feasible if consumers want purebreds. Additionally, unrestricted reproductive autonomy would mean that owners would not spay or neuter their pets. This could lead to uncontrollable growth of the pet
population and potentially harmful side effects for the animals being bred. However, if a breeder has a female that she wants to breed while allowing mate selection, one option would be for her to find several “suitors” that would be appropriate to breed with the female and allow the female to choose from those. While this concept still restricts reproductive autonomy, it is one way that breeders could increase their animals’ ability to choose.

Licensing breeders could be a fairly feasible solution, as long as governing bodies are in agreement about the types of qualifications that breeders need to meet. The government, AKC or CFA would also need to enforce their rules by periodically inspecting breeders’ facilities and punishing those who do not follow the rules. While enforcing rules may be somewhat easy to do with large breeding operations like puppy mills, it may be more difficult with thousands of individual breeders. Additionally, licensing breeders through the government may result in increased prices of pets, because fewer breeds would be able to attain licensure. Perhaps a better solution would be to form advisory committees in a private organization like “The Good Breeding Seal of Approval,” where collaborative groups could rate breeders based upon their ethics.

Pets experience issues related to health and reproduction when humans breed them for our purposes. Denying mate selection inhibits their ability to express their natural behavior, a component of animal welfare. But does having predictability in pet breeds outweigh the costs to the individual animal? Because we breed animals largely for companionship, many consumers believe that the predictability of purebreds outweighs the costs to the individual animal. However, there are also some pet owners that are educated about breed-specific disorders, so they would want a compromise between predictability and health. Thus, education will be the
key to increasing welfare for pets. By educating breeders and owners alike, we have a hope for minimizing their risk for hereditary disorders and increasing their reproductive autonomy.
Chapter 6 Conclusions

Humans have incredibly different relationships with zoo animals, livestock, and pets, which are reflected in our differing purposes for breeding them. However, what connects these groups is how we control their breeding from conception to rearing of their young, oftentimes for our own benefit. While the denial of mate selection in these groups of animals connect them, it is important to reflect on the reasons why we often deny this behavior. Exploring these issues through various ethical perspectives and performing cost-benefit analysis for each type of animal is necessary to adequately assess if our current breeding practices should continue or should be altered to allow for more mate selection.

Although some may argue that the efforts being made to increase the genetic diversity of wild animal species is the most noble of all the breeding projects considered here, DeBlieu argues in *Meant to Be Wild*, “The predominant goal of [captive breeding] programs is not to restore animal populations to their original conditions but to reshape them so they can exist in a thickly populated, heavily developed, economically expanding nation” (166). Our breeding efforts, while meant to improve their populations, in the end benefit us also by providing us animals for zoos. Unless captive breeding practices change, zoo animals will still experience lack of mate choice and loss of survival skills, risk inbreeding with others or losing their lives all too soon because they are considered surplus. But mate selection may not actually be a realistic solution for zoo animals due to their varying social structures and the zoos’ limited resources.

Livestock experience many issues associated with our breeding practices including inherited disorders, forced copulation, and the inability for mothers to interact properly with their offspring. These issues also often threaten farmers’ profitability. Increasing education about these issues will enable farmers to breed their animals ethically and consumers to make informed
choices. This can easily be accomplished through The Good Breeding Seal of Approval advisory committees.

With pets, the breeding methods used to create pedigrees make them vulnerable to diseases and also limit their ability to express mate selection. There are many breeders in the United States who are uneducated about their pets’ instinctual mating behavior as well as their pets’ vulnerability to inherited disorders. Again, education in the form of increasing laws for breeders and license requirements could change breeding practices in pets, or another sector of The Good Breeding Seal of Approval could help advise pet owners about where to purchase their pets.

As humans, we have dominion over other species and the power to breed them according to our will. But as Sandøe ponders, “Who are we to decide what kinds of animals are going to exist in the future?” (138). While environmentalists, animal rightists, and animal welfarists disagree on the ethics of captive breeding, a combination of the three provides an interesting, confounding, and sometimes contradictory analysis of our captive breeding techniques, or ones that could be implemented in the future. The environmentalists propose that we take a step back from our position of rulers of the ecosystem and instead act as members of ecosystems. Animal rightists promote the argument that because animals have inherent value outside of the value that humans give them, we should not use them or breed them for our purposes. Both inegalitarian and egalitarian welfarists argue that some breeding situations are justifiable, but animal welfare still needs to be considered. Since these views do not exist in perfect harmony, which view should we live by?

The most realistic view to apply to our daily lives is the one that I try to live by, the inegalitarian welfare view. This view enables us to use animals for our purposes, but we cannot
harm animals or hinder them from fulfilling their natural behaviors. Michael W. Fox proposes an eloquent sentiment about allowing animals the autonomy to exhibit their natural behaviors in *On the Fifth Day: Animal Rights & Human Ethics*: “If a human has a natural right, by virtue of his very being, to be free to seek self-actualization in an optimal environment, then surely this right should be accorded to all other living creatures” (Morris 118).

We deprive animals in all three of these groups of mate choice, which hinders their autonomy. However, many argue that mate selection often must be sacrificed to save the rhino population, to provide food for the masses, or to improve the health of a pet pedigree. These are great goals, but the ends may not always justify the means. In the case of the environment, the extinction of species would be a great loss to humanity, so captive breeding programs should continue to help foster genetically diverse populations, even if it means sometimes sacrificing mate selection. As for food, the way that we breed livestock is not necessary, nor is it highly profitable for farmers or ethical for the animals involved. By increasing education about breeding livestock, we can improve the lot for these animals. Mate selection may not be implemented on every farm, but sending a message through the market may increase the frequency with which farmers use this breeding strategy. For pets, it is difficult to incorporate mate selection and produce pets with predictable temperaments. Additionally, the alternative may mean producing animals that would wind up in animal shelters. But increasing education for pet owners and breeders alike may cause some breeders to rely more on mate selection and for owners to look for this when purchasing pets.

Through this project, I wanted to explore captive breeding practices used in zoo animals, livestock, and pets, and learn more about the ethical debates surrounding those practices. However, I also had an ulterior motive when I began this endeavor. As I mentioned in my
introduction, I am an aspiring veterinarian. Thus far, my animal experiences have been limited to domesticated animals. By researching breeding practices in zoo animals and livestock, I also wanted to see if I would potentially want to work with these animals in the future as a vet. What I discovered was that oftentimes veterinarians help artificially inseminate these animals, and I have somewhat mixed feelings about the practice, so I am unsure if I would feel comfortable performing it. However, one could argue that even working with small, domesticated animals would create a similar ethical issue. Most pet breeders choose which animals their pet will breed with, and those who do not breed their pets spay or neuter them. Is it really more ethical for me to work with small animals than the other groups, especially if they all have limited mate selection?

The key here is educating my clients, whether they are pet owners, livestock farmers, or zookeepers. Many books and articles abound about captive breeding, especially with wild animals, but the public needs to be more educated about how their choices each and every day affect the lives of animals. Both breeders and consumers need to understand how their choices may hinder the natural behavior of their animals. Mate selection serves as an excellent and confounding application of one of these behaviors, but it is important to question if the situations we place animals in affect their ability to express other natural behaviors as well. I plan on sharing what I have learned with my friends, family, fellow students, and eventually my future clients, so they can make informed decisions about purchasing and breeding their pets, where to buy their meat, and how to prevent habitat destruction. I want to act as a catalyst for animal welfare, regardless of the species.

Since humans coexist with animals, we have the power to harm and help them. What I have learned through this research process is that we need to speak up for those who cannot
speak for themselves and help ensure that they are treated ethically. Especially since we will likely continue using them for our purposes, it is important to do what we can to respect them and maximize their welfare. Lisa Kemmerer in *Sister Species: Women, Animals, and Social Justice* explains why animals are so important in our lives, and why we need to continue learning about the issues facing them:

“We count on animals to remind us of our ability to give and receive compassion and love – across boundaries, beyond language, in spite of our own undeserved power, and in the face of our dizzying mortality and isolated inner lives. We rely on animals to crack open our hearts to allow for the possibility of relationship, the Oneness of Beings, and the flood of healing that our species so desperately needs” (126).

By reflecting on our individual choices and educating those around us about the issues facing the animals we breed, we can begin to revolutionize captive breeding, making it more ethical for the animals involved. Small steps can eventually lead to larger changes. Conserving resources and recycling, being cautious of where we buy our meat and dairy, and adopting pets from humane societies are examples of small things we can do to improve the conditions for animals. Through these actions, each day, we can learn how to live in harmony with our fellow species.
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