CLIMATE INDUCED MIGRATION:
A PRAGMATIC STRATEGY
FOR WILDLIFE CONSERVATION ON FARMLAND

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ABSTRACT: This paper turns to pragmatism for strategies to assist with the timely implementation of conservation efforts, as it provides tools to unfreeze policy decision making so that stakeholders, from farmers to wildlife organizations, can readily address impacts associated with climate induced non-human migration. The first section of this essay introduces readers to the topic of climate induced migration and provides an overview of how agriculture could either inhibit or help facilitate migrating species. The second section then applies Thompson's analysis of water policy, specifically his triangular structure of libertarianism, utilitarianism, and egalitarianism, to the problem of non-human climate refugees to identify positions that could be taken, as producers, policy makers, and other stakeholders determine if they should adopt strategies to assist migrating species. This analysis ends with the argument that the field of applied ethics, while useful for identifying key policy positions, can provide little insight to stakeholders facing issues associated with climate induced migration. The final section of the paper turns to pragmatism for strategies that could help guide wildlife conservation decisions on the ground. It is the author's hope that a wide range of readers will find this paper useful, as it brings together work in environmental ethics, wildlife conservation literature, and public policy.

Climate Induced Migration: A Pragmatic Strategy for Wildlife Conservation on Farmland

Climate disruptions continue to impact agricultural systems and commodity production, as weather patterns shift, temperatures fluctuate, and extreme weather events become more common. According to the 2014 National Climate Assessment, "many regions will experience declines in crop and livestock production from increased stress due to weeds, diseases, insect pests, and other climate change induced stresses." (p.1). Such changes could affect the overall stability of agricultural systems and thus negatively impact food availability and food security. For this reason, a wide range of researchers, policy makers, and stakeholders are currently working to develop strategies to help producers adapt to shifting environmental realities (and thus reduce the negative impact on yields) and to curb agriculture's large contribution to total greenhouse gas (GHG) emissions (Barling 2010). However, there is another environmental impact that could a) add to stress on agricultural systems and b) where agriculture could play a key role in either addressing or exacerbating ecological disintegration. This is the "problem of climate induced migration" or when species migrate due to climate disruptions.

The first section of the essay introduces readers to this important topic and provides an overview of how agriculture could either inhibit or help facilitate climate induced migration, as agricultural areas can act as barriers to migration. The second section then applies Thompson's (1996) analysis of water policy to the problem of non-human climate refugees to identify positions that could be taken, as producers, policy makers, and other stakeholders determine if they should adopt strategies to assist migrating species. This analysis continues with the argument that the field of applied ethics, or work that applies traditional philosophical approaches to ethical problems (Altman 1893; Douglas 2010), can provide little assistance to stakeholders, beyond outlining normative positions, as it a) freezes debates and b) lacks the tools necessary to make time-sensitive decisions.[1] Finally, the paper builds on

[1] Historically, "applied ethics" could refer generally to work that applies "traditional philosophical approaches" or pragmatism to current ethical issues (Altman 1983). However, in several philosophical sub-fields, applied ethics is generally understood to include work that uses traditional approaches (such as utilitarianism, rights theory, etc.), in contrast to pragmatist work. Indeed, scholars, such as Thompson (1996), Douglas (2010), and Arras (2003), often separate the field of applied ethics from pragmatism, before arguing that pragmatism is a more prudent strategy to use in certain contexts. For example, Thompson (1996) clearly separates the two approaches in his work and bioethicists have recently offered pragmatism as an alternative to applied ethics (Wolf 1994; Dickstein 1998), with Arras (2003) going so far as to argue against the position that pragmatism could potentially address pitfalls associated with applied ethics & principlaism (Arras 2003). In this vein, then, this paper uses the term "applied ethics" to signify analyses that use traditional philosophical approaches, in contract the pragmatist approaches that, as Altman (1983) argues utilize a methodology "conceived in opposition to that traditional approach" (p.227).

Thompson's (1996) analysis, arguing that insights from pragmatic philosophy could be useful in outlining a new strategy to help address issues associated with climate-induced migration, in particular, and, the "value problem" in wildlife management on farmland, more generally.

Non-Human Climate Change Refugees Definition

For the purposes of this paper, the term "non-human climate refugees" should be understood as the "flora and/or fauna that are induced to leave their current geographical range due do the impacts of a changing climate" (Anonymized Forthcoming). Climate change impacts continue to be linked to environmental "push" factors, such as extreme weather events and "slow-onset events" (desertification, rising sea levels etc.) (Gemenne 2012; Gregory 1991). These "push" factors induce individuals and communities, both human and non-human, to migrate to new areas where environmental conditions are better suited to the survival of the species in question. It is important to note here that a wide range of species historically responded to weather fluctuations, extreme events, and slow-onset events by shifting their ranges, or migrating to areas more suitable to their survival (Angetter et al. 2011, Palmer and Larson 2014). However, humans rarely intervened, as push factors (other than those leading to mass-extinction events) were often limited to specific regions, in contrast to the widespread impacts (and extinction events) that we are experiencing today.

As of 2017, climate change is exacerbating push factors to the point where widespread migrations are currently underway across the globe, as species attempt to stay in their ideal temperature range (Minteer and Collins 2010). When coupled with other stressors associated with climate change (such as fluctuations of food availability, competition from new species, and habitat loss), climate induced migration can be understood as an emergency response to untenable changes that are increasingly leading to the rapid increase of species extinctions (Barnosky 2009, Hannah et al. 2007, FAO.org 2016). In fact, "one influential review predicts that, depending on the rate and magnitude of planetary warming, up to 35% of the world's species could be on the path to climate-driven extinction" (Minteer and Collins 2010, p. 1801; Thomas et al. 2004). More recently, Urban (2015) found that "if we follow our current, business-as-usual..., climate change threatens one in six species (16%)" (Urban 2015, p. 571). While the above percentages are predictions, it is important to note that if even a small percentage of the extinctions come to pass, this could greatly affect levels of biodiversity and potentially lead to the degradation of ecosystem services, such as water purification and crop pollination.

With extinction rates rising to "event" levels, a wide range of scholars, from scientists to philosophers are worried that biodiversity levels (Botkin et al. 2007, Bellard et al. 2012, Palmer and Larson 2014) and ecosystem functioning (Nelson 2013) could be negatively impacted. For these reasons, normative or value arguments in support of the adoption of mitigation strategies are on the rise. For example, Minteer and Collins (2010) argued that "we have spent decades trying to preserve wild species from direct threats like habitat destruction, overhunting, and pollution… [but] if climate change continues unabated and as rapidly as a few models predict, saving at least some species will require solutions more radical than creating parks" (p. 1801). In addition, conservationists are increasingly turning to conservation on farmland, as they grapple with how to balance food production, while simultaneously preserving rich biodiverse landscapes & the ecosystem services upon which food production relies (MacDonald et al. 2015). A recent EPA report argues that "climate change could make it more difficult to grow crops, raise animals, and catch fish in the same ways and same places as we have done in the past" (EPA.gov; 2017, p.1). As ecosystems rely intrinsically on climate, climate change is currently threatening the biodiversity and services ecosystems provide (Grimm et al. 2013). This, in

turn, threatens a wide range of agricultural practices and livelihoods globally (Nelson at al. 2013). What we are seeing then is a return to Leopold's position where conservation (and now climate change mitigation) will increasingly have to be integrated into agricultural production (Meine 1987).

Agriculture as a Barrier or Mitigation Strategy

In addition to climate change's negative impacts on ecosystem services and agricultural production, agricultural lands are also exacerbating biodiversity loss, as they often act as barriers to migration (FAO 2016). With climate change inducing mass migrations, the probability is high that species will a) attempt to move through or b) be barred by agricultural lands (Anonymized 2017). In point of fact, according to the Food and Agriculture Organization of the United Nations (2016), agricultural production is exacerbating the problem of non-human species migration, as intensive crop and forest cultivation (when coupled with urban development) create "barriers (physical, chemical and ecological) [that] will prevent the natural movement of individual animals in the short term and prevent the gradual shift of populations of plants and small territorial animals in the medium term" (FAO.org 2016; Anonymized 2017). The role that agriculture now plays as a "barrier" to species migration only exacerbates the loss of biodiversity that has historically been correlated with intensive practices (Macdonald et al. 2015). Thus, it appears that we are locked in a cycle where agricultural production negatively impacts ecological resilience and climate induced species migration, in turn, negatively impacts agricultural production. This is especially the case, if migrating species act as "pests" and ecosystem system services are undermined by species loss (Anonymized 2017).

This potential for farmland to act as a barrier is especially problematic, as around 11 percent of the world's land surface (13.4 billion ha) is being used for food production (FAO.org 2003). In the context of the United States, "about half the landmass is used for agriculture [and] in the United Kingdom, the figure is 40%" (Thompson 2010). In contrast, around 4,002,828 hectares worldwide can be categorized as areas not habitable by humans and/or land set aside for preservation and recreation. In the United States, only about 20% of land has been set aside for conservation or preservation. Of this natural land, McGuire et al. (2016) found that only approximately 41% retains the connectivity needed to facilitate species migration, such as in the case of the Florida jaguar. What this means on the ground is that, in the context of the United States, less than 10% of land is currently conducive for species migration. While this percentage will fluctuate widely, depending on the country, if the United States is any indication, areas conducive for migrations may be seriously lacking in many areas.

Yet agricultural production areas can also help facilitate species migration, thus mitigating some of the impacts of climate change. The desire for increased yields can be balanced with other goals such as the following: Increasing the sustainability of farming practices, improving animal welfare, promoting ecological resilience etc. While current farming systems are diverse, they are often guided by what a community values, such as increasing productivity, maximizing yield, social justice concerns, improving biodiversity, and a broad spectrum of other social, cultural, and aesthetic concerns (Anonymized 2015). When taking the diversity of farming practices and systems into account, farming management strategies could be utilized to increase ecosystem resilience, restore habitat, and/or support local non-human communities (Macdonald et al. 2015). In fact, according to the 2014 National Climate Assessment, producers will have to employ various strategies to deal with climate induced impacts, such as temperature changes, declining precipitation, and impacts from novel weeds, diseases, and insects. In this context, employing strategies to improve biodiversity

can be understood as one of several changes that will have to be made in light of the above impacts. Macdonald et al.'s (2015) work in the United Kingdom is an excellent example of how practices can be employed as part of a larger conservation plan to improve overall biodiversity of surrounding ecosystems, while meeting production goals. This and similar work could potentially be expanded to help transform agricultural areas from migration barriers to part of a larger network of wildlife corridors.

Non-human Climate Refugees: Should We Help?

It appears then that farmers, agricultural conservation experts, and/or policy makers will have important land management choices to make.[2] Due to climate change, agricultural areas are now in a unique position, where shifting practices could help mitigate biodiversity loss and ecosystem service degradation in areas well beyond the farm. For this reason, wildlife management on farmland, while always important, is becoming imperative for wider biodiversity conservation efforts. However, whether or not farmers institute conservation practices arguably comes down to value questions or how we address what is called the "value" problem in wildlife management on farmland. Macdonald and Willis (2013) have gone so far as to argue that "uncertainties in how to deal with the ethical imperative to conserve nature is one of the 'elephants in the room' in wildlife conservation (Macdonald et al. 2015). Popular valuation strategies in the field, such as ecosystem services and other economic strategies for valuing intrinsic aspects of habitats, can be difficult to actualize, as citizens are often frugal in their valuations (Duton et al. 2010).

While determining the worth of wildlife is of considerable importance to mitigate damage, framing value questions in the purely economic sphere can "exclude other reasons and intrinsic motivations for conserving ecosystems" (Luck et al. 2012). In fact, Rakham (1994) has gone so far as to argue that both economics, as well as aesthetics, are "too brittle" to be an adequate motivator for wildlife conservation efforts. What is needed then is an expansion of economically based approaches, such as ecosystem services, to include individual, societal, and cultural aspects (Macdonald et al. 2015).[3] The purpose of the section below is to partially answer this call, as it attempts to illuminate specific normative positions that could guide agricultural decision-making when addressing climate induced migration before presenting a pragmatic approach. These ethical considerations could help, hinder, or otherwise impact conservation efforts on the farm and thus form an important part of the picture.

In addition to illustrating pitfalls with an applied ethics approach, the following section's larger purpose is to provide a detailed theoretical analysis that producers and other stakeholders could find useful when making conservation and/or mitigation decisions on the ground. It draws upon Thompson's (1996) analysis of water policy and applies this triangular ethical structure to the problem of climate induced migration. In particular, Thompson identified three key theories that line up well with dominant value positions that inform current agricultural debates, though it should be noted that there are a multiplicity of values and ethical stances represented in this literature (Paarlberg 1987; Thompson

[2] The terms "farmers" and "agricultural custodian" will be used interchangeably in the next section of this essay to signify the wide range of stakeholders making agricultural land-use decisions. This definition is intentionally vague as the purpose of this paper is to explore the wide-reaching problem of climate induced migration and to provide theoretical tools that could be useful during decision-making. As this is a theoretical paper and as these decision-makers could change, depending on the specific context, providing further specificity is necessarily impossible.

[3] However, it should be noted here, that climate induced migration brings up a host of issues beyond the conservation of specific locations, as migrating species may seasonally rely on areas or may be temporarily passing through, as they follow their climate niche. For this reason, questions concerning wildlife corridors, invasive species management, and novel "pest" control may increasingly come to the forefront.

and Anonymized 2015; Rosenberg 1997). While it focuses on water issues, I argue that the triangular structure of libertarianism (property owners), utilitarianism (state sovereign rights), and egalitarians (environmentalists) illustrates three prominent ethical positions that could be taken, as producers, policy makers, and other stakeholders determine if they should adopt strategies to help facilitate climate induced migrations, whether or not they share this burden equally.

While this section primarily presents an analysis from an applied ethics perspective, it is nonetheless directly relevant to the issue of climate induced migration, in general, and the subsequent discussion concerning pragmatist approaches for the following reasons: a) The analysis illuminates normative positions that often guide conservation decision making, thus partially answering the call above, and b) explores how these positions often come into conflict with one another, potentially freezing or deadlocking debates. In contrast, as I will argue, pragmatic philosophy could provide useful strategies for addressing time-sensitive issues, such as climate induced migration. Both understanding what positions are at the table and adopting the best strategies for making time-sensitive decisions are necessary aspects of attempting to address problems associated with climate induced migrations. Thus, while applied ethics and pragmatism are treated as separate in this paper and in the wider literature (Altman 1987; Wolf 1994; Dickstein 1998), they each bring important contributions to the table and this is reflected in the paper. In fact, the analysis below coupled with pragmatist strategies could potentially provide a valuable framework for larger conservation efforts, beyond addressing questions concerning non-human wildlife refuges.

With this in mind, the analysis below (and subsequent discussion concerning pragmatism) utilizes a specific case-study to provide concrete examples a) of the ethical positions and b) how pragmatic strategies are better suited for making time-sensitive decisions. In particular, the subsequent analysis focuses on a climate induced issue currently impacting farmers in California. Wetlands in this state once supported between 50-80 million waterfowl during winter months (Heimbush 2015). However, 95% of California's wetlands are currently being used as farmland. Today, "over 200 bird species in California depend on agricultural habitats for at least part of their annual life cycle... Millions of water birds rest and feed in wetlands provided by winter flooded rice fields in the Sacramento Valley and it's estimated that 70% of the food needed to support the more than 5 million waterfowl wintering in the Central Valley every year is produced by private agricultural land" (Audubon 2015, p.1). To help mitigate negative impacts of development and drought on waterfowl, government agencies, land grant institutions, land owners, and conservation groups, such as The California Rice Commission, The Nature Conservancy, Point Blue Conservation, and The Cornell Lab of Ornithology, have come together to develop strategies for increasing available habitat on farmland during critical months (Heimbush 2015). However, if adequate strategies aren't put in place in the California's Central Valley, which is a major stop-over, "over 60% of the Pacific Flyway and 20% of the nation's waterfowl population" could be at risk of extinction (Audubon 2015, p.1). In this situation, there are clearly several stakeholder groups taking part in land use decisions. The following analysis categorizes and illustrates how these can largely be placed in the categories identified by Thompson (1996). The analysis follows the following structure: a) It will first provide an introduction the three ethical positions, b) outline how these approaches could influence the climate migration debate, and then goes on to c) illustrate how this framework is reflected in the wetlands case-study above.

Applying Ethical Theory to Species Induced Migration

The first ethical theory that makes up Thompson's (1996) triangular affair is liberalism. A common concern in agricultural debates involving conservation and biodiversity often centers on personal liberty or property rights (Thompson 1996; Rissman 2013). In fact, Horak et al. (2013) have gone so far as to argue that "ecologists and land managers are becoming increasingly aware that the landscape context within which a habitat fragment exists could be as important as the habitat fragment itself" (p.71). A key part of landscape context involves property rights, as individual producers have a wide amount of control, within the bounds of state and federal policy, over how land is used (such as being used as cropland, pasture, woodlot, etc.), what agricultural products are grown, and any strategies employed during each stage of the process, from planting/raising to distribution. From a practical standpoint, land ownership, and thus control over the parcel, is thought to stimulate economic development, as it provides producers access to credit and incentives to improve the productivity of the parcel (Rissman 2013). In addition, this personal freedom, or liberty, and the "normatively basic" institutions that protect it are a key part of the larger social structure of liberal societies, such as the United States (Cranston 1967, Gaus 1996, Rawls 2001). In such societies, rights are intended to ensure that specific liberties of citizens are not violated. Examples of common fundamental rights include the freedom of religion, the right to bear arms, the right to private property, etc.

For those espousing a libertarian or rights-based approach, then, the key question that needs to be addressed when determining if laws or polices are ethical, concerns whether or not they are justified in limiting personal liberty (Thompson and Anonymized 2015). In the context of agriculture and food systems, rights-based ethics commonly enter into discussions concerning the implementation of new policies, standards, or technologies that may limit or violate the basic rights of individuals. For example, questions concerning whether agricultural practices should be banned, such as the use a specific pesticide, could be seen as problematic from a rights-based position, as it would constrain the choice of inputs allowed to be used, and thus limit farmers' liberty. From this perspective, questions concerning land use should fall within the purview of the property owner, regardless of larger utilization or ecological concerns.

However, those that accept a utilitarian position often justify the violation of an individual's basic rights, if these limits ensure that resources are used in the most efficient manner (Thompson 1996). Drawing on Anderson and Leal's (1991) analysis of water disputes, Thompson (1996) argues that utilitarian arguments on the ground often include "the doctrine of allocative efficiency as the norm for effective resolution of conflicts" (p.194). This theoretical position combines the a) utilitarian maxim ("right" action is the one that produces the greatest good for the greatest number of citizens) and b) the allocative efficiency mandate (that resources should be distributed so that their utility is maximized) in order to bring about the just distribution of goods.[4] In this case, "just" distribution should be understood in terms of the maximization of efficiency and not in terms of addressing larger structures of oppression, as is discussed in the wider literature (Rawls 2001). Anderson and Leal (1991) then combine this argument with a neo-classical economic analysis, as a basic tenet of their analysis is that disputes are instantiations of a market failure. From this perspective, if market mechanisms are working properly, then property rights can be used as part of a larger structure to maximize utility (Thompson 1996). While utilitarian theorists do not, as a whole, accept neoclassical economic theories, coupling utilitarian theory with

[4] It should be noted here that this definition of distributed justice is contentious. For example, theorists who hold Rawls' difference principle, would argue that just distribution entails that only those least well off should benefit from the unequal distribution of goods.

economic analysis illustrates how both utilitarianism and libertarianism could potentially utilize property rights as a tool to bring about positive outcomes. In addition, it is important to note this economic turn, as conservationists trained in resource management often apply the value system and concepts associated with economic reductionism (Norton 1991).[5]

As agriculture makes use of resources and produces various products, it's understandable that the above discussion of ethical theories has largely focused on what constitutes just distribution and resource use. However, resources can also be treated as social goods, meaning that their use should not be controlled by market mechanisms (Thompson 1996). As Michael (2000) argues, within a Rawlsian liberal framework, questions concerning what should count as resources should be treated as *a priori*, or those that need to be answered before questions of just distribution (Anonymized 2014). From this position, one could argue that ecosystem services are social goods and thus resources necessary for their functioning should be removed from discussions of just distribution. However, ecosystem services are framed as services precisely because they can now be valued in economic terms (Macdonald et al. 2015).

Thompson (1996) labels positions that prioritize social goods as egalitarian. In addition, when determining right action, such theories also include a detailed discussion concerning the just distribution of harms to the larger community. For example, Shrader-Frechette (1993) applies Rawls' "difference principle" to a wide range of environmental issues. Roughly, this principle, which is part of Rawls egalitarian ethic, mandates that society should only institute policies that benefit those in the least advantaged group (Lamont and Favor 2016). This policy is aimed at creating egalitarian distribution of power, wealth, and opportunity over the long run. Shrader-Frechette's (1993) application of Rawlsian theory often involves an analysis of policy that illustrates how the weak bear a disproportionate share of risks and/or a limited amount of the benefits resulting from a specific policy. In the context of the food system, egalitarian (also labeled as justice arguments) are often martialed as a critique of the risks that farm and slaughterhouse workers take on in proportion to the benefits they receive.

Environmental philosophers, such as Leopold (1968), and later Callicott (1989) and Naess (1973), expanded egalitarian ethics to include the wider environment, in that they broadened the ethical sphere to include ecosystems, non-human animals, and/or biotic communities (Thompson and Noll 2015). Here "broadening the ethical sphere" should not be understood to signify the recognition that the wider environment has intrinsic value, as environmental philosophers craft both anthropocentric and non-anthropocentric or biocentric arguments (Norton 1991; Warren 2000). With this being said, environmental philosophers have made strong arguments for intrinsically valuing ecosystems, individual animals, and entire species. For example, deep ecologists (Naess 1973) and ecofeminists (Warren 2000) emphasize the view that the natural world does not exist solely for the use of humans, but accept a biocentric view of the natural world where it has intrinsic value (Norton 1991). Concerning non-human animals, rights based and animal liberation theorists, such as Regan (2004) and Singer (2009) start from the position that non-human others have intrinsic value and thus should be included in

[5] However, it is important to note here that utilitarian arguments, when decoupled from economic theory, could easily be used as justifications for constraining the rights of property owners. For example, in the case of water, following the maxim to produce the greatest good for the greatest number could be used to justify the mandate that producers upstream need to implement conservation strategies. Additionally, arguments could be martialed to justify other constraints that may be problematic from a libertarian perspective, such as the control of agricultural inputs (if overuse reduces the overall efficiency of the input), the reduction of specific practices (such as dumping waste into waterways, if it harms downstream operations), or the production of certain crops (such as growing hemp, or other water loving crops, during a drought).

ethical decision-making. Regarding species, various philosophers have argued that species have subjective intrinsic value, meaning that humans "subjectively value them" (Callicott 1989; Sandler 2012), and that species have objective intrinsic value, meaning that they are valuable independently of whether or not humans subjectively value them (Rolston 1986). As you can see from this brief survey of intrinsic arguments, let alone arguments coming from preservationists and conservationists, environmental ethics houses a wide range of positions. On the whole, "environmentalists often begin by implying that there is something morally wrong in the systematic exploitation of nature" (Norton 1991, p. 5). Thus, they share a common starting point, attempts to address larger environmental concerns within the ethical sphere.

Now that we've explored Thompson's (1996) triangular structure (of libertarianism, utilitarianism, and egalitarianism) that can be found in policy discussions, let us return to the problem of non-human species refugees. As discussed above, the probability is high that climate change impacts are going to induce flora and fauna to leave their current geographical range to follow their shifting climate niches. Agriculture could act as a barrier to these migrations, and thus play a key role in biodiversity loss, or could help mitigate impacts, if conservation practices are put into effect. As a wide range of species are forced to migrate or face extinction, agricultural lands "may have to shift their role from human-made barriers to areas that play a key role in mitigating species loss and thus help to ensure their ecological resilience" (Anonymized 2017). When making decisions, it is imperative that we explore positions that could be taken, as delays could directly translate into extinction events: What this means is that the ethical issue is time-based. Building off Thompson's (1996) analysis of water policy, what probable positions would producers, policy makers, officials, and other stakeholders take when determining whether we should adopt strategies to help facilitate climate induced migrations?

For those espousing a libertarian approach, or those prioritizing property rights, the mitigation of impacts to non-human climate change refugees (or the facilitation of their movement) would largely fall under the purview of the property owner. From this position, one could argue that strategies for mimicking local biospheres (such as intercropping, conservation tillage, use of wildlife corridors, etc.) are already commonly used in sustainable agriculture. If this this the case, then property owners have the option to adopt mitigation practices, if they so choose. Those who care about protecting biodiversity are free to adopt such practices, while those who prioritize other outcomes (such as an increase in yields, pest control etc.) are free to not adopt these practices. Even if only a small number of farmers adopt mitigation strategies, this change could potentially increase the acreage suitable for migration. Thus, there's no reason to adopt policies that would impinge upon the property rights of producers. In fact, when prioritizing property rights, the justification for limiting these rights would have to be strong. Seeing as the option to adopt strategies are already available to farmers, there appears to be little incentive to adopt policies mandating these changes. However, it should be noted that a myopic focus on property rights essentially ignores harms that individual producer decisions can have to both the larger ecological and human communities, especially when those making the decision are invulnerable to these impacts, such as those who live upstream. Aldo Leopold (1968) describes this problem when he argues that "we abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect" (p. viii). Thompson (1996) supports this critique when he argues that such externalities can be understood as the imposition of the liberty of others.

In contrast, those arguing from a utilitarian position could justify the violation of an individual's property rights, if these limits ensure that resources are used in the most efficient manner (Thompson 1996). For example, policy makers who hold this position could

mandate that producers add conservation buffers, corridors, windbreaks, and/or greenways to their properties. These landscape changes may take some area out of production, but they provide a wide range of goods and services for the larger community of farmers, such as "protecting soil resources, improving air and water quality, enhancing fish and wildlife habitat, and beautifying the landscape" (Bentrup 2008, p1; Bennett and Saunders 2010). For this reason, one could argue that these "improvements" increase the overall utility of the region and, therefore, should be adopted. Coincidentally, these changes could also help support local ecosystem services, provide corridors for migrating species, and increase local biodiversity levels, which are all activities that arguably could help mitigate climate change impacts. Indeed, when one takes this long-term ecologically based view, it's relatively easy to justify the ethical position that increasing the sustainability of farming regions, to ensure that farming families and non-human communities are able utilize the land for generations, is the most prudent position, even if it limits the individual property rights of current owners.

In contrast, those adopting an egalitarian position, or one that prioritizes social goods, could argue against the utilitarian argument above, depending on which group is understood to be the least advantaged. If policy makers and stakeholders prioritized the maintenance of social goods, then one could accept the utilitarian argument, since increasing utility also contributes to other social goods, such as ecosystem services, the availability of local game animals, etc. However, when we move away from benefits and focus on the just distribution of harms in the wider community, other arguments could be made from this position. For example, the economic climate in some parts of the world is such that the loss of a few cattle or a crop failure could cause the loss the farm (Pimbert 2010, Comstock 1987). In this context, a family farm advocate, who sees local farmers as the least advantaged (in the larger economic structure), could potentially utilize Rawls' (2001) difference principle to support the position that farmers should not take on the extra burden of implementing conservation strategies. Similar arguments could be cursorily made by advocates of various food related causes, from those who argue that we need to increase our yields to feed human climate-refugees to those advocating for global food security. In each case, limiting yields would directly harm the least well off identified by these interest groups and thus could be labeled unjust.

Whether or not an egalitarian would accept the ecological argument, or one made by an interest group focused on human populations largely depends on if they accept an anthropocentric or biocentric view of the world. This leads us to environmental ethics positions and what they would mandate in this situation. If one accepts a biocentric worldview, then non-human others facing extinction would be placed in the larger ethical sphere. As the problem of non-human climate refugees has both an individual, species, and larger ecological component, stakeholders who accept the view that ecosystems, non-human others, or species have intrinsic value could all contest the anthropocentric egalitarian position above. For example, one who argues from an animal rights position, such as Regan's (2004) could claim that not providing corridors violates the rights of non-human animals (or that this causes suffering, depending on the theory) and thus we have an ethical duty to adopt measures to ensure that these beings can migrate. Similarly, to return to Leopold (1968), a biocentric egalitarian could argue that "the land ethic simply enlarges the boundaries of the community to include soils, waters, plants and animals, or collectively the land." As such, one could argue that adopting wind barriers, greenways, corridors etc. could provide benefits for the entire community—one that is made up of humans *and* various other organisms. Finally, if we accept the position that species have objective or subjective intrinsic value (Sandler 2012; Rolston 1986)

one could make a case for adopting measures aimed at limiting the scope of climate induced extinctions, such as the conservation measures above.

The California wetlands case can provide more concrete examples of stakeholders that fit the above categories. In this situation, the California Rice Commission largely supports the interests of local rice farmers and mills located in the Sacramento Valley (California Rice Commission 2017). In contrast, The Nature Conservancy, Point Blue Conservation Science, and The Cornell Lab of Ornithology are organizations which primarily focus on protecting wildlife and habitats necessary for their survival. However, Point Blue Conservation is also committed to addressing climate change impacts for the benefit of both humans and other species (Point Blue Conservation 2017). Utilizing the applied ethics approach above, as a point of reference, the California Rice Commission's stance largely maps onto the libertarian stance, as it represents the needs of farmers and other commercial ventures. In contrast, The Nature Conservancy, Point Blue Conservation Science, and Cornell Lab of Ornithology accept an environmental or biocentric egalitarian position, as they advocate for habitat restoration and the reduction of threats to ecosystems. Additionally, these interest groups are required to develop strategies conforming with California State and local laws and thus could be understood to be working within a larger utilitarian or egalitarian framework, depending on the policy. With these various ethical interests at play, one could easily imagine situations where discussions on how to balance the production of rice with the needs of migrating birds might stall.

Applied Ethics: No Easy Path

Indeed, while ethicists can debate the finer points of the above ethical positions, as Thompson (1996) himself notes, the purpose of the analysis is to illuminate ethical commitments that motivate or inform policy positions. As such, even with this cursory analysis, it should be apparent that there are a wide range of positions that stakeholders could take when faced with problems associated with non-human refugees. It's not hard to imagine a situation where a wide range of interest groups, each with their own priorities and ethical commitments, could bring the policy implementation process to a standstill. An expanded treatment of the triangular structure of libertarianism, utilitarianism, and egalitarians illustrates a) potential positions that could be taken and b) how these different positions call for sometimes conflicting recommendations on the ground. In fact, Thompson (1996) ends his analysis with the larger argument that this impasse illustrates how applied ethics, as a field, often "freeze[s] the actual debate into stasis" and how this clarity "only hardens a dispute that might have been resolved" (p.200).[6] Thus one could argue that the field is of limited use in policy and other decision-making circles, beyond the identification of specific ethical frameworks. As applied ethics pushes policy debates from stakeholder conflicts of interest to the realm of theory, where consensus can only be achieved after one ethic reigns supreme, it's not hard to find justification for Thompson's critique. This is especially the case when one reflects on the plurality of ethical positions in the field.

Armed with valuable insights gained from awareness of these positions helps illuminate areas of potential conflict during land-use debates. Specifically, if water disputes can be used as a model, the conflict of positions utilizing different theoretical foundations could, in fact, freeze or needlessly prolong debates aimed at mitigating impacts. While this may not be an issue for non-time sensitive debates, the problem of non-human climate refugees is time-sensitive, meaning that this paralysis, itself, could exacerbate the very problem being

[6] It should be noted that this argument is currently gaining traction in the wider literature, with Douglas (2010) echoing the critique, when she argues that it has become increasingly apparent in all branches of applied ethics that the "application of traditional theories rarely provides either the philosophical insight or the practical guidance needed" (Douglas 2010, p.322).

addressed. Migrating species often do not have the luxury to wait (or will not wait) until consensus can be reached, as they attempt to follow their ecological niches. As such, I argue that the rapid production changes and policy shifts needed in the face of climate disruptions provides further support for both Thompson's (1996) and other environmental pragmatists' argument that "theoretical debates are hindering the ability of environmental movement to forge agreement on basic policy imperatives" and thus we need "a new strategy in environmental thought" (Light and Katz 1996). In fact, this analysis is mirrored in other fields, with Douglas (2010) going so far as to question applied ethics usefulness for addressing ethical issues on the ground. Building off of these critiques of applied ethics, the new strategy will have to perform at least the two following functions: a) Bringing disparate stakeholder groups together (rather than freezing debates) when addressing problems and b) finding the means to make difficult or forced choices, when making such a choice is imperative.

A Pragmatist Framework for Wildlife Conservation Decision-Making

What would an environmental pragmatist approach to wildlife conservation decision making look like? I argue below that such an approach or framework should consist of at least the following components: a) Pragmatic necessity, b) the epistemic criterion of serviceability, and c) the self and societal reflection necessary for habit revision. However, before exploring these, we first need to start with the basic question that guides this ethical framework. As Thompson (1996) argues, in contrast to the field of applied ethics that focuses, not surprisingly, on the application of ethical theories (Douglas 2010), the pragmatist recognizes that different views and positions are in contention (Altman 1983; Light and Katz 1996). When starting from this point, the guiding question becomes "how can the contention be resolved in a manner that is consistent with our political ideals?" (Thompson 1996, p.200). This second question is particularly important for pragmatism (and as we'll see for time-sensitive problems) because it has what James (1979) labels pragmatic necessity, or the recommendation to shift our focus from the validity of "facts" and instead focus on their usefulness.

What this means is that the pragmatic philosopher is not limited by the rule that they must only accept justified beliefs or, more loosely, only those propositions that are strongly supported by evidence. One is warranted in accepting unjustified beliefs in circumstances when accepting or not accepting this belief will positively impact psychological wellbeing or, importantly, our conduct. As James notes, "we cannot… remain uncommitted on matters such as what is right or wrong in the conduct of personal affairs; we must do one thing or another" (p.200). While this conception of knowledge can be problematic (McDermott 1986), for Thompson (1996), this shift has the benefit of capturing how people adopt or discard beliefs in practice, as non-philosophers often focus on the serviceability (or the impact) of beliefs to complete a task, rather than on whether they're justified, true, beliefs.

In the context of climate change discussions, one could argue that pragmatic necessity allows producers to accept contentious beliefs (if accepting these promotes wellbeing). This epistemic move then allows producers *to act* from the position that x is the case. For this reason, pragmatic necessity could move climate change discussions from epistemic gridlock (where stakeholders question whether there is even a problem to solve) to a position where mitigation strategies are on the table, as stakeholders are in a position where they can now accept the belief that climate change is happening, if this belief promotes wellbeing. This shift could be particularly useful in contexts, such as the United States, where climate change is a hotly debated issue and mitigation strategies are often halted by parties that intentionally cultivate epistemic doubt concerning climate science (Oreskes and Conway 2010). Thus, pragmatic necessity

could give us the flexibility needed to make decisions quickly when not acting could negatively impact our wellbeing, such as climate disruptions.

In addition to pragmatic necessity, Dewey's (1929) pragmatic philosophy could contribute valuable components of a pragmatic strategy (McKenna 2004; Thompson 1996). His work can help us to devise ways of a) bringing desperate stakeholder groups together and b) gradually changing behavior that has harmful environmental consequences and thus contributes to situations where pragmatic necessity is a reality. In particular, decoupling our concept of truth from logical necessity and, instead, placing greater importance on serviceability results in the increase in importance of community, as community is part of the pragmatic scientific method and the primary component of a pragmatic theory of truth (Hickman 1991; Thompson 1996). As Thompson (1996) argues, "the theoretical position is that truth is for and by a community of inquiry; hence, relative… In practice, however, communities that include practitioners… have a reliable mechanism of self-criticism: the ideas must work" (p.203). This focus on community as an epistemological entity helps to ground propositions and to guard policy discussions from polarization, as any discussion that does not take the wider community into account is "philosophically flawed." Here policy and/or land-use discussions are not framed in such a way where different groups are in opposition to one another, but as a community coming together to offer up, support, and/or refute knowledge claims and to use these claims as starting points to solve problems faced by members of that community. This process is collaborative and keeps open the possibility of reappraisal, as it grounds the discussion in instant peer review. Though, when coupled with pragmatic necessity, decisions will ultimately have to be made.

Additionally, Dewey's (1929) insights on connectiveness and altering habits provides insights useful for wildlife conservation discussions (McKenna 2004). According to Dewey, "it is our awareness of our connectedness that enables us to direct our behavior to certain goals" and this is what makes humans uniquely different from other species (Mckenna 2004, 164-65). In addition, as our behavior/habits can alter our environment, humans have a responsibility to be mindful of the impacts of these alterations, as society progresses. McKenna (2004) argues that the idea of "altering habits" is a key part of pragmatic philosophy, as "what is needed is the intelligent examination of the consequences that are actually effected by inherited institutions and customs" (p.166). This self and societal examination, or what Thompson (1996) calls pragmatist deconstruction, could help to unfreeze positions, open up new solutions to address problems, and change our habits, if these habits bring about negative consequences.

Non-human Climate Refugees Revisited

From a pragmatic perspective, then, do we have an ethical duty to mitigate impacts on species induced to move due to climate disruptions? Remember that applied ethics outlined a wide range of positions that decision makers could take on the problem of non-human climate refugee and illuminated a clear tension between anthropocentric and biocentric approaches. In contrast, the pragmatic strategy outlined above consists of a decision-making framework that incorporates the concepts of a) pragmatic necessity, b) the epistemic criterion of serviceability, and c) the self and societal reflection necessary for habit revision. As it focuses on serviceability, pragmatism is a method for coming to consensus, when situated communities recognize a common problem and work to solve this problem, rather than cling to an individual ethical ideology. For this reason, it's difficult to supply a universal answer to the above question. At best, one could answer the question above in the following way: If the numbers of non-human climate refugees are going to increase in the future, then employing strategies to help mitigate negative effects to agricultural areas and wider ecosystems, biodiversity levels etc. (depending on your

goal) is of pragmatic necessity for producers and those who rely upon the land (aka all of us). Accepting this position at the beginning of discussions could help induce conduct that may reduce psychological and physical harm brought about by climate change. In contrast, not working to mitigate impacts on or by migrating species could increase the severity of their effects on those that rely upon the land.

When the framework is taken as a whole, mitigation decisions will have to be made in the areas impacted by climate induced species movement, as these communities will ultimately determine whether or not a strategy is serviceable and will be able to reflect on how this strategy impacts their context. (Indeed, this will be illustrated below, when we return to the wetlands case study.) While this may be problematic from an applied ethics position, from a wildlife conservation standpoint, conservation decisions are necessarily bound to the ecosystem or context within which one is working (McDonald et al. 2015), as different problems arise and diverse strategies are employed in the different climate-zones, such as the deserts of New Mexico, Pacific Northwest forests, etc. In this context, the three-part pragmatist method outlined above could be of use, as it could map on to (and thus contribute to) these "on the ground" wildlife conservation discussions.

In this vein, it should be noted that pragmatic necessity and the criterion of serviceability shifts non-human climate refugee discussions from those where vested interests are calcified, to the more productive ground of conflict resolution and the limiting of negative consequences to the wider community. The pragmatic strategy above asks decision-makers to reflect on what is valuable to them; to be mindful of the consequences of their actions, customs, and larger social structures on the world; and to determine whether our actions are a serviceable strategy for achieving our goals. With this being said, how would a pragmatist strategy be employed when addressing the problem of non-human climate refugees?

To provide an example, let us return to the wetlands case-study in California. As discussed above, the California Rice Commission largely supports the interests of local rice farmers and mills located in the Sacramento Valley (California Rice Commission 2017). In contrast, The Nature Conservancy, Point Blue Conservation Science, and The Cornell Lab of Ornithology are organizations which primarily focus on protecting wildlife and habitats necessary for their survival. However, Point Blue Conservation is also committed to addressing climate change impacts for the benefit of both humans and other species (Point Blue Conservation 2017).

With these various ethical interests at play, it is easy to imagine how discussions might stall. However, these disparate groups have already come together to implement a wide array of strategies aimed at increasing available habitat during migration stop-over periods. One successful plan is "pop-up habitats" or the temporary renting of land (by conservation groups) during the migrating season to open it up to birds. This provides farmers with an additional revenue stream, while opening up over 10,000 acres for the season and increasing the numbers of shore-birds by 30% (Heimbush 2015). Additional strategies they have come together to implement include easements aimed at protecting producers who use irrigated pastures, the creation of ecological reserves (and preserves) among farmland, and the building of partnerships between conservation groups, ranchers, and farmers.

What could a pragmatic approach contribute to the above conservation efforts? In key ways, the collaborators are already using a pragmatic approach, as they are setting aside differences to address a time-sensitive issue. The California Rice Commission and local farmers involved in these efforts are beginning to shift their practices, such as flooding fields in the winter, to ensure that their farms can help provide habitat (California Rice Commission 2017). From this position, one could argue that stakeholders are coming together to change their conduct in such a way as to increase the

serviceability of California's Central Valley. These are great first steps. However, the current strategies may not be enough. California continues to experience drought and water allocations to farmers are being cut. And, despite efforts, key species, such as the tricolored blackbird, have been experiencing steep declines over the last decade.

Non-human climate migration may only exacerbate this situation, as limited resources are further taxed. One benefit that the pragmatic framework could provide is that it nudges decision-makers to reflect on what is valuable to them; to be mindful of the consequences of one's actions, customs, and larger social structures on the world; and to determine whether one's actions are a serviceable strategy for achieving goals. This reflection may help stakeholders identify larger aspects of their lived world that is contributing to the crisis and to reflect on how these practices could change. For example, if water allocations are being cut, one could ask how water based policies, distribution and treatment practices, and larger conservation efforts could be changed to help ensure that there is enough of this resource to provide habitat. Thus, the process of group reflection could help decision-makers identify workable strategies. This analysis illustrates how pragmatism includes processes already producing successful strategies on the ground and could enrich future wildlife conservation efforts.

A Final Theoretical Consideration

In addition, another strength of the pragmatic approach that should be at least cursorily mentioned is that it succeeds in balancing both anthropocentric and biocentric considerations. For example, the pragmatic approach is anthropocentric, as humans are beings who are aware of their connectedness (Dewey 1929; McKenna 2004), yet also mandates a larger ecological view, as we are pushed to examine the consequences of our actions to the wider environment. This is especially useful for decision-making in agricultural contexts, as strategies for maintaining one's farm necessarily include the wider environment that farming depends upon, such as your fields, waterways, weather patterns, etc. This flexibility allows both positions to be weighed, as situations arise, without polarizing anthropocentric and biocentric views, at least within the context of agriculture. As Leopold argued (1968), people are in relation to one another *and* in relation to the land.[7] The pragmatist lens exposes these connections, while including the social component of this larger picture. The integration of the anthropocentric with the biocentric, coupled with having stakeholders reflect on how their actions and the larger social structures impact the wider environment, could also help address the "value problem" in wildlife management on farmland (Macdonald et al. 2015) precisely because it gives people the opportunity to reflect on how their actions impact the larger environment.

What this provides us then is a general argument for working to mitigate the impacts on and produced by migrating species and a decision-making framework that can handle time-sensitive problems and is flexible enough to recognize different positions at the table, while rigorous enough to demand that each of these positions be examined to determine their consequences and if they work to maintain community. Indeed, the prioritization of community, and the epistemological assumptions guiding the approach, nudge decision makers to collaborate and allow for the critique of rigid positions that do not take other groups into account, such as those myopically focused on property-rights. As Thompson (1996) argues, deconstruction is always coupled with reconstruction in pragmatic thought.

A critique of the above approach is that it is too flexible, as it allows space for a wide range of ethical positions and thus does not provide guidance—guidance that is especially needed as we are increasingly faced with climate change impacts. However, it is important to remember that pragmatism provides a strategy for

[7] However, it should be noted that discussions concerning the efficacy of farming, as a practice, could still be on the table.

problem solving as a community, rather than a universal theory that can be applied to various situations, such as in the case of applied ethics. Rather than a limitation, this should be seen as a strength, especially in policy circles, as this bypasses problems with applied ethics discussed in detail. However, it should be noted here that environmental ethicists may not accept the claim that this is a strength, as leaders in the field, such as Callicott (2002) and Hargove (See Light 2004) have continued to attack "the relevance of policy to the work of environmental ethicists," (Light 2004, p.120) and thus could use this critique as a reason to discount Thompson's (1996) analysis of applied ethics discussed prior. While I do not provide a full critique of the position, as it is not the aim of this paper, I want to acknowledge this tension in the field and to note that the above pragmatic strategy offers a tacit reply.

Conclusion

It is the author's hope that a wide range of readers will find this paper useful, as it brings together work in environmental ethics, wildlife conservation literature, and public policy. Specifically, this paper makes a contribution to the wider environmental philosophy literature, as current work on the topic of climate induced species migration predominantly focuses on providing a theoretical apparatus that could help address ethical questions that arise during managed relocation projects and not on situations where species move on their own.[8] Finally, and most importantly, this paper builds on Thompson's (1996) work on agricultural policy and uses insights from pragmatic philosophy to outline a new strategy that could help address the "value problem" in wildlife management on farmland. The conservation scientists (Macdonald and Willis 2013) have gone so far as to argue that inadequate handling of ethical arguments for the conservation of nature is an 'elephant in the room' in wildlife conservation (Macdonald et al. 2015). In contrast to the field of applied ethics, pragmatism has a unique set of tools that can be of particular use in wildlife conservation discussions.

[8] Here "managed relocation" (also known as "assisted migration") should be understood as a conservation strategy that involves the transportation of species to different ecosystems prior to an anticipated climate range shift (Minteer and Collins 2010).

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