Economies of Extinction: Animals, Labour, and Inheritance in the Longleaf Pine Forests of the US South

Nathaniel Otjen
Princeton University

Abstract: Despite mounting critiques, extinction continues to be framed as a unidirectional problem where humans, through acts of negligence and intent, lead nonhuman species to their demise. In addition to universalizing the actors and processes involved, unidirectional approaches overlook the ways nonhuman beings participate in the extinction of others and the ways extinction continues to impact multispecies communities long after the violent event or the death of an endling. With its focus on how nonhuman animals experience and navigate violence, the field of critical animal studies can illustrate how nonhuman animals contribute to extinction events and how extinction unfolds across distinct groups over extended temporal periods. Placing critical animal studies in conversation with species loss, this article takes up the longleaf pine forests of the US South, an ecological community that was once among the largest in the world and is now among the most endangered. I consider how late-nineteenth and early-twentieth century naval stores and logging operations used animal labour and the logics of animality to extract longleaf pine and its products. Animal-dependent industries like turpentining and logging, I argue, were part of what John Levi Barnard calls an 'extinction-producing economy'. Looking at the labour of oxen, mules, and horses, together with the Black and immigrant labourers tasked with providing their care, I ask how animals and their human caretakers become caught up in the wider deaths of others. Acknowledging that the absences resulting from species loss extend beyond the historical events and timeframes that produced them, I then examine how subsequent generations of humans and nonhumans have inherited the loss of longleaf forests. Turning to Janisse Ray's memoirs *Ecology of a Cracker Childhood* and *Wild Card Quilt: The Ecology of Home*, I consider her family's involvement in eradicating longleaf forests and how this loss continues to be experienced.

Keywords: animal labour, extinction, longleaf pine, Janisse Ray, extinction-producing economy, naval stores, logging

All through the land are the forests dying,

One piece of silver a tree-life buying;

Listen! The great trees moan to each other:

'The ax has scarred us too, my brother'—

'We die, we die!'

— Anne McQueen, 'The Cry of the Pines'

Stitched together from the fragments of collective memory and the records of history, contemporary stories of longleaf pine begin with the tree's absence, even as they try to resurrect the places and communities that the species once brought into existence. In one of her reflections on the difficulty of living well in Baxley, Georgia – a place that arose through specific historical relations with longleaf pine and has, since the early twentieth century, been almost devoid of the tree and its ecologies – the author Janisse Ray writes:

> Growing up, I witnessed a fragmented landscape, with only pieces of true [longleaf] forest left here and there. The landscape, I thought, mirrors our lives. … I began to associate homeland with loss. Somehow, as the landscape fell apart, so did what bound humans to it. (*Wild Card*, 117)

As Ray explains, the extirpation, or localized extinction, of longleaf forests in what is now known as south-central Georgia precipitated the decline of local communities and, more insidiously, eroded people's sense of attachment to place and their ability to comprehend the ongoing ramifications of historical loss. Ray's observation raises the following question, one that often guides narratives of extinction and extirpation: how can people engage beings with whom relations are no longer possible and, thus, whose knowability may be constrained by the past? In the case of longleaf forests in the US South, the communities that inhabit these absences have, whether knowingly or not, inherited the ecologies and circumstances of extinction. The near-total elimination of this tree exacerbated pre-existing conditions of scarcity, dispossession, and inequity which were, in turn, unevenly passed down through multiple generations and across

species borders. Extinction, the field philosopher Thom van Dooren reminds us, is 'a slow unraveling of intimately entangled ways of life that begins long before the death of the last individual and continues to ripple forward long afterward, drawing in living beings in a range of different ways' (*Flight Ways*, 12). The long unfolding of loss, and the nonhuman beings drawn into this process, comprise the focus of this article.

Unlike the mixed hardwood forests of the Northeast and Great Lakes regions which were allowed, at least in part, to regrow and the evergreen forests of the Pacific Northwest which received some environmental protections, the longleaf pine forests of the US South were largely decimated through industrial activities and scientific mismanagement. Stretching along the coastal plain from the area currently known as southern Virginia to Florida and as far east as Louisiana, longleaf flatlands were 'once among the most extensive ecosystems in North America' (Brockway et al. 2). Part forest and part grassland, longleaf environments stretched for thousands of miles. Due, in large part, to the frequent fires ignited by Indigenous peoples and lightning strikes, the forests comprised one of 'the most biologically diverse ecosystems on earth' (Earley 33). Longleaf environments supported more than 300 known species, many of which were endemic to the pine woods, including the gopher tortoise, red-cockaded woodpecker, flatwoods salamander, redstart, pine snake, gopher frog, and wiregrass. Though the forests had provided local inhabitants with a steady supply of building, heating, and medicinal materials for millennia, they did not begin to be exhausted until the second half of the nineteenth century when the logging and naval stores industries established large-scale operations to extract lumber and maritime products like turpentine, rosin, and tar. First made possible by the erasure of the Cherokees, Chickasaws, Muscogees, Choctaws, and Seminoles, followed by the federal government's sale of 'open' land and then by the expansion of the steam-powered railroad, naval stores and logging operations relied upon and reproduced the infrastructures of settler colonialism and racial capitalism. These extractive industries bought large tracts of land and drew upon historically oppressed labour forces, including nonhuman animals. At the same time, the growing science of fire exclusion and forest management removed the regenerative cycles of burning from lands that had not only evolved with fire but had come to depend upon it.

Unable to adapt to the speed and scale of extractive industry, longleaf forests vanished from most of the US South within five decades. The extraction of naval stores and lumber began in earnest during Reconstruction and continued into the 1920s. Naval stores operators recruited Black and immigrant labourers to cut long gashes into the sides of living trees, causing them to spill crude resin that was then distilled to produce turpentine and rosin, two products with many uses, particularly in the maritime industry. The procedure eventually killed the tree, which was then felled, processed, and sold as lumber. When logging operators looked at longleaf forests and the communities that grew amid them, they saw 'a substantial amount of timber in the public domain' and a plentiful source of expendable labour (Way 286). Most logging began adjacent to transportation lines that could bring sawed lumber to domestic and global markets. Once longleaf stands near rivers and railroads were exhausted, the industry turned to the interior. By the start of the twentieth century, some scientists in the budding discipline of forestry expressed concern about exhausting supplies of longleaf. Acknowledging that 'many destructive human agencies … [are] constantly threatening it,' one specialist remarked that 'supplies are quickly melting away' and recommended that forests 'be protected against fires' to ensure their continued use (Schwarz 19, xii, 103). At the time of that writing in 1907, more than half the area once encompassed by longleaf had been logged (Brockway et al. 8-9). With the growth of industrial operations in the early twentieth century and the widespread deployment of fire exclusion practices, only fragments of longleaf forest remained by 1930 (Neel 6; Brockway et al. 8-9). Today, longleaf pine flatlands are 'among the most endangered of southern ecosystems' (Brockway et al. 2). In half a century, 98 percent of longleaf forests in the US South had been eradicated, making their loss 'among the most severe of any ecosystem on earth' (Earley 2). Someone travelling across North America is far more likely to encounter old-growth Douglas firs and intact tallgrass prairie than ancient longleaf forest.

The activities that eliminated longleaf from most of the tree's native range constituted part of a larger socioeconomic order dependent upon extractive knowledges, worldviews, and technologies. Naval stores and clearcut logging were part of what literary and cultural critic John Levi Barnard calls an 'extinction-producing economy'. By 'relentlessly transform[ing] sentient life into market value' (Barnard 854), this economic order generates capital through

nonhuman death. In the process, it privileges certain forms of life and ways of living at the expense of others. Instead of being viewed as a lively entity who holds other forms of life in the world, a longleaf pine is seen as a potential product with a specific number of board feet that can, through the intervention of various technologies, produce saleable objects. Writing in the early 1900s, author Anne McQueen describes the longleaf economy as a system of 'tree-life buying' (2), an exchange of life for capital. Extinction, in this model, becomes an 'externality' of economic production and growth, a byproduct of progress. Attending to the structural roots of extinction has led postcolonial critic Ashley Dawson to argue that 'extinction cannot be understood in isolation from a critique of capitalism and imperialism' (15). As it remade the US South into a tapestry of altered landscapes, the extinction-producing economy responsible for nearly eradicating longleaf pine relied upon the instruments of colonial land theft and global capitalist markets. For people like Ray, these forces left reminders of what had been lost.

Though they remain marginalized within studies of industrial development, nonhuman animals occupied central roles within the extinction-producing economy that coalesced around longleaf, not only as members of wider species that suffered extreme population declines, but also – and perhaps more crucially — as beings who provided much of the labour that led to the eradication of forests. In addition to supplying labour, nonhumans were evoked in animalizing logics used to rationalize the mistreatment of Black and immigrant human labourers who worked beside them in the pine woods. As I show in this article, farmed and domesticated animals – namely mules, oxen, and horses – laboured with dispossessed humans to collect and process resin and to cut, transport, and mill logs. By attending to the animalizing logics circulating within this particular extinction-producing economy, I show 'how the question of the animal bears on the question of hierarchies of humanity' (Jackson 16). Moreover, in considering the role of animals as labourers, I study how nonhuman beings like the mules in Figure 1 participate, both willingly and unwillingly, in economies of extinction, and I propose several ways that critical animal studies can productively intervene within the growing literature on extinction.

Fig. 1. Longleaf Logging Team Near Columbia, South Carolina.
Courtesy of Forest History Society, Durham, North Carolina.

Humanities and social science approaches typically frame extinction as a human-caused problem arising from capitalist-colonialist activities, one that produces nonhuman death on a rate and scale far exceeding the 'background' loss of species. While such approaches usefully show how settler-industrial actions lead to species loss, they often deploy a unidirectional focus on the movements and impacts of anthropogenic violence that misses the ways nonhumans become implicated in the extinction of others. When studies do consider how nonhumans participate in another species' extinction, they tend to focus on beings involved with counter-extinction efforts. For instance, Matthew Chrulew's research on the animals who taught captive-bred golden lion tamarins how to survive outside captivity, and van Dooren's work on sandhill cranes tasked with incubating the eggs of endangered whooping cranes, emphasize how conservation programs use nonhumans to rescue endangered species. What are scholars and

activists to make, however, of the animals caught up in the exploitative colonialist-capitalist systems responsible for bringing some ways of life to a close? How can those of us interested in critical animal studies and extinction studies most effectively engage nonhuman beings and the wider extinction-producing economies that operate through animal labour and its logics? With its investment in analysing and resisting forms of violence enacted against animals and its concern with the roles and valuation of animals in capitalist economic systems, critical animal studies provides several frameworks needed to answer these questions.

In addition to bringing attention to the animals who facilitate the extinction of others, critical animal studies can prompt modes of analysis that account for the ongoing violence experienced by multispecies communities in the wake of extinction. Approaches from critical animal studies, I argue, illustrate how subsequent generations of humans and nonhumans inherit loss. By studying the localized extinction of longleaf pine communities as inherited, I demonstrate that extinction-producing economies and their harmful effects persist long after extractivist activities conclude and long after a species disappears. Counter-extinction responses must, therefore, address the 'long dyings' of extinction and must continue well after the final event (Nixon 2). In the US South, the elimination of longleaf forest during the late-nineteenth and early-twentieth centuries continues to harm the multispecies communities that emerged with the tree and its ecologies. As Ray – a 'daughter of the pine flatwoods' born in the early 1960s (*Wild Card* 144) – explains, 'This was not a loss I knew as a child. *Longleaf* was a word I never heard. But it is a loss that as an adult shadows every step I take. I am daily aghast at how much we have taken, since it does not belong to us, and how much as a people we have suffered in consequence' (*Ecology* 15). Far from being an isolated loss, the extirpation of longleaf pine continues to impoverish the communities that were once entangled with the tree, resulting in what feminist philosopher and multispecies ethnographer Deborah Bird Rose calls a 'double death' (*Wild Dog Dreaming*). While I consider inheritance as an always-unfolding loss that radiates outward across different geographies, scales, and temporalities following mass casualty events, the Extinction Studies Working Group describes inheritance as an accumulative process of living passed down from generation to generation across long evolutionary histories. Extinction, according to their body of work, brings an end to 'intergenerational heritages' that constitute

particular ways of living and being (Rose, van Dooren and Chrulew 9). Shifting focus away from the imperilled processes that produce species to the cumulative effects of species loss, I suggest that critical animal studies is well positioned to expose and clarify how loss becomes inherited and how the absence of species becomes felt decades later in lands, bodies, and senses of self. With its commitment to understanding how nonhumans experience and navigate violence, the field of critical animal studies can show how economies of extinction produce ongoing forms of violence that are felt differently across distinct groups of humans and nonhumans.

In the following section, I consider how naval stores and logging industries used animal labour and the logics of animality to extract longleaf pine and its products from the coastal flatlands of the US South. Investigating the labour of oxen, mules, and horses, together with the Black and immigrant labourers tasked with providing their care, I ask how animals and their human caretakers become caught up in the wider deaths of others. Acknowledging that the absences resulting from species eradication extend beyond the historical events and timeframes that produced them, I then examine how subsequent generations of humans and nonhumans have inherited the loss of longleaf forests. Ray's memoirs *Ecology of a Cracker Childhood* and *Wild Card Quilt: The Ecology of Home* describe her family's involvement in eradicating longleaf forests and the ways this loss continues to be experienced and felt. Following literary and cultural studies scholar Ursula Heise's contention that extinction is fundamentally a cultural problem, a matter of 'what we value and what stories we tell' (5), I ask how Ray's stories about growing up in Baxley, Georgia, and her efforts to make a life in this damaged place might compel responses to species loss that resist its ongoing violence.

Animals, Labour, and Extirpation

Though Indigenous peoples have, for millennia, used the copious amounts of resin produced by longleaf pines for a variety of purposes, settler colonialists began injuring, or 'tapping,' the trees in North Carolina during the early eighteenth century, mainly to extract and collect a sticky ooze used to waterproof and seal the hulls of ships (Outland 14). By the 1830s, prices for resin products rose and transportation infrastructure and distillation technologies improved to such a

degree that the naval stores industry began to spread throughout the southeastern US (Mason 93; Outland 37-38). Resin forms 'water-impermeable barriers', contains 'anti-microbial and insecticidal properties', and constitutes a 'good adhesive', all properties that made the material highly desirable, especially in a growing settler-industrial economy (Mason 80; Outland 6). Turpentine, a liquid processed from resin, was used as a paint and stain solvent, as a laxative and insecticide in medicine, and as a waterproofing agent for leather and cloth (Outland 6; Mason 97). Rosin, a hard residue remaining after turpentine distillation, was used to produce soap, cover floors, and pave roads (Outland 6). Finally, tar, a waterproof 'mixture of hydrocarbons, alcohols, and other compounds' produced by burning enormous amounts of longleaf wood and 'wastage', was applied to ship rigging and hulls to prevent decay and repair cracks (Earley 94, 88-90; Buttrick 900). With a wide variety of uses, especially in the naval industry, longleaf pine resin and its compounds played critical roles in the economies of the United States and Europe. Ubiquitous in the late-nineteenth- and early-twentieth-century maritime industry, longleaf products enabled the movement of enslaved humans, domesticated and free-living animals, and plants across the Atlantic and around the world. As author Lawrence Earley observes, 'No vessel could be built without them' (87).

Fig. 2. Resin Extraction in Longleaf-Wiregrass Flatwoods.
Courtesy of The History Center, Diboll, Texas.

Collecting and processing desirable materials from longleaf pine involved substantial violence, for trees and labourers alike. Pine trees produce resin as a defence mechanism after receiving an injury; the sticky substance helps to 'seal wounds and eject foreign matter' (Mason 72). To trick longleaf pines into producing a steady supply of resin, workers cut a 'cat face' or 'face', a heart-shaped pattern in the side of a tree just above a main root (Outland 68; Mason 94; Hickman 122). Before the introduction of clay, zinc, and tin cup-and-gutter systems in the early 1900s, workers cut 'boxes' approximately four inches wide, seven inches deep, and twelve inches long below the face to collect the resin, typically performing this task from December to April (Hickman 134, 122). When the resin began to flow in the early spring, workers used a

tool called a 'hack' to scar the tree by cutting 'downward-pointing chevrons' approximately one-half to one-and-a-half inches deep into the sapwood that would guide the resin into the box where it could be collected (Outland 70; Hickman 123; Mason 94). Every one or two weeks, labourers cut fresh wounds in the bark just above the box – an activity called 'chipping' – that kept the tree 'bleeding' or producing resin for the duration of the 32-week season (Outland 72; Hickman 123). 'Unbled' or 'virgin' trees were the most desirable, as they produced greater quantities and higher grades of turpentine and rosin (Buttrick 904; Earley 143-44; Mattoon 38). Figure 2 illustrates a standard operation in a virgin longleaf 'orchard'. Each gash or 'streak' contributing to the chevron face would emit new resin which would run down the wound into the box or, in this case, the cup. Once the boxes or cups filled, 'dippers' extracted the resin using a long ladle, emptying the crude 'dip' into a pail which was then poured into a larger barrel and transported by mule or horse cart – like the one pictured in Figure 3 – to a distillation site where turpentine and rosin were extracted (Hickman 125; Outland 70). Dippers emptied boxes four to seven times a season, most frequently during the months of July and August when resin flow reached its peak (Hickman 123-24). A barrel of resin yielded approximately 20 percent turpentine, 65 percent rosin, and 15 percent water and waste (Mattoon 35). While industrial operators could make 'a fairly large profit' from this business, especially by tapping virgin orchards, it came at a high cost for the trees (Hickman 135). Most longleaf trees grew exhausted after three to five years of production (McKee 2). As soon as production slowed, naval stores operators sold the severely injured and disfigured trees for lumber. Perhaps unsurprisingly, many foresters and economists viewed the extraction of resin and its products as a 'crude method' (Schwarz 105), with some even calling it a 'butchery' (Earley 147).

Fig. 3. Resin Transportation by Mule Cart. Gillican-Chipley Company, New Orleans. Courtesy of Forest History Society, Durham, North Carolina.

As terms like 'butchery', 'face', and 'bleed' demonstrate, the naval stores economy drew upon language typically reserved for animals and applied this lexicon to activities performed on vegetal beings. With the possible exceptions of terms like 'virgin' and 'unbled' which suggested that the 'tapping' of trees was also a patriarchal and phallocentric act, most of the animalizing language attributed to longleaf pines came from animal killing, a familiar activity during a time when animal death constituted everyday experience. It was common within the naval stores industry, for instance, to speak of trees 'being bled for turpentine' (Mattoon 2). For enslaved and formerly enslaved labourers, terms like 'bleeding' likely drew comparisons between their spilt blood and the resin emitted from trees. McQueen, for example, compares the weeping faces of chipped pines to the 'bare' and vulnerable bodies of labourers (16), a move that suggests the analogy was well-known by the 1920s. Such zoomorphism also suggested, however, that naval stores labourers recognized their pine-tapping activities as harmful and detrimental to the health of trees. The face, or the open wound carved into the side of a tree that emitted resin, became an evocative site layered in meaning. As the location from which

ethics and obligation arise in Levinasian philosophy, the face serves as a guiding concept for critical animal studies. Understood to be a site of reckoning, liberation, and action, the animal face 'emphasises that others call not only in their suffering, but equally in their beauty and their joy' (Rose, *Shimmer* 65). From the perspectives of the labourers tasked with extracting and refining resin from longleaf, the glistening white faces cut into the surface of trees exposed the violence of their work. Historians and scientists have documented how longleaf trees emit sap almost immediately upon being cut, how the work of collecting resin brought labourers into intimate relations and proximities with trees, and how workers knew that turpentining activities killed trees and dramatically altered landscapes (Hickman 122-23). Workers may have, then, experienced feelings of discomfort and anxiety with their work, feelings that were distinct from the romantic imagery of pine trees weeping 'tears of resin' described by contemporary authors such as McQueen (19). The naval stores industry, like any extinction-producing economy, suppressed doubt and vulnerability among their workforce by rearticulating harm as a necessary part of industrial production, economic growth, and job security.

In an effort to dispossess and control their workforce, actors in the naval stores industry dehumanized labourers. Though this was accomplished through numerous means, dehumanization often occurred by comparing labourers to animals, either directly or indirectly. From the industry's beginnings in the mid-nineteenth century to its end in the 1940s, Black workers constituted the majority of the workforce (Outland 60, 280; Hodges 44; Mason 94). Many were forced into these difficult and low-paying jobs first through slavery and then convict leasing and debt peonage. During the Postbellum Period, for instance, naval stores operators relied upon incarcerated Black men as a primary labour source (Shofner 14). Immigrant labourers – including Crackers, people from the border region of England and Scotland – also worked the pines, though in fewer numbers (Ray *Ecology*, 160, 162; Earley 80). While men held most jobs, women and children worked as dippers during the summer months (Hickman 126). A form of ongoing 'economic bondage' carried over from slavery, the naval stores industry subjected workers to 'coercion, brutal treatment, and other abuses', including fights, shootouts, and death (Hickman 140, 141, 145). During the Antebellum Period, enslaved naval stores labourers likely 'endured harsher working and living conditions than bondsmen on a typical

agricultural plantation' (Outland 60). Resin caused dermatitis; the vapours and fumes from turpentine distillation gave workers asthma; turpentine was ingested accidentally which could lead to abdominal irritation; the heating of resin often resulted in severe burns; and labourers lived in 'isolated camps' distanced from other communities (Outland 22, 90-91, 44). The white resin streaming down the sides of longleaf trees looked like 'ghosts in the moonlight staring' or, more worryingly for Black labourers, white hooded figures reminiscent of the Ku Klux Klan (McQueen 17). Partly informed by these horrific working and living conditions and partly by overt racism, Cracker immigrants were considered 'poor white trash', and Black labourers were called 'tar heels', a racial epithet before it became a Confederate phrase of endearment (Earley 80, 96).

In his 1962 history of the longleaf pine industry in Mississippi, Nollie Hickman reproduces the dominant views of, and attitudes toward, Black workers that were common throughout the naval stores industry. Associating Black labourers with primal animality, he describes 'drunken orgies,' loose marriages, chaotic living quarters, overindulgence of food, and rampant illnesses ranging from 'malarial fevers' to 'colds and venereal diseases' (149, 151). In a particularly racist and dehumanizing statement, he declares, 'The turpentine Negro was illiterate, ignorant, unambitious, diseased, skilled only in the crude simple tools of his trade, and almost wholly subject to the whims and caprices of his employer' (152). These attitudes were reflected in sample cost schedules published in trade magazines that placed items such as 'mule feed' beside estimated labour costs for chipping (Blaine 12). Similarly, in a move that reproduced historical labour hierarchies while naturalizing logics that associated Black individuals with animals, bosses tasked Black workers with caring for the work animals, milk cows, hogs, and chickens kept in company camps (Walker 29; Butler 127, 131). Labourers were, of course, far from the caricatures and passive victims Hickman and others described. Some escaped the violent and oppressive naval stores camps to find work elsewhere, while others worked to make the best lives for themselves amid challenging conditions, collecting, for example, a variety of plants from the longleaf forests to treat their ailments and providing social and economic support to one another (Outland 92; Shofner 17). In her folklore collection

Mules and Men, ethnographer and author Zora Neale Hurston describes how Black workers mixed small doses of turpentine with plant root extracts to cure sexually transmitted infections (340-41).

While the naval stores industry produced multiple products from the same raw material, the logging industry produced variations of a single product that could be used in numerous applications. A highly versatile wood, longleaf pine became desired in the United States and much of Europe – particularly Britain, Germany, and France – for its hardness, strength, beauty, and durability, especially its resistance to decay (Hickman 184, 195, 3). In the US, longleaf lumber was predominantly used for framing, interior finishing, flooring, ship building, rail transportation, telecommunication infrastructure, roofing, and fencing (Mattoon 15; Hickman 3). As early as 1824, American botanist Stephen Elliott explained that longleaf pine 'is more extensively used than any other species of timber we possess' (637). In his study of regional plants growing in South Carolina and Georgia, Elliott writes:

> For the frames, the covering, and even the roofing of houses, [longleaf] is used wherever cypress cannot be obtained; for the flooring of houses, it is preferred to any wood that is known. It is extensively used in ship-building, for the beams, plank, and running timber of vessels. It is used to make the casks in which we ship our rice, and the fencing of our plantations. (637)

Central to settler infrastructures and industries, longleaf played an outsized role in the development of the nation's economy.

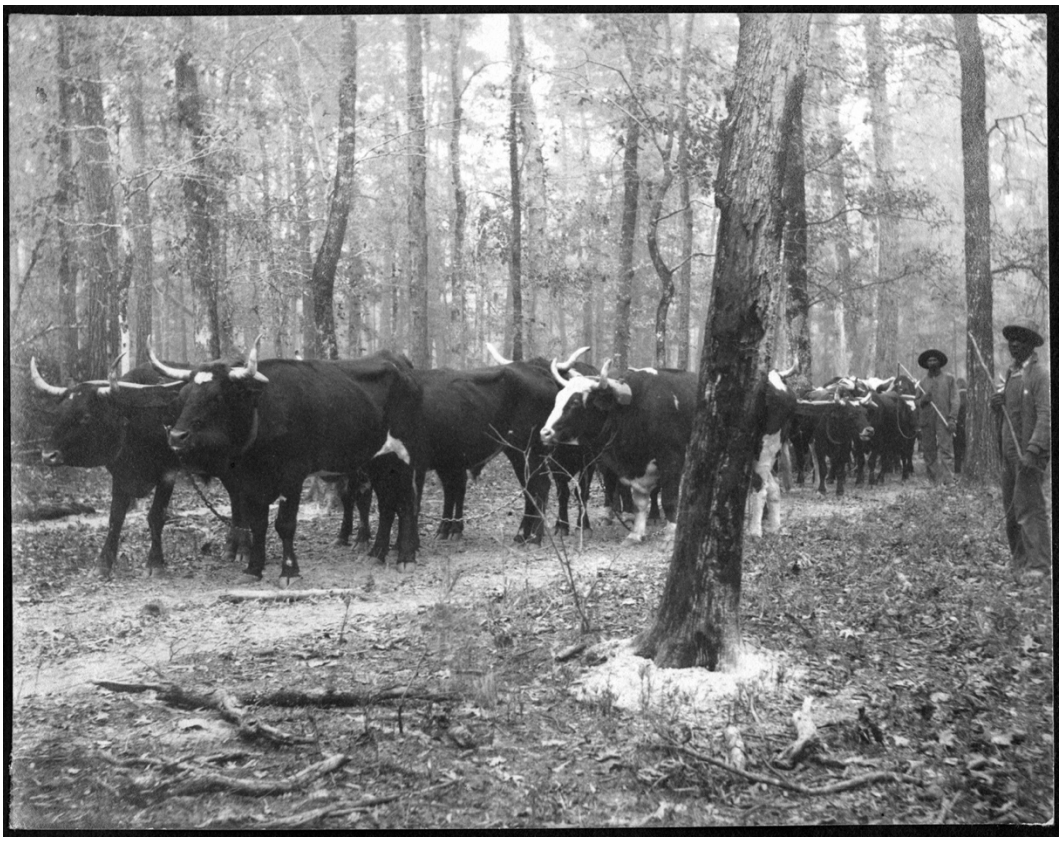

Fig. 4. Oxen and Drivers. Courtesy of The History Center, Diboll, Texas.

Logging and milling businesses, much like the naval stores industry, relied upon a workforce of disenfranchised labourers. Organized predominantly by race, class, and gender, longleaf logging and sawmill crews reflected the deep social and economic divisions that structured life in the US South. White men typically held 'management and skilled blue-collar jobs', while Black men and, to a lesser extent, Mexican, Italian, and Irish immigrants performed the dangerous and strenuous labour (Barnett and Lueck 41, 10). Drawing upon a longstanding science of naturalizing race and justifying racial hierarchies, industry bosses believed that the Black worker 'was perhaps better adapted than the white man to the usual tasks inside the mills' because they 'stood the great heat as well as the swamp fevers', they possessed 'superior strength and endurance', and they were able to perform 'the simplicity of tasks' required of longleaf labourers (Hickman 41, 245, 244). Operators pointed to similar reasons for favouring

animals such as oxen, mules, horses, and donkeys, and routinely drew comparisons across species boundaries. Hickman, for instance, compared Black mill workers with an ox and a steam engine, noting the human-animal-machine triad that enabled nineteenth- and twentieth-century industrial operations. 'The average Negro, unspoiled by education and life in the city', he writes, 'was, if dealt with properly, the best type of mill labor [*sic*], as patient as an ox and as reliable as a steam engine' (Hickman 244). Such language permeated day-to-day operations on logging and milling crews where Black and animal labourers, like the two men and the team of oxen pictured in Figure 4, worked alongside one another. The boss who oversaw a lumbering crew, for example, was called the 'bull of the woods' (Barnett and Lueck 13).

Animal labourers worked together with loggers and millers, performing tasks that ranged from skidding freshly sawn timber to hauling carts of lumber, transporting labourers and supplies, and keeping workers company through the loneliness and isolation of their work. Operators paired specific breeds, and even individual animals, with particular tasks and environments. Oxen were preferred for hauling logs in 'low wet country and boggy swamps' because 'they were less susceptible to bogging than were other draft animals' (Hickman 105). They were also said to require less feed than mules and horses, and 'when not actually working, they could be turned loose on the open range to graze without cost to their owners' (McCabe and Tiner 14; Hickman 105). A typical logging team consisted of several animals, each of whom occupied a specific position. A large five-yoke team, for example, paired oxen in the following order beginning with the wagon tongue: 1) the tongue steers, 2) the grab steers, 3) the swing steers, 4) the lead swing steers, and 5) the lead steers (Appleyard 73). On dry ground, however, logging operators deployed mule teams led by highly skilled workers called 'mule skinners', to haul or 'snake' cut logs to loading sites generally less than a mile away (Barnett and Lueck 14; Kenley 3). Viewed as 'smarter', 'less high-strung', 'more tolerant of injury', 'less excitable', and more 'docile', mules were widely preferred over the Percheron and Belgian horses employed in dry environments (Barnett and Lueck 14; McCabe and Tiner 14; Appleyard 73). The 'draft mules' involved in logging were also tolerant of the machinery, equipment, and noises of industrial logging and milling operations (Ellenberg 7, 20). For example, mules 'intuitively adjusted to the use of the high-wheel cart or when logs were skidded with choker

setters [a cable device used to skid logs] fastened to tongs' (Barnett and Lueck 14). Animal labourers were often given names that reflected their personalities; two oxen working for the Southern Pine Lumber Company were called 'Rough' and 'Rowdy,' for instance. Some, like the mules 'Molly' and 'Dolly' who accumulated 'a lot of affectionate beaus' around the Southern Pine logging camps (Walker 29), even attained semi-celebrity status. When paired with the proper environment and job, the ideal animal labourer required minimal expenditure, tolerated busy workplaces, and performed physically demanding work for long periods of time. Of course, many 'animal rebels' resisted the use of their labour by running away from worksites, refusing to work, and retaliating, all common practices in capitalist economies dependent upon animal labour (Colling xxx).

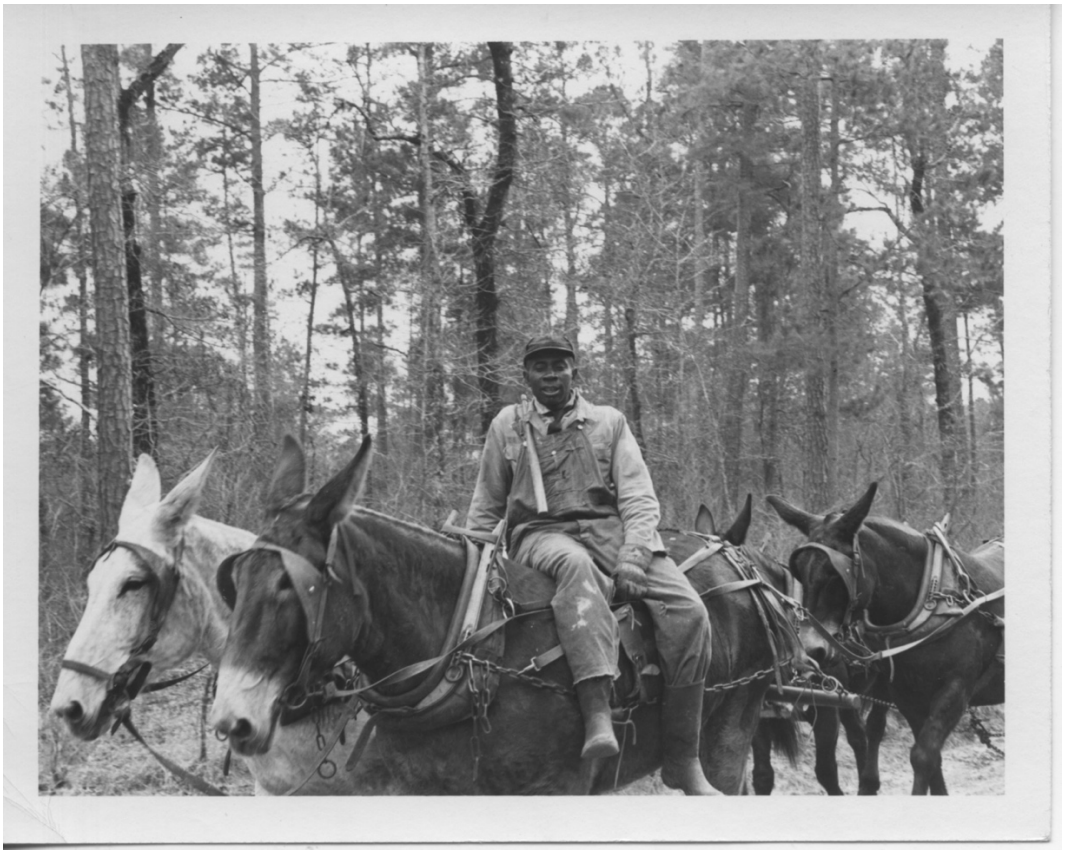

Fig. 5. Mule Skinner Sitting atop Mule.
Courtesy of The History Center, Diboll, Texas.

Black men usually worked as mule skinners, forming deep relationships with the mules they drove through a combination of coercion, affection, and trust. Silviculturist James Barnett and geologist Everett Lueck remarked, 'Uncanny partnerships formed between the skinner and his animals; mules learned to respond to oral commands like *gee* and *haw* for right and left, respectively' (14). When properly trained and handled, teams of mules worked in unison with mule skinners, together becoming 'helpmate[s]' in the woods (Leighton 52). Figure 5 pictures Namon Calhoun, a mule skinner working for the Southern Pine Lumber Company, riding atop a mule in a larger team. Calhoun's relaxed body language suggests that he felt at ease within the group and knew the animals well. Moreover, the calm appearance of the mules implies that they felt a degree of comfort. Barnett and Lueck explain, 'It seemed the mules and mule skinners loved each other, understood each other, and respected each other' (15). Mule skinners used a whip – like the one Calhoun has draped over his right shoulder – to force the mules to work, though it was said that the whip never touched hide and that it was lined with soft cotton (Barnett and Lueck 15). Such accounts sit uneasily, however, with oral histories that describe patterns of abuse directed toward working animals. Asbury Grace, a mule skinner and logger who worked for the W.T. Smith Lumber Company in Alabama, recounted whipping mules who 'wouldn't work right' in order to 'learn them a thing or two' (Appleyard 76), for instance. As geographer Yi-Fu Tuan argues, human-nonhuman relationships often develop through a combination of dominance, affection, and exploitation.

The widespread implementation of animal labour and animalizing logics illustrates the extent to which animal labourers participated in the extinction-producing economy of the US South. Animals and humans worked alongside one another to damage and remove the longleaf forests until their exhaustion, showing that '[m]any human and animal work-lives [were] entangled or even interdependent' (Coulter 1). Most immediately, their activities caused severe population declines for the numerous species that co-evolved with longleaf pines. Ray observes:

> A clan of animals is bound to the community of longleaf pine. They have evolved there, filling niches in the trees, under the trees, in the grasses, in the bark, under ground.

> They have adapted to sand, fire, a lengthy growing season, and up to sixty inches of rain a year. Over the millennia, the lives of the animals wove together. (*Ecology* 141)

The loss of longleaf unravelled the myriad lifeways and relationships associated with this multispecies community. As van Dooren explains, '[E]xtinction takes the form of an unraveling, a breaking down of existing patterns of relationship' ('Extinction' 172). Fire exclusion practices and policies only exacerbated this loss. Seen as a destructive evil that threatened people's livelihoods, fire was widely discouraged, even by logging companies that insisted on keeping clear-cut land unburned (Way 286). One longleaf forester, for example, mistakenly wrote in 1925, 'Every informed and right-thinking person knows that the stopping of forest fires is the first step in the reproduction of forests' (Mattoon 54). Having evolved in a lightning-prone region, however, longleaf pine is exceptionally adapted to large-scale burns. Without fire to expose the soil and suppress the growth of competing species, longleaf seeds rarely germinate and, if they do, they seldom mature. By withholding fire and removing longleaf pines from their native lands, the naval stores and logging industries harmed the multispecies communities that depended upon the piney woods and passed this loss onto subsequent generations.

Inheriting Loss

Across the US South, human and nonhuman communities felt the absence of longleaf forests. For some, the loss produced a nostalgic yearning for pre-industrial, pastoral society. Hickman describes this emotional pining when he notes that those 'born and raised in the piney woods … experience[d] a feeling of loss and longing for the forest world of their childhood' after the forests were cut (2). For the families and individuals who relied upon income from the extinction-producing economy, the loss produced intergenerational poverty and long-lasting inequities. Ray's Cracker ancestors, a collection of people she names 'longleaf pine settlers', worked in sawmills and clear-cut the area around the town of Baxley, Georgia, during the late-nineteenth century (*Ecology* 85). The local logging and sawmill industry collapsed soon after her family cut the forest, plunging a group of people already struggling to achieve social ascendancy into financial turmoil and uncertainty. 'More than anything else,' Ray reflects, 'what happened

to the longleaf country speaks for us. These are my people; our legacy is ruination' (*Ecology* 87). Finally, for all those who inhabited places of pine, the loss of longleaf disrupted the myriad relations and ways of being that came into existence with the tree and its associated species, some better and some worse than others. The flatwoods salamander became endangered; farmed animals labouring in the longleaf industry transitioned back to the agricultural and mining sectors; and community activities dependent on the tree, such as syrup boiling, came to an end.

As these disruptions to everyday life suggest, species loss and its effects were experienced differently among distinct communities and continued long after the tree's extirpation. Asking how longleaf removal impoverished her family, her sense of place, and her ecological relations, Ray takes up the problem of inheritance in her memoirs *Ecology of a Cracker Childhood* and *Wild Card Quilt*. For her, the decimation of longleaf has been a cumulative violence passed down from one generation to the next until it damaged her relationships with place. A 'child of pine' (*Ecology* 5), Ray cannot separate her understanding of self from the pinewoods. Calling attention to her inherited history, she writes, 'The memory of what they [her Cracker ancestors] entered is scrawled on my bones, so that I carry the landscape inside like an ache. The story of who I am cannot be severed from the story of the flatwoods' (*Ecology* 4). The formal organization of *Ecology of a Cracker Childhood* – particularly the oscillation of chapters on her family history followed by shorter chapters on the ecology of longleaf pines – further underscores Ray's entangled relations. Her feeling of 'ache' arises from the gulf between her identification with longleaf pine ecologies and their elimination that was caused, in part, by her forebears. Personal narratives provide Ray with a 'powerful tool … for criticizing [and] resisting modernization and colonization' (Heise 23). The interconnected legacies of turpentining, logging, and fire exclusion, she observes, have produced widespread suffering and cultural impoverishment.

> When we consider what is happening to our forests – and to the birds, reptiles, and insects that live there – we must also think of ourselves. Culture springs from the actions of people in a landscape, and what we, especially Southerners, are watching is a daily erosion of unique folkways as our native ecosystems and all their inhabitants

> disappear. Our culture is tied to the longleaf pine forest that produced us, that has sheltered us, that we occupy. (*Ecology* 271)

By refusing to separate cultural practices, beliefs, and identities from the environments that make them possible, Ray draws connections between species loss, societal poverty, and diminished resilience. She goes on to explain:

> We recognize that the loss of our forests – which is to say of health, of culture, of heritage, of beauty, of the infinite hopefulness of a virgin forest where time stalls – is a loss we all share. All of our names are written on the deed to rapacity. When we log and destroy and cut and pave and replace and kill, we steal from each other and from ourselves. We swipe from our past and degrade our future. (*Ecology* 271-72)

An inherited collection of activities, extirpation spills into the present and the future, denuding lands, cultures, and selves.

Even though she has only known the absence of longleaf pines, Ray feels that she has inherited not only a sense of self arising from the trees, but also the burdens and responsibilities attached to the violence committed by her settler relatives on the pinewoods. Such ecological inheritance places Ray in two seemingly impossible positions: she identifies with a tree species and set of relations that she cannot directly experience, and she assumes responsibility for violence she did not perform. Ray understands her sense of self as emerging from the historical presence and contemporary absence of pinewoods. She writes in *Wild Card Quilt*:

> I often can't tell where my body ends and the earth begins. What became painfully clear was how much wildness we had already lost in Georgia. As the forests dwindled, so did my spirit. How can a place produce a person it cannot sustain? (180)

Though the region remains largely devoid of longleaf forest, the land provides continual reminders of the ecologies and relations that used to exist. Living in a place fundamentally altered through species loss draws Ray into the contradiction identified at the outset of this article: how can she, as a person of longleaf, live amid deforested ecologies, or 'blasted landscapes' (Tsing), where relations with pine forests are no longer possible?

The only way to repair the multispecies communities and the relationships and senses of self inherited from the eradication of longleaf pine, Ray argues, is to intervene in the historical and ongoing loss. She describes the task ahead as an ongoing commitment to mending damaged ecologies through personal involvement, historical awareness, and sustained effort. Together, these activities constitute what extinction studies scholar Rick De Vos calls 'counter-extinction practices' (10).

> My heart daily grows new foliage, always adding people, picking up new heartaches like a wool coat collects cockleburs and beggar's-lice seeds. It gets fuller and fuller until I walk slow as a sloth, carrying all the pain [my ancestors] … and so many others tried to walk from. Especially the pain of the lost forest. Sometimes there is no leaving, no looking westward for another promised land. We have to nail our shoes to the kitchen floor and unload the burden of our heart. We have to set to the task of repairing the damage done by us and to us. (*Ecology* 103)

Ray understands 'the task of repairing the damage done by us and to us' as a project of the heart, one that involves taking responsibility for wrongs and actively intervening in ways that support and foster more liveable worlds. By viewing her home as 'fractured, fragmented, complicated, and layered' through the 'counter-nostalgic' lens of the damaged present, Ray strives to envision an improved future (Ladino 91).

Inheritance, as Ray conceptualizes it, becomes more than the fractured material and social conditions left behind in the wake of species loss. Instead, inheritance becomes 'worlding work' (van Dooren *The Wake*, 74), an obligation to fashion better worlds out of the ruins of industrial modernity. As a keyword for critical animal studies, inheritance ensures that 'the question of how to inherit histories is pressing, and how to get on together is at stake' (Haraway 35), even several decades after the extirpation of a species. For the purposes of this article, inheritance involves understanding how extinction-producing economies strategically deploy animal labour and animalizing discourses to meet their extractive goals. For the wider objectives of critical animal studies as it engages the topic of extinction, inheritance focuses attention on how loss is experienced differently across temporalities, scales, historical contexts, and species boundaries.

Works Cited

Appleyard, John. *The W.T. Smith Lumber Company: A Chronicle*. Pace Printer, 2000.

Barnard, John Levi. 'The Cod and the Whale: Melville in the Time of Extinction.' *American Literature*, vol. 89, no. 4, 2017, pp. 851-79.

Barnett, James P., and Everett W. Lueck. 'Sawmill Towns: Work, Community Life, and Industrial Development in the Pineywoods of Louisiana and the New South.' *General Technical Report SRS-257*, United States Forest Service, November 2020, pp. 1-68.

Blaine, John M. 'A Clean Cut Statement of Actual Conditions the Naval Stores Producer Faces.' *Savannah Weekly Naval Stores Review and Journal of Trade*, p. 12, 'Naval Stores' folder, 'Natural Resource – New England' box, Forest History Society Library and Archives, Durham, NC.

Brockway, Dale G. et al. 'Restoration of Longleaf Pine Ecosystems.' *General Technical Report*, United States Department of Agriculture, October 2006, pp. 1-34.

Butler, Carroll B. *Treasures of the Longleaf Pines: Naval Stores*. Tarkel Publishing, 1998.

Buttrick, P.L. 'Commercial Uses of Longleaf Pine.' *American Forestry*, September 1915, Forest History Society Library and Archives, Durham, NC, pp. 896-908.

Chrulew, Matthew. 'Saving the Gold Lion Tamarin.' *Extinction Studies: Stories of Time, Death, and Generations*, edited by Thom van Dooren, Deborah Bird Rose, and Matthew Chrulew. Columbia University Press, 2017, pp. 49-88.

Colling, Sarat. *Animal Resistance in the Global Capitalist Era*. Michigan State University Press, 2021.

Coulter, Kendra. *Animals, Work, and the Promise of Interspecies Solidarity*. Palgrave Macmillan, 2016.

Dawson, Ashley. *Extinction: A Radical History*. OR Books, 2016.

De Vos, Rick. 'Provocations from the Field: Extinction, Encountering and the Exigencies of Forgetting.' *Animal Studies Journal*, vol. 6, no. 1, 2017, pp. 1-11.

van Dooren, Thom. 'Extinction.' *Critical Terms for Animal Studies*, edited by Lori Gruen. University of Chicago Press, 2019, pp. 169-81.

---. *Flight Ways: Life and Loss at the Edge of Extinction*. Columbia University Press, 2014.

---. *The Wake of Crows: Living and Dying in Shared Worlds*. Columbia University Press, 2019.

Earley, Lawrence S. *Looking for Longleaf: The Fall and Rise of an American Forest*. University of North Carolina Press, 2004.

Ellenberg, George B. *Mule South to Tractor South: Mules, Machines, Agriculture, and the Transformation of the Cotton South*. University of Alabama Press, 2007.

Elliott, Stephen. *A Sketch of the Botany of South-Carolina and Georgia*, vol. 2, J.R. Schenck, 1824.

Haraway, Donna. *When Species Meet.* University of Minnesota Press, 2006.

Heise, Ursula. *Imagining Extinction: The Cultural Meanings of Endangered Species*. University of Chicago Press, 2016.

Hickman, Nollie. *Mississippi Harvest: Lumbering in the Longleaf Pine Belt 1840-1915*. University of Mississippi, 1962.

Hodges, Alan W. 'The Naval Stores Industry.' *The Longleaf Pine Ecosystem: Ecology, Silviculture, and Restoration*, edited by Shibu Jose, Eric J. Jokela, and Deborah L. Miller. Springer, 2006, pp. 43-50.

Hurston, Zora Neale. *Mules and Men*. J.B. Lippincott Company, 1935.

Jackson, Zakiyyah Iman. *Becoming Human: Matter and Meaning in an Antiblack World*. New York University Press, 2020.

Kenley, Dave. 'Oral History Interview.' By John Larson, 1954, Forest History Society Library and Archives, Durham, NC.

Ladino, Jennifer. 'Longing for Wonderland: Nostalgia for Nature in Post-Frontier America.' *Iowa Journal of Cultural Studies*, vol. 5, no. 1, 2004, pp. 88-109.

Leighton, Albert C. 'The Mule as a Cultural Invention.' *Technology and Culture*, vol. 8, no. 1, 1967, pp. 45-52.

Mason, Laura. *Pine*. Reaktion, 2013.

Mattoon, Wilbur R. 'Longleaf Pine.' *Department Bulletin No. 1061*, United States Department of Agriculture, August 1925, pp. 1-67.

McCabe, Paul P. and Elizabeth Tiner. 'Mule-Logging: A Dying Art?' *Alabama's Treasured Forests*, Spring 1992, Forest History Society Library and Archives, Durham, NC, pp. 14-15.

McKee, E.R. 'The French Turpentining System Applied to Longleaf Pine.' *Department Circular 327*, United States Department of Agriculture, October 1924, pp. 1-16.

McQueen, Anne. 'The Cry of the Pines.' *The Long Leaf Pine*, by Thomas P. Ivy. The Sandhill Citizen Print, 1923, Forest History Society Library and Archives, Durham, NC, p. 4.

Neel, Leon. *The Art of Managing Longleaf: A Personal History of the Stoddard-Neel Approach*. University of Georgia Press, 2012.

Nixon, Rob. *Slow Violence and the Environmentalism of the Poor*. Harvard University Press, 2011.

Outland, Robert B. *Tapping the Pines: The Naval Stores Industry in the American South*. Louisiana State University Press, 2004.

Ray, Janisse. *Ecology of a Cracker Childhood*. Milkweed Press, 1999.

---. *Wild Card Quilt: The Ecology of Home*. Milkweed Press, 2004.

Rose, Deborah Bird. *Shimmer: Flying Fox Exuberance in Worlds of Peril*. Edinburgh University Press, 2022.

---. *Wild Dog Dreaming: Love and Extinction*. University of Virginia Press, 2011.

Rose, Deborah Bird, et al., editors. *Extinction Studies: Stories of Time, Death, and Generations*. Columbia University Press, 2017.

Schwarz, G. Frederick. *The Longleaf Pine in Virgin Forest: A Silvical Study*. John Wiley & Sons, 1907.

Shofner, Jerrell H. 'Forced Labor in the Florida Forests, 1880-1950.' *Journal of Forest History*, 1981, Forest History Society Library and Archives, Durham, NC, pp. 14-25.

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

Tsing, Anna Lowenhaupt. *The Mushroom at the End of the World*. Princeton University Press, 2015.

Walker, Laurence C. *Axes, Oxen, and Men: A Pictorial History of the Southern Pine Lumber Company*. The Angelina Free Press, 1975.

Way, Albert G. 'Burned to be Wild: Herbert Stoddard and the Roots of Ecological Conservation in the Southern Longleaf Pine Forest.' *Environmental History and the American South: A Reader*, edited by Paul S. Sutter and Christopher J. Manganiello. University of Georgia Press, 2009, pp. 500-26

Acknowledgments

I would like to thank the High Meadows Environmental Institute at Princeton University, the Forest History Society, and The History Center for generously supporting this research. Special thanks go to Eben Lehman and Steve Anderson at the Forest History Society for sharing their archival knowledge. Parts of this article have appeared in my dissertation 'Multispecies Memoir: Self, Genre, and Species Justice in Contemporary Culture'.